

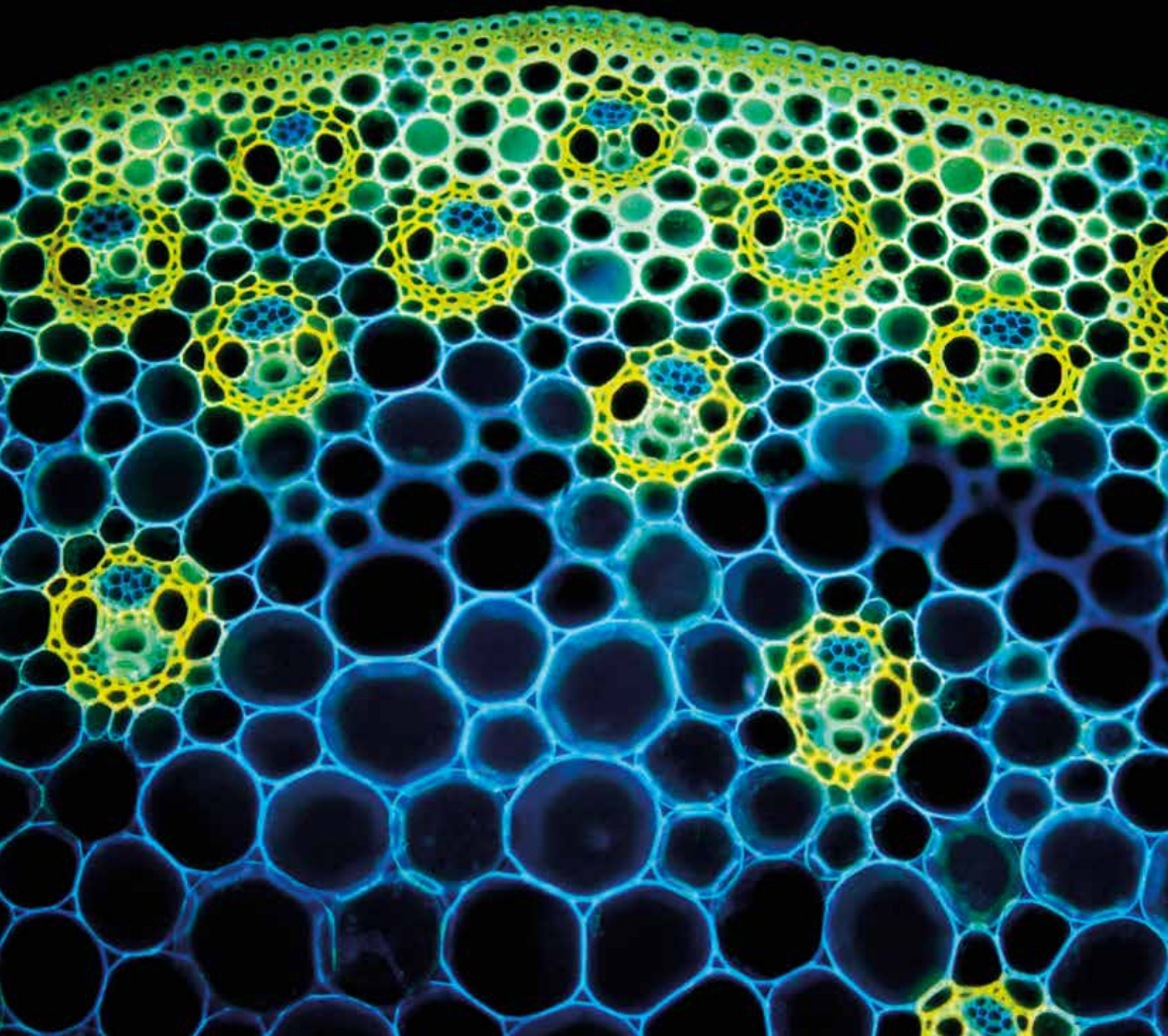


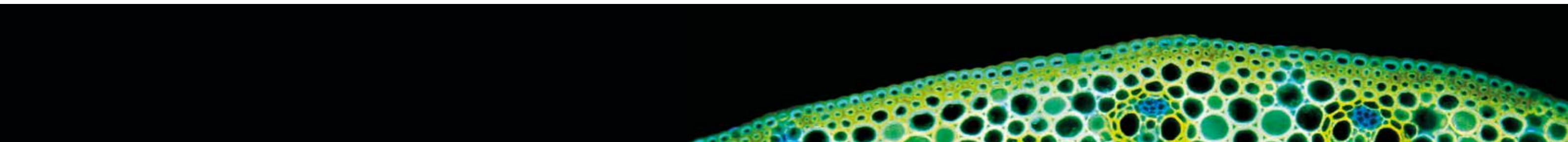
**International
Science Council**

The global voice for science

ADVANCING SCIENCE AS A GLOBAL PUBLIC GOOD

ACTION PLAN 2019 – 2021





Cover Photo Credit: MAGDA TURZANSKA / SCIENCE PHOTO LIBRARY (Magnification: x360 when printed at 10 centimetres across).

The photo on the front cover of the ISC Action Plan represents a section of vascular tissue from a stem of the maize plant (*Zea mays*). The green bundles contain the tissues responsible for transporting water and nutrients. This particular sample has been stained with berberine and imaged under an ultraviolet light, causing the berberine to fluoresce.

Why we have chosen this photo for our Action Plan cover

This single section of a maize stem allows us to reflect on how we grow our food sustainably and responsibly, how we feed the population, how we lift people out of poverty, how we work towards the UN 2030 Agenda for Sustainable Development and ultimately, the crucial role that science has in identifying transformative pathways towards the sustainable and equitable use of planetary resources. The image also evokes a feeling that the maize stem is a celestial body, and we recall the famous photograph “Earthrise,” taken by astronauts during the Apollo 8 mission, which first allowed us to see our home as a fragile and vulnerable planet.

Inside photos:

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● PREFACE

This document sets out the International Science Council's (ISC) goals for action over the next two and a half years. Its most important purpose is to form a practical framework for the ISC's work, in all of its key functions, until the end of 2021. It therefore gives effect to the Council's vision and mission, contained in the high-level strategy published on the occasion of the Council's launch in 2018. In addition, it will serve as a basis for active engagement with ISC members, and as a point of departure for dialogue and cooperation with partners and funders who share our objectives.

The Action Plan is intended to be a living document, allowing the ISC the flexibility to respond to new and emerging opportunities, and to adapt to ongoing strategic reflection and development. It will also provide a basis for continual monitoring and progress reporting to members and other stakeholders.

At the heart of the Action Plan is a selection of projects and programmes that are relevant to all scientific fields and all parts of the world. Some of these are already in progress; others are ready for development. Many encompass and build on ongoing ISC activities, including the Council's portfolio of international research programmes, scientific committees, networks, data bodies and observing systems.

PROCESS OF DEVELOPMENT

The Action Plan was initiated at the October 2018 meeting of the ISC Governing Board. At that meeting, members of the Board identified four domains of critical importance for contemporary science. A review of existing activities was also undertaken to explore how these domains were already being addressed. Following this initial phase of priority setting, Governing Board Working Groups were established to develop, with support from the Council's headquarters team, plans for the Council's work on science, on freedom and responsibility in science, on outreach and engagement, on finance and fundraising, and on the future of the ISC's existing regional structures. The process of science planning included consultation with members on a series of projects and programmes, which have since been further reviewed by external experts. This eight-month planning period concluded during the June 2019 Governing Board meeting.

IMPLEMENTATION

Our success in implementing the ambitious plans set out in this document will depend on the support and involvement of all the Council's members and partners. The implementation process will be overseen by the Governing Board, assisted by four specialized Standing Committees which have recently been appointed on the basis of nominations from members. Their respective remits are for: Science Planning, Freedom and Responsibility in Science, Outreach and Engagement, and Finance and Fundraising. Each of the Committees convenes a rich set of expertise and networks, and is chaired and vice-chaired by members of the Board, providing close alignment with the Board's activities.

CALL TO ACTION

The Action Plan effectively launches the ISC's global call to action – a call that aims to motivate and activate our growing membership to engage in the ISC's projects and programmes listed under our four domains of impact – the 2030 Agenda for Sustainable Development; The Digital Revolution; Science in Policy and Public Discourse, and The Evolution of Science and Science Systems. The ISC seeks partnerships with members, with other international scientific organizations, with funders and with stakeholders in the public and private sectors who are inspired by the actions presented in the Plan and who want to join us and who share the ambitions captured in our global call.

The next three years will be crucial for the Council. One year on from the merger of its two predecessor organizations (ICSU and ISSC) and the launch of the ISC, we need to harness the support behind the merger in order to deliver on its promise to build a stronger global voice for science. In what may be a challenging environment for science, we as scientists have the responsibility to deliver knowledge that can help find solutions to the complex problems facing societies worldwide. The Council's Action Plan is commensurate with the challenges we face, and is designed to make our unique contribution as the global voice for science. It represents a first step, and, indeed, a commitment to our vision of science as a global public good. We look forward to working with you to make that vision a reality.

Daya Reddy,
President, International Science Council,
September 2019



International Science Council Governing Board 2018 - 2021

Row 1: Renée van Kessel, Pearl Dykstra, Melody Burkins, Elisa Reis, Daya Reddy, Peter Gluckman, Sirimali Fernando, Heide Hackmann (ex-officio).

Row 2: Li Jinghai, Geoffrey Boulton, Saths Cooper, Alik Ismail-Zadeh, James C. Liao, Anna Davies, Natalia Tarasova

Absent: Martin Visbeck, Ruth Fincher

1

ISC VISION AND MISSION

The International Science Council (ISC) is the world's premier representative scientific organization. It works at the global level to catalyse and convene scientific expertise, advice and influence on issues of major concern to both science and society. Its role is growing in need and importance in a world of growing complexity and pressing global challenges.

The ISC was launched in 2018 following a merger of the International Council for Science, which was created in 1931, and the International Social Science Council, created in 1952. The Council's growing membership includes more than 140 national and regional academies, research councils and other scientific organizations, and 40 international scientific unions and associations. Through its members and associates, its partnerships with other international scientific organizations, UN agencies and inter-governmental bodies, and its wider networks of expertise, the Council is unique in its capacity to bring together scientific excellence and science policy expertise from all fields of science and all regions of the world.

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

The mission of the International Science Council is to be the global voice for science; a trusted voice that speaks for the value of all science by:

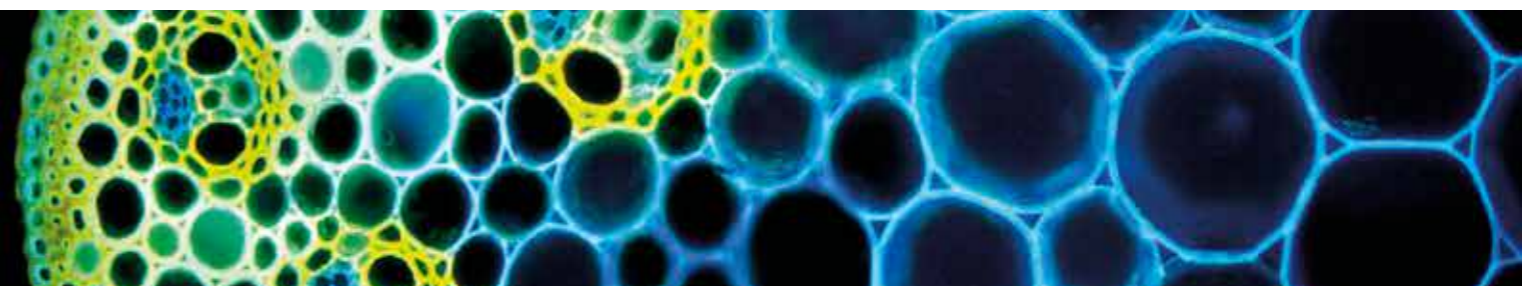
1. Promoting international research and scholarship on key global challenges
2. Increasing evidence-informed understanding and decision-making at all levels of public policy, discourse and action
3. Promoting the continued and equal advancement of scientific rigour, creativity and relevance in all parts of the world
4. Protecting scientific freedom and advocating principles for the responsible practice of science

The Council convenes the scientific expertise and resources needed to lead on catalysing, incubating and coordinating impactful international action on issues of major scientific and public importance.

The Council is governed by an international Governing Board which provides scientific and strategic leadership for the organization, and is advised on key aspects of its work by a number of Advisory Bodies. The Council's global headquarters are located in Paris, France. The ISC currently has regional offices based in Africa, Asia and the Pacific, and Latin America and the Caribbean. A General Assembly of all members is convened every three years.

2

THE CONTEMPORARY GLOBAL CONTEXT



● INTRODUCTION

The ISC has adopted a bold vision that is vitally important in a world of growing complexity and pressing global challenges. Within this context, the Council is committed to supporting the development of all science, from discovery to application, and including the full range of disciplines, from the natural and social sciences to the behavioural, data and technological sciences. It will work with its members to represent, champion and apply science at global, regional and national levels, and to stimulate policies for science that enhance its creativity, maintain its integrity, and continually adapt it to a changing world. As the “global voice for science” the ISC must be responsive to public priorities and concerns. It must promote and apply ways of working that maximise the role of scientific understanding in policy and in public discourse. And it must work to ensure that the science system itself is efficient and creative in these purposes.

Within this broad frame of responsibilities, the Council must prioritise its actions in response to continual assessments of the contemporary global setting. What are the major opportunities and challenges for global society to which science should respond? What are the emerging areas of science that benefit from international cooperation and have major implications for society? And how should the practice of science adapt to the changing environment of demands and opportunities?

MAJOR CHALLENGES FOR SOCIETY TO WHICH SCIENCE SHOULD RESPOND

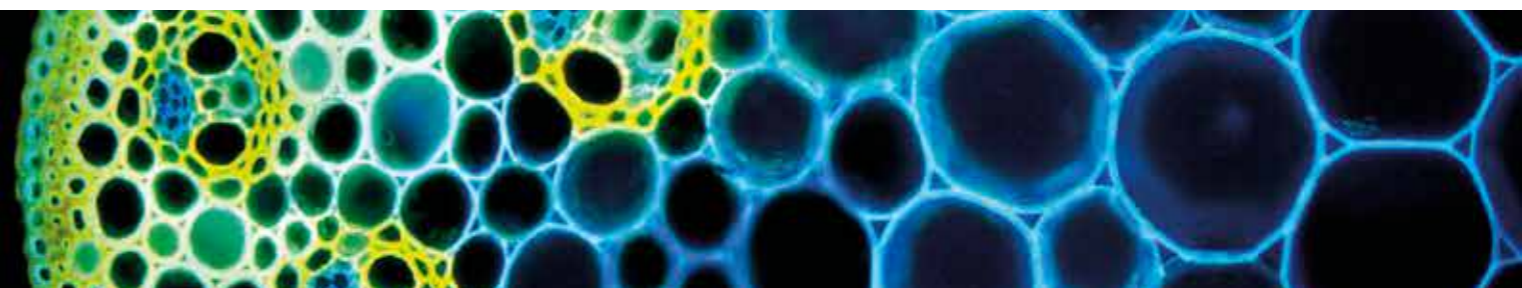
Humanity has become a defining geological force. It has created a novel global ecology which is harmful to many of the natural processes that have created and sustained the Earth’s biosphere, atmosphere and hydrosphere, and that form the bedrock of the human economy and life support system. Human impacts, which continue to grow, are of such a magnitude as to pose a credible existential threat to the wellbeing of the planet’s human population.

Despite enormous progress the world still faces endemic issues of conflict, poverty and inequality, with unsustainable lifestyles, consumption and production patterns. A fundamental challenge to contemporary science is to identify manageable pathways to global sustainability through the complex web of cause and effect connecting planetary, social and economic processes, and to assist in the creation and promotion of policies and public action that can move societies along them. It is a challenge most prominently reflected in the UN’s 2030 Agenda and its set of 17 Sustainable Development Goals. It is associated with calls for more global cooperation and deep social change. But how does equitable cooperation and real social transformation come about and how, if at all, can it be initiated, fostered and steered? What are the possible levers, and who are the potential agents of change? What decision-making processes are required to foster effective and acceptable processes of transformation?

Such imperatives for global society coincide with a technological revolution of historic proportions. Today’s digital technologies are a good example of a ‘general-purpose technology’ that continually transforms itself, progressively penetrating almost all domains of private and public life. It disrupts

existing patterns of behaviour, organization and production and boosts productivity across all sectors and industries because of its cost-effectiveness, with profound economic and social implications. It has ushered in a new era of data-driven science, with concomitant pressures for change in the social organization of science. It has had profound impacts on social networks and public discourse, and enabled novel dimensions of cyber-crime, cyber-warfare and interstate cyber-subversion. It offers widespread challenges to privacy, to many ethical standards, and to legal systems. The global ‘knowledge space’ is increasingly contested through web technologies that do not discriminate between the true and the false, and by technology companies that see benefit in privatizing publicly funded data, with the potential to control access to knowledge. The potential danger is of a society that is less open and more susceptible to the loss of scientific freedom.

These issues arise within a shifting geopolitical frame, where the rules-based international system developed over the past 70 years is under pressure, and international configurations of power and influence are changing. Several decades of globalization have progressively integrated national economies within a global market and increased the mobility of capital and labour, but this process now appears to have stalled in a setting of resurgent nationalism. There has been a global shift of resource and influence from public to private sectors, with a related loss of public capacity to implement major policy shifts in both the national and the international arenas. There has been an increase in both intra and inter-state migration, driven by conflict, climate change, land degradation and annexation. Some states have responded to these trends by increasing barriers to mobility, reflected, for science, in increasing difficulty in traveling for scientific purposes.



EMERGING SCIENCE WITH MAJOR SOCIETAL IMPLICATIONS

The human capital involved in scientific research and its application is greater than ever before, reflecting the centrality of scientific understanding to contemporary human affairs. Major advances have occurred across the whole spectrum of science, partly driven by curiosity about the fundamental processes that animate nature and society, and partly in response to the complexities of a world that needs science more than ever, and where the 'social' and the 'natural' are inextricably entwined.

The vast new data streams created by the digital revolution have provided new resources for discovery, and brought the approaches of artificial intelligence into their own as a powerful, generic suite of methods. They mimic cognitive functions such as trial-and-error learning and pattern recognition that have always been essential components of scientific analysis, but are now supercharged through the data acquisition and processing power of modern digital devices. Their unprecedented capacity to characterize complexity and find optimal solutions for complex problems is relevant to all the sciences, and to all national science systems. They have huge potential for social benefit in providing efficient solutions for human healthcare, in enhancing societal interactions, in creating business opportunities and in enhancing governmental efficiency. But they also create dilemmas through their potential to alter societal dynamics and to disrupt patterns of employment through the creation of learning machines that displace human roles, or through autonomous systems that have the potential to dispense with human decision-makers.

Similarly, deep shifts of capacity and potential are being generated in the life and biomedical sciences, where the discoveries of 20th century genomics have created the foundation for a theoretical fusion of molecular and evolutionary biology. Coupled with new experimental tools, rich data resources and AI, they have created new understanding of genetic and neural systems that offer pathways for solutions to basic problems and applications at every level of organization, from the molecular to whole populations. Such applications lie in the domain of human health and wellbeing, but also in the functioning of the biosphere and the future of life on Earth. Exploiting this wealth of opportunity depends upon integrating contributions from physicists, chemists, computer scientists, engineers, mathematicians and social scientists with the work of biologists. The potential benefits of these technologies are profound, and include gene editing for the treatment of genetic disease or in sustaining food security. At the same time, they raise ethical, philosophical, societal, legal and even existential questions that will sometimes require careful deliberation involving wider society.

Developments in these two domains of science and technology are beginning to converge in ways that have the potential to transform human wellbeing: from brain development, to mental health, to social interaction, to the sense of human autonomy and agency, to the control of identity and privacy, and on to the relationship between the individual and the institutions of civic life. They increasingly draw on many other domains of science and technology, and pose deep questions that require integrated responses from across scientific disciplines.

ADAPTING THE PRACTICE OF SCIENCE TO CHANGING DEMANDS AND NOVEL OPPORTUNITIES

The methods of science have proven to be the most effective means of creating reliable knowledge. In a world of complexity, such knowledge is vital in creating public policy and conditioning public discourse. More effective bridges are required between the science community, the policy communities and the wider public space, and there needs to be greater mutual trust between them.

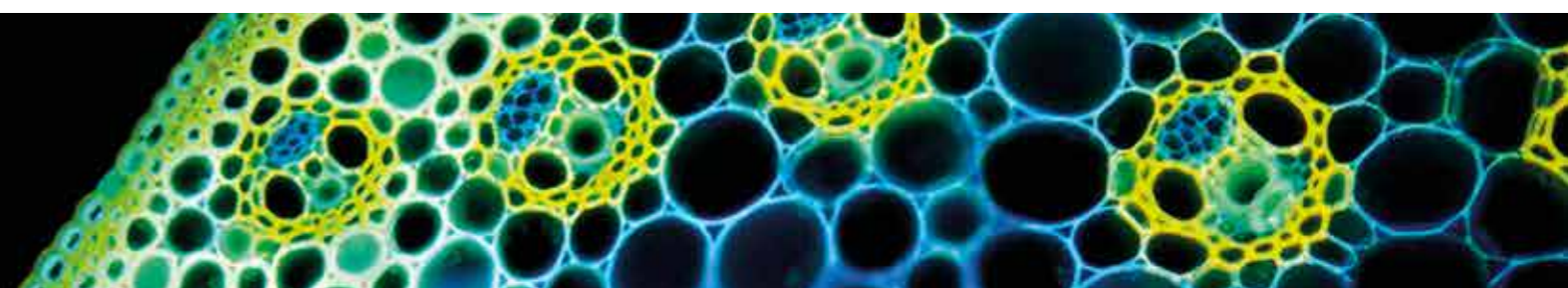
The organization of national and international science systems, and the working habits scientists have developed in earlier eras, are under pressure from changing priorities, technologies and social norms. There are pressures for more effective mobilization of international funding to address urgent global challenges; for strengthened cross-disciplinary collaboration; for the promotion and recognition of under-represented groups; for incentives that are better adapted to current priorities; and for adaptation to the opportunities and challenges of novel developments in science. A particular priority is for open data and open access to scientific results, part of the developing paradigm of a more open and engaged science, and in replacing the perverse incentive systems that have created the current massive global scientific publishing bubble. More than half of all research and development now occurs in the private sector,

including an increasing proportion of basic research. How do the demands on scientists differ between different sectors? Are there standards of integrity and responsibility that should be common to all? Are sector-specific systems of societal dialogue, adaptive regulation and anticipatory governance needed to protect and optimise the public good?

The many changes in the environment in which scientists work inevitably pose questions about the extent of their responsibilities and norms of behaviour, whether they work in publicly or privately funded organizations. What are their responsibilities, and how do they relate to their peers and to other societal stakeholders? A sense of international responsibility in the face of truly global challenges has led to many examples of international cooperation that transcend political difference and societal conflict. The science community, however, is one where some countries and regions have enormous resources to advance and apply science, whilst others struggle to remain engaged. At a time of increased geopolitical complexity, should the science system address global inequalities, encouraging benefit sharing, global exchange and cooperation at all levels? Should the community be an advocate for global science that informs social and political priorities? How should the scientific community act to defend the norms of scientific behaviour when they are under threat?

3

SCIENCE CREATING SOLUTIONS



● INTRODUCTION

The core of this Action Plan is a portfolio of 12 projects and programmes of critical importance to science and to society. All the operations of the Council, whether in strengthening membership engagement, building new partnerships, extending its global reach through improved communications, or mobilizing new resources through more strategic fundraising, are intended to support the successful delivery of these scientific activities and to maximise their impact.

The ISC’s four strategic objectives set out in Section One were adopted by ISC members in 2017 as part of the Council’s High-Level Strategy. They address generic issues that are likely to be relevant to science in any era. In October 2018, the ISC Governing Board identified four ‘domains of impact’ to frame the Council’s scientific work in the coming years. Each represents a landscape of opportunities and challenges, which require thought leadership and action from the ISC as the global voice for science. The domains are headlines for the ISC Action Plan; they are:

Domain One: The 2030 Agenda for Sustainable Development.

Domain Two: The Digital Revolution

Domain Three: Science in Policy and Public Discourse

Domain Four: The Evolution of Science and Science Systems

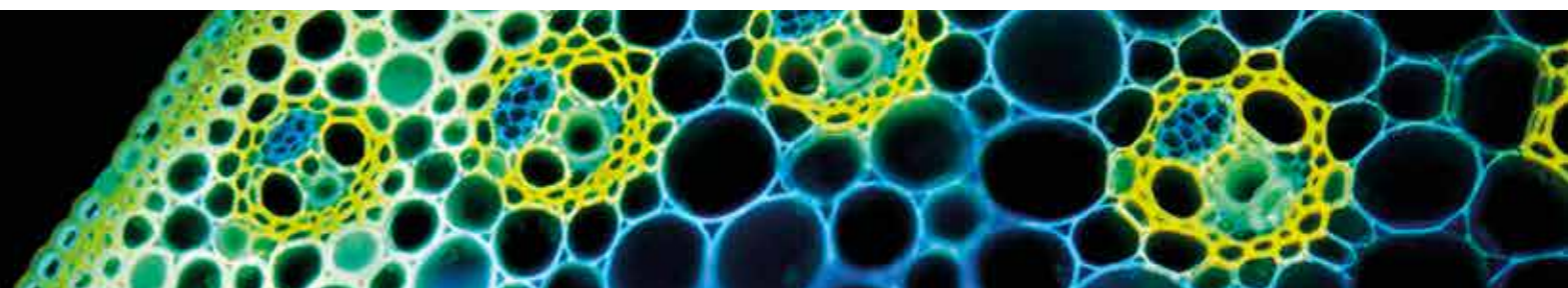
The projects and programmes that the ISC has identified as priorities for action in the coming years are listed in Figure 1 on the next page; and each is described in this Action Plan. They provide a suite of solutions-oriented actions that address major opportunities and challenges within the four domains and provide the basis for a balanced portfolio. There are multiple interconnections and synergies between the domains, projects and programmes, which also build on the ISC’s portfolio of existing activities. The latter include sponsorship of a wide range of global scientific networks and events, the management of international funding programmes, and ISC leadership roles in global policy fora, particularly in the post-2015 development processes of the United Nations. These activities are summarized in Appendix One.

Together, the ISC’s strategic objectives, domains of impact and new projects and programmes emphasize a need for the ISC and the global scientific community it represents to take leadership in providing solutions by supporting science that creates actionable knowledge and shaping policies and practices that enable this.

Figure 1 – Overview of science projects and programmes

Projects/Programmes	Anticipated timeframes				
	July-Dec 2019	Jan-June 2020	July-Dec 2020	Jan-June 2021	July-Dec 2021
Domain One: The 2030 Agenda for Sustainable Development					
1.1 International science for global sustainability: addressing complexity, supporting policy coherence					Ongoing Activity →
1.2 SDG interactions as a national policy driver					
Domain Two: The Digital Revolution					
2.1 Data-driven interdisciplinarity					Ongoing Activity →
2.2 Global data resources and governance					
Domain Three: Science in Policy and Public Discourse					
3.1 Science-policy interfaces at the global level					Ongoing Activity →
3.2 The public value of science					
3.3 Science in the private sector					
Domain Four: The Evolution of Science and Science Systems					
4.1 Gender equality in science: from awareness to transformation					
4.2 Refugee and displaced scientists					
4.3 Open science in the Global South					Ongoing Activity →
4.4 The future of scientific publishing					
4.5 Knowledge production and diffusion as global public goods					

The projects and programmes presented are diverse in their nature, timescale and need for resources. Some are already in progress, while others will be initiated and further developed in the coming two and a half years. The inherent flexibility of this portfolio ensures that the Council will be able to respond to major external developments; ideas or suggestions arising from its members; and new opportunities and emerging issues identified by its Standing Committees.



CRITERIA FOR CHOICE

The projects and programmes that follow were selected from a longer list of proposed actions circulated to ISC members in November 2018. They have been selected on the basis of members' feedback and the following criteria:

- Importance to society or to science itself
- Strategic fit with the ISC vision, mission, and strategic objectives
- Clarity and feasibility of potential pathways to influence and impact
- Timeliness and potential for innovation
- Distinctiveness and relevance of an ISC intervention
- Relevance to ISC members and their activities, and potential for knowledge exchange and policy learning
- Potential for enabling partnerships which could support delivery and impact
- Resource availability

RELEVANCE TO MEMBERS

Strengthening the voice for science and the public recognition of and trust in science strengthens all those engaged in the scientific endeavour. The projects and programmes presented above are designed to be relevant to the interest and priorities of all ISC members. They should be implemented in collaboration with members and bring benefit by creating opportunities for ISC members to:

- shape global priorities for science;
- collaborate on issues of common interest;
- showcase the scientific and societal relevance of their work at the international level;
- bring their scientific and policy expertise to bear on global issues and on challenges facing contemporary science systems;
- strengthen national and international awareness of and support for the scientific communities they represent;
- enhance their influence within scientific and policy communities, including national governments and research funders;
- engage in new networks of knowledge exchange, best practice sharing and policy learning;
- strengthen their capacities through access to information on international scientific developments, engagement in international scientific leadership, and support for the development of structures, skills and competencies; and
- contribute to shaping the funding and policy landscape required to enable supportive environments in which scientific research can flourish.

IMPLEMENTATION

As the ISC moves from planning to action, it will seek partners able to support the Council's projects and programmes. Some members have already indicated an interest in engaging with particular projects. The ISC will now re-engage with members, as well as partner organizations, to explore their involvement in and support for specific projects or programmes. More detailed descriptions of each of the projects and programmes described in this Action Plan will be made available on the ISC website as a basis for these actions. They will serve as initial concept notes for developing results-oriented work and business plans to guide implementation, partnership development and fundraising.

The Committee for Science Planning will regularly monitor and evaluate progress on the development and implementation of the Council's projects and programmes. It will also benchmark progress in realizing the Council's vision of science as a global public good.

ONE

THE 2030 AGENDA
FOR SUSTAINABLE
DEVELOPMENT

Domain One: An improved understanding of the globally coupled natural, physical and social systems of our planet, and the identification of tractable pathways for sustainable and equitable development, are major and urgent tasks. The 2030 Agenda, and the 17 Sustainable Development Goals (SDGs), agreed in 2015 by all 193 Member States of the United Nations, provide an integrated framework for this work. Science is vital to the development and implementation of this agenda and of related post-2015 agendas such as the Paris Agreement under the UN Framework Convention on Climate Change (UNFCCC), the New Urban Agenda (UN-Habitat), and the Sendai Framework of the UN Office for Disaster Risk Reduction (UNDRR).



● 1.1 INTERNATIONAL SCIENCE FOR GLOBAL SUSTAINABILITY: ADDRESSING COMPLEXITY, SUPPORTING POLICY COHERENCE

(Project in progress)

The biggest and most urgent challenges for contemporary science are to identify tractable pathways to global sustainability, and to assist in the creation and promotion of policies and public action that can advance societies along those pathways. Implementation of the 2030 Agenda calls for multi-sectoral, multi-stakeholder collaboration and for greater policy coherence, based on systemic understanding and so-called ‘whole of government’ approaches. The scientific community must be a key partner in the implementation of the global goals at national, regional and global levels. Science can provide critical data, knowledge and innovation to inform society and decision-makers about the opportunities and challenges associated with particular pathways and interventions. It can identify leverage points for social transformations that support greater sustainability.

The SDGs are increasingly a rallying point for scientists, science policy-makers and funders. As the number of science-based initiatives relevant to one or more of the goals increases, so does the potential for duplication, as well as competition for resources and for policy influence. With just over a decade to go to achieve the ambitious goals of the 2030 Agenda, there is a pressing need, and a significant opportunity, to amplify the impact of international scientific efforts through strengthened collaboration and strategic coordination. This should enable critical knowledge gaps and barriers to policy implementation to be identified, leading to the design of mission-oriented priorities for science and the mobilization of increased support for their successful delivery. It should also help to provide easier access to scientific knowledge for all actors, including governments, civil society and the private sector, in working towards the 2030 Agenda.

ANTICIPATED IMPACT

Increased relevance and impact of international scientific input, advice and influence within global policy processes related to the 2030 Agenda.

NEXT STEPS

The ISC will convene a global sustainability science leadership meeting, bringing together relevant international science providers (including ISC co-sponsored research programmes, related initiatives and partner organizations) and key representatives from the global policy community (including UN agencies and programmes). The meeting will seek to secure agreement on a longer-term programme of coordination and collaboration to facilitate strategic exchange, foster synergistic alignment and develop joint scientific actions in response to agreed priorities. The agenda would include discussion on the need to strengthen the science base for a

‘system of systems’ approach to global sustainability through the establishment of a common platform to develop, compare and validate global system models for scenario building and the prediction of system outcomes.

The Council will also continue to convene the global forum of science funders from across national, philanthropic and international development cooperation agencies that met for the first time in July 2019. The meeting resulted in a common call for a decade of global sustainability funding action, aimed at accelerating and amplifying the impact of investments in international science for the SDGs through strategic exchange, alignment and multilateral collaboration.

By bringing together the international science, policy and funding communities in this way, the ISC will lead on the co-design and promotion of critical missions for science in support of the 2030 Agenda.

● 1.2 SDG INTERACTIONS AS A NATIONAL POLICY DRIVER

(Project in progress)

The global ecosystem, of which humanity is an integral part, is a complex system in which interventions designed to achieve specific outcomes require an understanding of the system as a whole. A systems-based approach to addressing the 17 SDGs comprising the 2030 Agenda exposes the nature and extent of interactions between individual SDGs. Positive interactions can produce synergies that in turn lead to policy interventions with multiple benefits, increasing the impact of limited resources and accelerating the successful implementation of the 2030 Agenda. Negative interactions or trade-offs mean that progress in achieving one goal makes it harder to achieve another, undermining hard-won development gains. Interactions will be assessed differently by different stakeholders and in different contexts.

An analysis of SDG interactions, and the identification of the nodes where they are at their strongest, can show policy-makers and practitioners where they can have the greatest possible impact. This approach can also help identify research priorities for the scientific community. It would support existing work on science-for-SDGs roadmapping being undertaken by the UN Technology Facilitation Mechanism’s Inter-Agency Task Team (IATT).

Translating the interactions approach into global, regional, national- and local-level policy is essential if the SDG framework is to serve not simply as a checklist for policy reporting, but as an instrument for driving coherent intervention, for mobilizing relevant coalitions for implementation, and tracking progress across the board. Given the absence of relevant and tested policy support tools and processes, interactions-based policy development remains a challenging objective.

ANTICIPATED IMPACT

Accelerated implementation of the 2030 Agenda through support for interactions-based research and policy prioritization and programming at all levels of governance.

NEXT STEPS

The ISC has played a leading role in promoting awareness and understanding of SDG interactions within international science and policy communities. The SDG interactions project builds on this work. It is led by a consortium of partners including the ISC, the International Network for Government Science Advice (INGSA), the International Institute for Applied Systems Analysis (IIASA), the Stockholm Environment Institute (SEI) and the Joint Research Centre (JRC) of the European Commission.

A key output will be an online tool for mapping and visualizing interactions across the 17 SDGs, and identifying associated priorities for action that can be used in different geographical or sectoral contexts. In addition, the project will deliver a multi-stakeholder process of facilitated workshops, designed and organized to engage local science-policy-practice partnerships in identifying SDG interactions relevant to specific national priorities. The tool and the workshop process will be tested in a number of countries. These pilot case studies will serve to develop a broader community of practice, and provide a basis for the further development of the project and its scaling up to other countries and stakeholder groupings, including by interested ISC members, partner organizations and the UN’s Inter-Agency Task Team (IATT) on science, technology and innovation for the Sustainable Development Goals.

TWO

THE DIGITAL
REVOLUTION

Domain Two: Global society is in the throes of a digital revolution that has transformed the way in which information and knowledge are acquired, stored, communicated and used. This revolution is distinguished by its speed, its global pervasiveness and its disruptive consequences. There are few areas of individual, commercial, social or political action that are unaffected. It poses powerful opportunities and radical challenges both to science and to society to adapt in ways that maximise beneficial and minimise negative outcomes.

Thirty years since the inception of the World Wide Web, the culture of sharing and collaboration that it embodied has progressively expanded from open source software, to open access publishing, to open data and entirely open analysis, and to the growing open science movement. There is now an opportunity, and arguably an obligation, to systematically open science and its outputs to a wider range of societal actors, including citizens, to address shared problems and enable the joint creation of actionable knowledge.



● 2.1 DATA-DRIVEN INTERDISCIPLINARITY

(Project in progress)

Many of the major contemporary problems faced by science and society are inherently complex. They concern the operation of systems that exhibit emergent behaviour as a consequence of interactions between their component parts. Some examples include the operation of cities, of the human brain, of the dynamics of infectious disease, of climate change and of pathways to sustainability. Researching these challenges almost invariably requires interdisciplinary collaboration. The tools of the digital revolution, now enhanced by the techniques of artificial intelligence, have created unprecedented opportunities to exploit such collaboration by integrating relevant data from disparate disciplinary sources. The prospect is of realizing Stephen Hawking's prediction that "the next century [the 21st] will be the century of complexity".

Yet our ability to combine data from heterogeneous sources and across disciplines remains limited in many instances and, at best, is excessively resource intensive. The adoption of new data-intensive techniques across scientific communities and practices is uneven, and the manual effort required to prepare and cleanse data before use is a considerable diversion of scientific resources. Ontologies and vocabularies are often incompatible and sometimes quite inadequate to the task.

Addressing these problems is crucial if we are to use to best effect the increasing quantities of diverse data to understand the complex systems that are at the heart of global challenges. Doing so will require the widespread adoption of replicable, generic approaches to data integration and FAIR (Findable, Accessible, Interoperable and Reusable) data standards in more science disciplines and interdisciplinary research areas. This is a decadal effort and its success will depend on active participation and engagement from all disciplines, including the social and human sciences, and by scientists from all parts of the world, including countries whose data science capacities may be limited.

ANTICIPATED IMPACT

More effective, evidence-based solutions for complex global challenges based on interdisciplinary collaboration enabled by data integration policies and practices across scientific fields and disciplines.

cities and disaster risk reduction) designed to contribute value in these areas but also to act as demonstrators of the value and importance of the approach in all areas of complex interdisciplinary science.

- Engagement with scientific unions and associations in programmes of work designed to promote progress across the disciplines of science that will enable interdisciplinary data interoperability.

Programme development will be led on behalf of the ISC by CODATA, working in partnership with the Council's World Data System (WDS) and the Research Data Alliance (RDA). The ISC will work to promote membership engagement in ways that extend this approach to new communities of scientists and stakeholders, including from developing regions, where the open science platforms described under Domain Four could be key agents for these processes.

NEXT STEPS

Working with the support of the ISC, the Council's Committee on Data for Science and Technology (CODATA) has been developing technology and semantic good practice for data interoperability and integration. Based on this initiative, a three-pronged programme is planned, comprising:

- Underpinning technologies and good practice for data integration that are applicable across a wide range of disciplines.
- Interdisciplinary case studies in global challenge areas (infectious disease, resilient

● 2.2 GLOBAL DATA RESOURCES AND GOVERNANCE

(Project for development)

It is 30 years since Tim Berners-Lee's vision of universal connectivity and openness became the World Wide Web: open and accessible to all. The culture of sharing and collaboration that it embodied has progressively expanded from open source software, to open access publishing, to open data and entirely open analysis, and now to the growing open science movement. This modern offspring has much wider dimensions than open access publication and simply making data available. It extends to providing information on how to repeat or verify an analysis, exposing results that can be reused by others for comparison, confirmation, or deeper understanding and inspiration. But it has two even more ambitious and radical targets:

- Firstly, if we are to understand the complex systems that are at the heart of most global challenges (see project 2.1) by analysing the wide diversity of data that this involves, we need to have access to such data in an interoperable form. To achieve this would require a widespread ethos and practice of data sharing, not just within the publicly funded scientific community, but across the public and private sectors, including government, scientific publishers and international agencies.
- Secondly, there is now an opportunity, and arguably an obligation, to systematically open science and its outputs to a wider range of societal actors and to citizens in addressing shared problems and in the joint creation of actionable knowledge. For both purposes, stimulating the widespread availability and use of data resources, and securing their effective governance, are vital issues for 21st century science and for addressing today's global challenges.

This is therefore a timely moment to consider the global data ecology, its governance, ownership, accessibility and usability in the data universe; to identify principles for the emergence of systems, protocols and commons from these typologies; and to envisage how a federated global commons might develop and operate to the benefit of science. It is also vital to understand how global society's data patrimony may best be conserved when many scientific databases are supported by short-term funding in the absence of a sustainable business model. Maximizing affordable access to well-governed data is in the interest of all scientific fields and communities, as well as funders, publishers and companies handling large amounts of data.

ANTICIPATED IMPACT

A global, cross-sectoral coalition of support for principles and processes of data access, for the adoption of priorities for its federated governance, and for sustainable business models for key scientific databases in a way that aids the global scientific enterprise.

the taxonomy of scientific data-holding and its governance within commercial enterprises and publicly funded research efforts, global and national monitoring entities, and national statistical and standards bodies. It would explore the role of open science platforms or 'commons' in supporting open data initiatives, and the potential for a global data commons. Its findings would be analysed by a high-level group of representatives from relevant bodies and by technical experts. They will make recommendations on topics such as the optimal principles of data governance for adoption by the widest number of data holders, and propose a programme for further action.

NEXT STEPS

The ISC will convene a group of technical experts and representatives of the principal data-holding sectors to determine the scope and ambition of the project. An exploratory phase would consider



SCIENCE IN THREE POLICY AND PUBLIC DISCOURSE

Domain Three: Science creates knowledge tested against reality, an essential contribution to public discourse and to policy-making at every level of governance, and one that has never been more urgent. It is vital to develop more effective science-policy interfaces, based on enhanced competencies within science and policy communities, and informed by relationships of trust. These interactions are challenged by a policy environment that tends to favour short-term responses and by a setting in which international norms are increasingly disrupted. At the same time, interest groups increasingly question the credibility and authority of scientific evidence and the trust that science should be afforded. Notwithstanding its democratic potential, the World Wide Web has become a powerful enabler of ‘alternative facts’ in a so-called ‘post-truth society’. It is imperative to advance the value of science as a global good and ensure its better use in policy decisions and public discourse.



● 3.1 SCIENCE-POLICY INTERFACES AT THE GLOBAL LEVEL

(Project in progress)

Science is critical to virtually every policy decision at every level of governance. Policy-making is inevitably going to achieve better outcomes when it is informed by robustly developed knowledge from the natural, social or data sciences. Yet, despite widespread agreement on the need to ensure that all policy decisions are informed by the best available scientific evidence, the potential contribution of science to policy-making could be much greater than it is today.

At the global level, and particularly within the UN system, more impactful science-policy engagement will require effective coordination between a growing range of interface mechanisms, which operate within and between different agencies and with different mandates, modes of engagement and cultures of decision-making. Given that global policy-making is ultimately dependent on endorsement from member states, it is also essential to connect efforts to advance evidence-informed policy-making at the national level to those undertaken internationally. The critical role of science in addressing virtually every global issue must be continually reinforced through coordination between and across these levels.

Amplifying the visibility and voice of the international scientific community within the UN and other global policy forums will require a long-term vision of the role of science in global policy. This must be based on an understanding of the complex political dynamics and policy processes at the global level and of the most effective pathways to influence for science, formal and informal.

ANTICIPATED IMPACT

A strengthened mandate for science in global policy, supported by effective and coordinated science-policy interface mechanisms and based on recognition of the ISC as the global go-to for independent, integrated scientific expertise, input and advice.

NEXT STEPS

The ISC will prepare two strategy papers to be published by the end of 2019: a white paper on science in and for the United Nations system, and a paper on opportunities for engagement in other global policy fora. Both papers will draw on the experience and expertise of ISC members and partners at the interface between science and policy, including the Council's International Network for Government Science Advice (INGSA), and will make recommendations for ISC actions to achieve increased impact in this arena.

● 3.2 THE PUBLIC VALUE OF SCIENCE

(Project for development)

The scientific community has an obligation to explain and champion the role of science in all decisions that affect society. Even when the science is complex and contradicts popularly held ideas, it can help in framing the issues, explaining complexity and proposing possible options.

Levels of public trust in science remain relatively high. But the political and media environment is increasingly fragmented and polarised, and trust in institutions is declining. This means that scientific knowledge appears to have a diminishing influence on public opinion. This trend is exacerbated by pervasive digital technologies and social media, which enable the widespread dissemination of misleading and biased information. This in turn feeds new expressions of science denialism, casts doubt on the need for scientific understanding and interpretation, and threatens evidence-informed decision-making. This problem affects all scientific fields, all types of research, and all scientific communities around the world. It is naturally of great concern, as our future health and survival depend on the adoption of policies that have a sound scientific basis.

Merely repeating scientific results and opinions, either more clearly or more loudly, is not the way to success. Instead, direct engagement is needed with those outside the scientific community, and a deeper understanding of how people receive and respond to messages, both individually and collectively.

ANTICIPATED IMPACT

Increased awareness amongst wider publics, policy-makers and decision-makers of science as a global public good.

NEXT STEPS

The ISC will convene an international expert working group to frame these issues, identify evidence to inform the strategies that the ISC should adopt, and prepare by mid-2020 a plan for delivering a long-term global campaign on the public value of science.

Its initial outputs could include discussion papers for ISC members and partners on steps that the scientific community can take to counteract disinformation, and develop skills in critical thinking and analysis. This might involve rethinking the communication of science to non-scientists. These actions should lead to the development of new resources to help the ISC and its members amplify their existing work, and participate in a new global campaign profiling the value and importance of science.



● 3.3 SCIENCE IN THE PRIVATE SECTOR

(Project for development)

The private sector's share of global science and innovation is growing, and is now estimated to represent approximately 70 per cent of global expenditure on science. At the same time, publicly funded researchers are increasingly encouraged to form partnerships with the private sector and to undertake research that will support private priorities, whilst the commercialisation of academic research is increasingly regarded by government as a priority for universities.

This increasingly mixed research economy poses a number of dilemmas. Knowledge freely released into the public domain is by definition a public good. What are the pathways of public and private goods in the current world economy? Whilst peer review and the open publication of evidence are the standard routes by which scientific rigour has been maintained for publicly funded science, both are lacking in many areas of privately funded science.

The incentives and the institutions that are designed to generate trust and confidence in public science are not necessarily present in the private sector. Whilst financial risk to a company's investment may provide an incentive for strong internal peer review, the risk to the public from private-sector innovation would be expected to be covered by a regulator, if indeed effective regulation is imposed. There are differing norms for transparency, such as the role of the sponsor in experimental design, material provision, editorial roles, access to data and IP rights. In general, publics are less trustful of private sector science, in part because of major scandals, and in part because of the private interest in minimal regulation. In order to preserve trust in science, it is essential that public and private sector scientists apply similar ethical standards to those prevalent in the public sector.

ANTICIPATED IMPACT

Increased understanding and agreement on the norms of responsible conduct, transparency and ethical standards that are needed to protect science as a global good in both the public and private sectors.

NEXT STEPS

The ISC will establish an expert working group to explore issues around trust in private sector science, and to prepare a discussion paper for consultation with members and other stakeholders. This would build on preliminary work on how private sector science is used in policy settings, carried out in 2018 by ISC-INGSA. Over the longer term, a forum will be explored for engagement between the science community represented by the ISC, and private sector stakeholders including both scientists and executives.

FOUR

THE EVOLUTION
OF SCIENCE AND
SCIENCE SYSTEMS

Domain Four: Scientific procedures, scientific organizations and scientists themselves must continually adapt to changes in knowledge, technologies and societal norms. Science systems must be open and agile, and should adjust in ways that safeguard scientific freedom and advance scientific responsibility, rigour and relevance. Traditional systems of scientific discovery and innovation have given the world immensely beneficial and transformative knowledge and innovation. Now they must respond to pressures for greater interdisciplinary and transdisciplinary collaboration, to the explosion of digital technologies, as well as the imperative to ensure that science systems represent and promote the intellectual contributions of women and other under-represented groups, and respect and engage with indigenous knowledge. There is increasing recognition of the need for change in scientific systems, including the reform of academic incentives, funding systems, processes of scientific publication, and scientific norms in the private sector.

● 4.1 GENDER EQUALITY IN SCIENCE: FROM AWARENESS TO TRANSFORMATION

(Project for development)

The persistent under-representation and unequal capacity to exercise agency of women in science is the subject of much academic research, of an ever-growing resource of case studies and advisory reports, and of longstanding debate. It has prompted policy intervention at institutional and political levels within national, regional and international scientific communities. Yet generally effective practice to correct this anomaly remains elusive. The current task must be to ensure that scientists and science systems throughout the world adopt working processes and practices that banish inequitable gender roles and norms, address unequal power dynamics, and promote the status of women in science, in ways that go beyond mere gender awareness in favour of effective, transformative action.

ANTICIPATED IMPACT

Increased gender equality in global science, through improved sharing and use of evidence for gender policies and programmes in scientific institutions and organizations at national, regional and international levels.

NEXT STEPS

The ISC will convene existing international initiatives on gender equality in science, including those by the Council's members, as well as those of the Global Research Council, the InterAcademy Partnership and GenderInSITE, to develop plans

for an impactful global initiative on gender equality in science, which could take the form of a virtual platform or resource hub. It would collate existing evidence from ISC members and other scientific organizations on effective policies, programmes and practices to advance gender equality in science; assess the efficacy of those interventions against an agreed set of outcomes; share findings in an accessible way; and encourage policy-makers and practitioners to use the findings to inform their decisions and responses. Partners in this initiative would be challenged to consider additional campaigning actions and partnerships, for example with the Global Young Academy, to support transformative action in this area.

● 4.2 REFUGEE AND DISPLACED SCIENTISTS

(Project in progress)

The world is currently witnessing the highest numbers of forcibly displaced people on record. Their migrations are driven by conflict, persecution, violence, political uncertainty, climate change and environmental degradation, and are unlikely to diminish in the coming years. Forced migration affects some of the world's least well-funded science systems, with relatively low levels of scientific capacity, as well as countries such as Iraq and Syria, which have had strong science systems that are now largely destroyed. Although the precise total is difficult to assess, the number of scientists involuntarily 'on the move' is currently estimated at approximately 60,000 worldwide.

Although the issue of migration is high on the world agenda, little attention is given to the consequences of tens of thousands of scientists interrupting their work, whether in terms of global scientific progress or of lost capacity, knowledge and investment at the national level. The forced displacement of scientists ultimately affects the capacity of affected societies to carry out post-conflict reconstruction.

ANTICIPATED IMPACT

Increased international awareness of and attention to the issue of refugee and displaced scientists, through the establishment of a global network of institutions supporting them.

NEXT STEPS

This project is being led by The World Academy of Sciences (TWAS) under the auspices of Science International (a partnership involving the ISC, TWAS and the Inter-Academy Partnership).

Initial outputs will include a draft position paper for Science International partners and other organizations willing to contribute to an international awareness-raising campaign. The intention is to support the establishment of a global network of institutions which support refugee and displaced scientists, and to identify synergies, gaps and best practices in current efforts. Based on an assessment of impact and lessons learned, a subsequent phase of the project would consider how to develop processes to rebuild national science systems in post-conflict settings.

● 4.3 OPEN SCIENCE IN THE GLOBAL SOUTH

(Project in progress)

National science systems worldwide are struggling to adapt their infrastructures, capacities, policies and practices to the opportunities and challenges posed by the spread of digital technologies, and to the explosion of scientific data that is supercharging a novel model of data-intensive science. This imperative poses a particularly acute dilemma for the many relatively poorly funded science systems of the Global South. Do they attempt to adapt, with their relatively slender resources, or do they stand aside, risking national stagnation of scientific progress and isolation from creative streams of social, cultural and economic opportunity?

A creative response to this dilemma could be provided by regional collaboration to develop ‘platforms’ or ‘commons’ that provide and manage access to data, computational hardware, connectivity and the tools and concepts required for effective practice, in training and capacity development, and in data-intensive application activities directed towards productive scientific, societal and economic outputs and outcomes that are regionally relevant. There are important moves to establish such platforms in the Global South, including in Africa, in Latin America and in the Asia Pacific region.

These developments also coincide with emergence of the new ‘open science’ paradigm based on three pillars: open data, open access publishing and open engagement of science with society. This provides a potentially powerful basis for regional development, calling on scientists to work more interactively through greater sharing of data and ideas, and to engage more effectively with policy-makers, business, communities and citizens as knowledge partners in the co-design and co-production of solutions-oriented knowledge. In an era when solutions to global problems need global engagement, the danger associated with the rapid development of data-intensive, open science is that yet another knowledge divide will be created between the Global North and the Global South, not only to the detriment of the latter, but to the detriment of all.

ANTICIPATED IMPACT

Positioning scientists and science systems in the Global South at the cutting edge of data-intensive open science, through the development of efficiencies of scale, the creation of critical mass through shared capacities, and amplifying impact through a commonality of purpose and voice at regional levels.

NEXT STEPS

In collaboration with CODATA, the Council has been working with its Regional Offices and other partner organizations to create regional Open Science Platforms that will convene and coordinate regional interests, ideas, people, institutions and resources needed to advance data-intensive, solutions-oriented research in the Global South.

They are intended to create critical mass through shared capacity, and to amplify impact through their shared purpose and voice. The Platforms will function as federated systems, providing connective tissue between dispersed infrastructures and actors, bringing them together in advancing data-driven science in the Global South for social and economic benefit.

A pilot study for a Pan-African Open Science Platform (AOSP) was launched in December 2016 with the support of the South African Department of Science and Innovation and in collaboration with the Academy of Science of South Africa and the South African National Research Foundation. Planning is under way for the launch in 2020 of the AOSP operational phase. Inspired by the African example, there are now parallel initiatives in the process of development in Asia and the Pacific and in Latin America and the Caribbean. The

potential for a successful South-South network of regional platforms, closely connected to analogous developments in the Global North, augurs well for healthy global collaboration as equals rather than as in the donor-recipient model of the recent past. The ISC will seek support for such a network. A Global Open Science Commons may be a practicable and desirable longer-term outcome.

● 4.4 THE FUTURE OF SCIENTIFIC PUBLISHING

(Project for development)

Accessible publication of the results and ideas arising from research is a fundamental part of the scientific enterprise. Yet technological change, an explosion in demand for journal outlets, monopolistic behaviour on the part of publishers, and the use of journal impact factors and cited publications as primary indicators of scientific merit, have created systemic instability in scientific publishing. With many institutions and researchers excluded from accessing articles that are hidden behind paywalls, there are increasing calls for the reform of scientific publishing in order to further the global progress of science. It is clear that the system is no longer fulfilling the needs of its main audience: scholarly researchers and the institutions in which they work. At the same time, open access is lauded as a means of increasing the use of scientific evidence in decision-making, and overcoming inequities in access to knowledge, particularly in poorer countries and institutions. However, routes to open access are far from resolved, as debates around the European Commission’s ‘Plan S’ initiative have demonstrated. The scientific publishing model is ripe for renewal. The Council will undertake a major review, involving key stakeholders, of the role of publishing in the scientific enterprise, as a basis for identifying pathways for change that maximise the potential for rigour, creativity and impact.

ANTICIPATED IMPACT

Agreement on a set of principles for scientific publishing to maximise benefit to global science and wider audiences for scientific research; and their advocacy among the wider community of science producers, users, funders and publishers.

NEXT STEPS

Rather than starting from the present business model, the project will begin by defining what the contemporary scientific enterprise needs from scientific publishing. The ISC will initiate further conversations with experts in scientific publishing, and review existing initiatives towards the development of operational principles for scientific publishing in the 21st century. These principles will be refined jointly with members and partners before publication and the launch of an advocacy campaign to promote change. The ISC recently published a series of interviews on Plan S and Open Access and will continue to explore current issues and possible responses.

● 4.5 KNOWLEDGE PRODUCTION AND DIFFUSION AS GLOBAL PUBLIC GOODS

(Project for development)

When freely released into the public domain, scientific knowledge is by economic definition a public good. It is most efficient in realizing benefit when it is made rapidly accessible and usable to the largest number in the public domain. Its effectiveness in serving the public good depends both upon the efficiency with which new knowledge is created and the speed with which it diffuses through the public space. This efficiency is, or should be, of concern to the tax-paying public and to governments which fund science from the public purse.

It is critical however that new knowledge is comprehensible to those who may be able to use it in innovative ways through all sectors of society. There are three principle modern pathways through which new scientific knowledge finds its way into society: through education, through the mass media, including the web, and through the publication of scientific results. Universities are particularly important in these processes, having the advantage of combining knowledge creation through research and education. Academics, who individually embody these two roles, therefore have a crucial role to play. But their behaviour, and that of the institutions that employ them, has been increasingly driven by proxy measures of the short-term impact of scientific research. The extent to which these indicators measure impact on the public good is questionable. These indicators do however focus overwhelmingly on research production, in particular on numbers of published research articles and citations, which has increased the pressure on academics to devote themselves to publication, compounding the trend towards a research-dominated model for universities, potentially to the detriment of their educational role. Moreover, such proxies can be gamed in ways that satisfy the targets but have little relation to the fundamental purpose of a university. The present system of metrics poses pressing questions for individual scientists and for the global scientific enterprise.

ANTICIPATED IMPACT

To identify and promote systems of metrics, and rules for their use, that could be adopted at national level and which would enhance the value of research in serving the public good.

NEXT STEPS

This project would explore appropriate ways of evaluating scientific work, the effects of metrics on scientific careers and on the balance between research and education, and the potential for universal metrics. The ISC will consult members and partner organizations, undertake a summary mapping of “alt metrics” projects, and convene a small international group of experts representing disciplinary, sectoral and diverse national interests to determine a potential project focus and a longer-term work plan.

4

DEFENDING THE FREE AND RESPONSIBLE PRACTICE OF SCIENCE

● INTRODUCTION

The right to share in and to benefit from advances in science and technology is enshrined in the Universal Declaration of Human Rights¹, as is the right to engage in scientific enquiry, pursue and communicate knowledge, and to associate freely in such activities. But rights go hand in hand with responsibilities; in the responsible practice of science and the responsibility of scientists to contribute their knowledge in the public space. Both are essential to the ISC's vision of science as a global public good.

A commitment to protect these freedoms and advocate for these responsibilities is embedded in the Council's Statutes, as fundamental to scientific advancement and human and environmental well-being. The Council's Committee for Freedom and Responsibility in Science (CFRS) is mandated to oversee this commitment.

The freedom for scientists to pursue knowledge and to freely exchange ideas is coupled with the responsibility of scientists to maintain scientifically defensible conclusions, along with the responsibility of scientific institutions to apply high standards of logical reasoning, and respect for evidence, replicability and accuracy.

There are four fundamental scientific freedoms that the ISC seeks to uphold:

- Freedom of movement;
- Freedom of association;
- Freedom of expression and communication; and
- Freedom of access to data and information.

These freedoms are threatened by attacks on the values of science and through individual cases

of discrimination, harassment or restriction of movement. Such threats can be based on factors related to ethnic origin, religion, citizenship, language, political or other opinion, gender identity, sexual orientation, disability or age. Their settings are often complex and it may be difficult to disentangle the scientific, political, human rights or socio-economic aspects of specific cases.

Scientists are responsible for conducting and communicating scientific work with integrity, respect, fairness, trustworthiness and transparency, and for considering the consequences of new knowledge and its use. The maintenance of ethical standards by scientists and their institutions is a prerequisite for trust in science by both policy-makers and the broader public.

Given the pervasive nature of the issues of freedom and responsibility, it is essential that the CFRS is aware of, able to evaluate and – where necessary – to comment on the relevant work of other ISC advisory bodies to ensure that the principles articulated here are upheld. Keeping this in mind, the mandate of the CFRS will be achieved through the following actions:

ACTION 1

ADVOCATE FOR RECOGNITION OF FREEDOM AND RESPONSIBILITY OF SCIENCE IN TODAY'S WORLD

The digital age has changed irrevocably the circumstances under which news and information are communicated. The ease and speed by which manipulated, biased or fabricated information is shared highlights the lack of editorial norms and processes for ensuring the accuracy and credibility of information. Furthermore, the politicization of some issues at the science-society interface has contributed to an emergent, populist 'post-truth' stance on knowledge, and to the adoption of ideological or anti-scientific positions on topics such as climate change, genetically modified organisms (GMOs) and vaccination, that are diametrically opposed to and in conflict with the scientific consensus on these issues. These developments pose a fundamental threat to the integrity of processes by which science informs policy-making.

Given this contemporary and ever-shifting context, the role of scientists in public discourse in advocating the use of scientific understanding that is relevant to public policy and societal debate has never been greater. When scientists engage in highly controversial and politicized scientific debates, it is vital that they respect feelings, values and cultural contexts, while at the same time, remaining alert to the role of special interests that may impair public discourse. The growing importance of science in responding to today's challenges means that scientists and their organizations are increasingly drawn into muscular public debates where their authority and knowledge could be contested. It is crucial that the scientific response adheres to the principles of responsibility set out above while maintaining a robust advocacy for the scientific method.

The work of the CFRS in the coming years must therefore be framed by the need for effective responses to the anti-science discourse and a re-

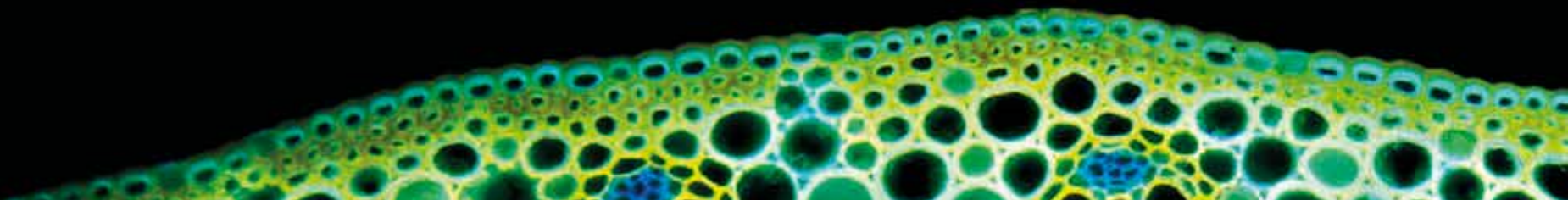
examination of the meaning of scientific freedom and responsibility in the 21st century. It will provide guidance on responsible conduct in science in the contemporary context, the ethical dimensions of associated activities and actions, and the boundaries of advocacy.

This work will make use of the unique global reach of the ISC in identifying the issues that affect scientists in their interactions with policy-makers and the general public. It will explore and promote the right to science as a global public good and the right to scientific freedom. These rights are based on an implicit social contract that mandates science and scientists to uphold a set of scientific values, become engaged with integrity and honesty, and act ethically. The CFRS will develop globally informed guidance for ISC members, for research and educational institutions, and for individual scientists and their communities on what constitutes responsible conduct in contemporary science.

The initial actions include:

1. Convening an expert working group to reach consensus on the meaning and interpretation of scientific freedom and responsible and ethical conduct in science, and on the responsibilities of scientists to communicate their knowledge in the public domain and to engage with policy-makers. The working group will publish a position paper.
2. Development of a toolkit on protecting and encouraging freedom and responsibility in science, with particular emphasis on countries that are working to strengthen their science systems; and
3. Developing interventions, possibly based on existing guides and codes of conduct, which serve as the basis for promoting science communication that deals fundamentally with the values of the scientific enterprise, at the same time ensuring respect for audience, evidence and transparency.

¹ See Article 27 and Article 20 of the Universal Declaration of Human Rights. www.un.org/en/universal-declaration-human-rights



ACTION 2
SET AN AGENDA FOR PRIORITY ACTION

Based on the outcomes of Action 1, and working in consultation with members, partners, and the Committee for Science Planning, the CFRS will set a strategic agenda of priority topics and a related workplan for the ISC to address in the coming two years. Implementation will be through a series of workshops that can be used to develop outputs for use by ISC members in order to mobilize action at the national level or within a specific discipline.

Strong candidate actions for the CFRS agenda must:

- Have global implications which make the ISC the most natural organization to fill the need;
- Be concerned substantively with science or with the freedom of scientists;
- Yield evidence to support a defensible ISC position; and
- Have scope for the views of the ISC to be published.

ACTION 3
STRENGTHEN THE IMPACT OF THE COMMITTEE FOR FREEDOM AND RESPONSIBILITY IN SCIENCE

While the ISC's CFRS was constituted in June 2019, it builds on the legacy of its predecessors. To strengthen the impact of the new committee, priority actions include:

- Establishing active collaboration or partnership with Scholars at Risk (SAR) and the International Human Rights Network of Academies and Scholarly Societies (IHRN) in order to expand the ISC's expertise and reach;
- Developing a strategic toolkit for interventions. CFRS currently uses a range of mechanisms and tools for intervention, such as letters of support or online statements, but strengthening the impact of these tools will require further scaling-up efforts, such as through an innovative media strategy for evidence-informed commentary on current issues relevant to scientific freedom and responsibility; and
- Engaging with ISC members to support processes of preparation and peer review, and potentially a horizon-scanning function which could alert the scientific community to emerging threats to scientific freedom.

IMPLEMENTATION

The initial choice of topics will be a mix of longer-term issues affecting science, as listed above, and on-going actions responding to threats such as political repression, the replication crisis, and other issues arising from outside and inside the scientific community. The CFRS will also work closely with other ISC Committees.

Secretarial support for the Committee for the past eight years has been provided on a voluntary basis, first by the Swiss Academies of Arts and Sciences (2010-2016), and then by the Royal Society Te Apārangi of New Zealand (2016-present). The current CFRS secretariat is supported by a contract with the New Zealand Government which extends through June 2020. The Council will give priority to securing new arrangements for hosting the secretariat beyond that date.

5

AMPLIFYING IMPACT THROUGH OUTREACH AND ENGAGEMENT

● INTRODUCTION

Outreach and engagement are key components to the ISC's Action Plan and vital in amplifying our global voice for science. Central to outreach and engagement is its newly constituted advisory committee, which will work closely with other ISC committees and in conjunction with HQ-led activities. Promoting the vision of the ISC for science as a global public good calls for consistent strategic communications, engagement and messaging.

The aim of the Outreach and Engagement Strategy is to:

- Establish a clear messaging and communication strategy for effective engagement with our global ISC members, giving voice to the excellence of their scholarship and developing greater opportunities for the recognition and global impact of ISC member activities;
- Ensure that the global community beyond current ISC members recognizes the ISC as an effective and trusted voice for science as a public good that is of value to them. They should see its benefit for individual scientists as well as for scientific bodies including universities, research centres, institutions and professional societies, research-based NGOs, private sector research bodies and learning and education associations;
- Establish the Council's commentary and advice on scientific and science-society matters as effective, trusted, and valued by global communities beyond the scientific academies. Key audiences include politicians and policy-makers, and decision-makers in the private sector, civil society, and the global media;

- Encourage all global ISC partners to see the value of active collaboration in programmes led or endorsed by ISC;
- Ensure that major funding organizations seek out the ISC and its member network to advance science and society actions, encouraged by its record of impactful and effective work and by confidence in the ISC vision and mission.
- Respond to the rapidly growing, diverse and increasingly transdisciplinary science community by developing a value proposition that encourages our current and potential members to be active in a strong collective that together forms the global voice for science.

These goals for the ISC Outreach and Engagement strategy will be achieved through the following actions:

ACTION 1

ENGAGING ISC MEMBERS AND THE GLOBAL SCIENCE COMMUNITY

Strengthening ISC membership engagement and outreach is a core priority for the ISC.

The ISC will implement a membership engagement strategy that includes a broad consultation with individual member organizations around the world. The goal will be for all ISC members to have at least one strategic conversation about their current relationship with the ISC and future engagement opportunities that are relevant to their priorities and the ISC Action Plan.

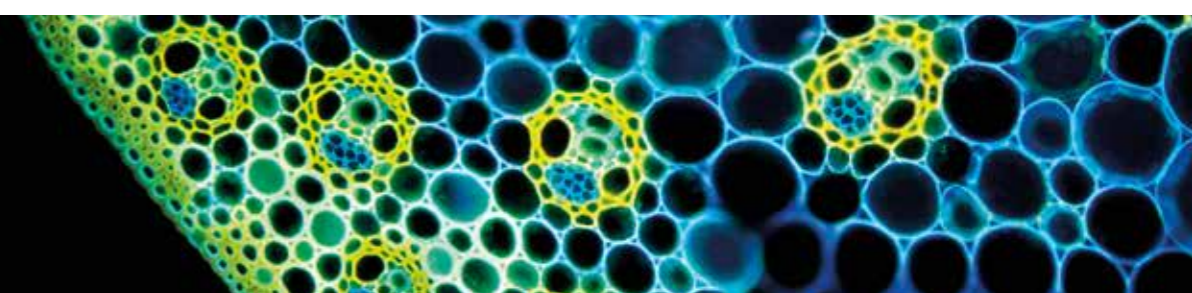
The ISC will also begin an internal assessment of the roster of ISC membership to ensure that the network represents the full range of scientific and science policy constituencies around the world, including next-generation science leader organizations for young scientists and early career scientists.

ACTION 2

WORKING WITH OTHER INTERNATIONAL SCIENTIFIC ORGANIZATIONS

The ISC shares its purpose of connecting science and society with other international science organizations and global institutions, both governmental and non-governmental, which have influence in the international landscape. This creates opportunities for the ISC as a leader in convening global partners for greater impact and effectiveness, and to amplify the ISC vision to advance science as a global public good.

The ISC will convene a leadership meeting with the Presidents and/or Chairs of key international scientific partner organizations including the IAP, TWAS, Global Young Academy (GYA), the World Federation of Engineering Organizations (WFEO), the International Council for Philosophy and Human Sciences (CIPSH), UN programmes and others, to exchange information about common priorities, using the Action Plan as a framework for collaboration.



ACTION 3 A FORUM OF PATRONS OF GLOBAL INFLUENCERS AND OPINION LEADERS

Patrons are individuals who assist organizations by lending their high-profile names to raise the visibility of a group or cause. In accordance with its Statutes (Article 33), the ISC will engage the patronage of a diverse group of individuals from within and beyond the scientific world who will be positively and publicly supportive of the Council's vision and mission. The ISC has already recruited the first two patrons – Mary Robinson, the former President of Ireland, and Ismail Serageldin, Founding Director of the Bibliotheca Alexandrina. The patrons will serve as champions of the ISC in a variety of ways that are suited to their diverse and complementary backgrounds, areas of expertise and interests.

The ISC will work with the new patrons to form a Forum of Patrons, which may include Nobel laureates, former heads of state or senior politicians, global celebrities, global youth activists, global citizens with policy interests and expertise, and major philanthropists, among others.

ACTION 4 ENGAGING THE POLICY COMMUNITY

There are multiple policy communities, on scales from the global to the regional and local, that the ISC must reach in order to ensure that science is integrated into key decision-making and implementation. At the global level, the Governing Board has identified the establishment of a high-level, dedicated ISC presence within the United Nations (UN) system as a route to:

- Improve the use of evidence in policy
- Improve policies for science and innovation
- Address information disorder, particularly in the digital space, that lessens the impact of evidence-based science.

Further strengthening of the effective impact of the scientific community on these dimensions requires better engagement between science and society and more effective science-policy interfaces.

The ISC has appointed Dr Flavia Schlegel, former Assistant Director General for Science at UNESCO, as Special Envoy for Science in Global Policy, for a pilot period of one year. The aim is to establish the essential basis – in terms of networks, resources and strategic actions – for the longer-term deployment of a permanent, high-level ISC presence in the UN.

ACTION 5 MOBILIZING THE PRIVATE SECTOR AND CIVIL SOCIETY

Through Projects 3.2 and 3.3, the ISC recognizes that the private sector and civil society are important communities for achieving its vision of science as a global public good.

The ISC will convene an international expert working group to frame these issues, identify possible knowledge-based solutions to inform the strategies ISC should adopt, and prepare a work and business plan for delivering a long-term campaign on the global public value of science.

ACTION 6 RAISING THE GLOBAL PROFILE OF THE ISC

As noted throughout this document, raising the global profile of the ISC – with strong messaging around its values, vision, and mission – will help enhance and strengthen the outcomes of its strategic actions. Greater global name recognition will also be invaluable to our membership. It will allow the ISC to highlight their expertise and knowledge and connect the member unions and academies more closely to the science and policy work needed to address global challenges, including the Sustainable Development Goals.

A strong communications plan that positions the ISC as the global voice of science will require investment in strategic messaging, to ensure that ISC is recognized as the trusted, 'go-to' global voice for science and science policy, on behalf our ISC members and broader global society.

To achieve this goal, a unified message and brand identity will need to be strengthened within a cache of communication tools that includes the ISC website, marketing materials including policy briefs and brochures, and right down to e-mail signatures that reinforce the ISC's brand recognition.

ACTION 7 DEVELOPING THE VALUE PROPOSITION

A value proposition will be one of the outputs of the outreach and engagement strategy. But a robust and meaningful value proposition can only be fully developed after a consultation with existing and potential members. This value proposition will reflect the issues our members and potential members consider the most pressing, and provide a roadmap for addressing them. Underpinning the value proposition will be the unique convening power and authority that membership of the ISC represents on behalf of both science and society. This membership is uniquely placed to assist policy-makers in creating solutions to global challenges, and to advance diplomacy through science.

IMPLEMENTATION

Implementation has already started on outreach and engagement, however the strategy will be further developed by the ISC Outreach and Engagement Advisory Committee, and other ISC statutory committees formally created in July 2019. Holding conversations with a representative from every member is an ambitious but important task that will assist in the implementation of the Action Plan and ultimately, in realizing the vision of the ISC.

6

A STRONGER REGIONAL PRESENCE

● INTRODUCTION

Being a trusted and recognized global voice for science will require the ISC to engage meaningfully with its members and wider scientific communities throughout the world. The Council can only be globally relevant if scientific communities in all major regions have a voice in shaping the ISC's strategy, determining its priorities, implementing its actions, promoting the results, and harnessing the benefits. In this way the ISC can have both regional resonance and global impact.

A growing number of regional scientific bodies and networks, with varied and sometimes overlapping missions, are already dedicated to advancing science in their own regions. Any ISC presence here must add distinctive value. It must help to bring synergy to, rather than fragment, the work of other regional actors, and it must ensure that regional and global scientific efforts are more effectively connected, and that regional scientific communities are fully engaged in developing and delivering global scientific strategy and action.

A VISION FOR THE ISC'S PRESENCE IN THE REGIONS

The ISC Governing Board has considered a range of possible approaches to securing an effective regional presence for the ISC, and agrees on the merits of a model in which the Council has a single global secretariat with headquarters (HQ) in Paris and branches in different parts of the world.

In this model, the HQ and its branches would work as one team to deliver the global ISC strategy and its related action plans. They would share responsibilities for implementing a single portfolio of priority actions and would work with a single outreach and engagement strategy, presenting a coherent brand and communicating with one voice in all regions of the world. In addition to leading on the implementation of certain ISC projects and programmes, branches would lead on regional partnership development and policy engagement, complementing the Council's work at the global level. They would extend the ISC's membership base

and scientific networks in the regions, and support active membership participation in ISC activities.

Unlike the ISC's existing regional offices – in Africa, Asia and the Pacific, Latin America and the Caribbean – ISC branches would not develop separate strategic plans for specific regions of the world. In addition, the ISC HQ and its branches would operate under a common governance and management system. Whilst the possible establishment of regional advisory structures, or of regional membership-driven working groups, would not be excluded, both HQ and the branches would be accountable to the ISC Governing Board and, through the Board, to the ISC General Assembly as a whole.

This vision of a distributed global secretariat meets the need for the ISC to strengthen the engagement of its members, particularly in the Global South, in shaping relevant and impactful global priorities and actions. It will ensure alignment between the work of the Council's HQ and its regional structure,

and enrich the secretariat's capacity to deliver on the ISC Action Plan. By creating opportunities for global projects and programmes to be led from ISC branches around the world, the Council will give international visibility to scientific capacity in different world regions, and foster more evenly distributed leadership for global science.

In the coming two and a half years the ISC will work towards the creation of a single, distributed global secretariat. Key actions to be completed in this period include:

ACTION 1

TRANSITION EXISTING REGIONAL OFFICES INTO REGIONAL BRANCHES

The Council will maintain its existing institutional presence in Africa, Asia and the Pacific, and Latin America and the Caribbean. It will work closely with the staff of these offices, and with their hosts and funders, on developing and implementing feasible plans for their transition into ISC branches by January 2022.

The transition process will include opportunities for discussion with existing regional committees and members, including regional bodies such as the Council for the Development of Social Science Research in Africa (CODESRIA), the Latin American Council of Social Sciences (CLACSO) and the Association of Asian Social Science Research Councils (ASSREC).

The transition plans will include mechanisms to ensure that future branches are fully integrated into the ISC secretariat, adequately resourced, and effectively governed. The possibility of relocating future regional branches or redefining their geographical scope may be considered. As part of the transition process the ISC will enable a realignment of current regional office activities and capacities towards the priorities of the current ISC Action Plan.

ACTION 2

STRENGTHEN THE ISC PRESENCE IN OTHER PARTS OF THE WORLD

The ISC is aware of the importance of extending its engagement with under-represented parts of the world and with particular groups of developing countries. In the coming two and a half years, the Council will take initial steps towards establishing a presence in the Middle East and amongst the Small Island Developing States (SIDS). The longer-term ambition would be to have ISC branches in place to represent and connect these groups of countries to the Council.

In the case of SIDS, resource constraints and the associated difficulty of securing local hosting will require the ISC to identify less resource-intensive means of engaging. The intention is to establish a small but effective SIDS Liaison Committee. It would consist of no more than five individuals, including representatives of relevant scientific organizations. They would be invited to work with the ISC in developing stronger membership relations and engagement, as well as new partnerships with the SIDS scientific community.

ACTION 3

SUPPORT OTHER REGIONAL GROUPINGS OF ISC MEMBERS

The ISC welcomes the support and strategic input of other regional membership groupings, such as the informal, self-organized European Group of ISC members (see <http://euro-isc.org>).

The ISC will continue to engage with the European Group and any other emerging groupings of members to ensure that their interests and priorities are properly represented in the ISC's Action Plans, and to foster their participation in the design and delivery of ISC projects and programmes.

7

RESOURCING THE ACTION PLAN

● INTRODUCTION

The ISC continues to be generously supported by membership dues and by project grants from external donors. Yet the raised ambitions for an influential future that accompanied the creation of the Council, and which are reflected in this Action Plan, require a step change in the Council's resource mobilization strategy.

As an immediate priority, the ISC must demonstrate and realize its potential for successful and sustained growth by strengthening its access to core discretionary funding. Such income fuels the engine room of the organization and will determine its success in securing the necessary project-based funds for new priority actions across the full range of ISC operations.

The longer-term objective is to secure for the ISC a healthy, sustainable and more diversified income, with a five-year target of raising an additional €1-1.5 million per annum, which would increase the Council's annual operating budget by approximately 12 – 20 per cent. This would allow the Council to operate at a higher level, meet the expectations of its members and stakeholders, and remove the intermittent need to draw down reserves to meet its core obligations.

A new resource mobilization strategy designed to meet this target will be developed under the leadership of the Council's Standing Committee for Finance and Fundraising. The strategy will entail a portfolio of actions including:

- The development of detailed business plans for each of the Council's priority projects and programmes, including their resource requirements and possible sources of support.
- External grant applications.
- Activity-based agreements with project or programme-implementing partners, entailing commitments to matching support and joint fundraising.
- Strategic investment of a percentage of ISC reserves to leverage additional external funds, support essential activities and seed fund new projects or programmes.

- Engaging ISC members in the implementation of new projects or programmes, and encouraging in-kind and other contributions such as secondments or hosting of expert group meetings.
- Planning for an appropriate expansion of the ISC membership base.
- Developing the idea of establishing an ISC endowment fund.

The Council's participation in an extensive, growing network of major science funders from around the world is an important foundation for its future fundraising efforts. The ISC is a partner in the Belmont Forum, which convenes national agencies that support global change research, and is developing its partnership with the Global

Research Council, a world network of national research councils. In addition, the ISC is convening a new decadal initiative aimed at fostering strategic collaboration and cooperation by a multi-sectoral forum of funders including national agencies, international donor agencies and foundations. This initiative is intended to accelerate and amplify the impact of funding for international science that contributes to the achievement of the 2030 Agenda for Sustainable Development.

Involvement in these funding networks gives the Council access to strategic information and advice on funding opportunities for international scientific collaboration. It also enables the ISC, as the global voice for science, to participate in the strategic development of policies and practices for international science funding.

APPENDIX 1

SUMMARY OVERVIEW OF CURRENT ISC ACTIVITIES

1. International scientific initiatives (co-)sponsored by the ISC

The ISC sponsors a number of high-profile international scientific initiatives. Many of these are co-sponsored by other international scientific partners, including UNESCO and other specialized UN agencies.

- The International **Network for Government Science Advice** (INGSA) provides a forum for policy-makers, practitioners, and scientists to advance the theory and practice of using scientific evidence to inform policy at all levels of government. www.ingsa.org
- International **Research Programmes** promote international scientific collaboration and science-policy interfaces related to specific global challenges.
 - Comparative Research on Poverty Programme (CROP) www.crop.org
 - Future Earth www.futureearth.org
 - Integrated Research on Disaster Risk Programme (IRDR) www.irdrinternational.org
 - Urban Health and Wellbeing Programme (UHWB) <https://sites.google.com/view/uhw>
 - World Climate Research Programme (WCRP) www.wcrp-climate.org
- International **Scientific Committees** coordinate international science in specific thematic fields.
 - Antarctic Research (SCAR) www.scar.org
 - Frequencies for Radio Astronomy and Space Science (IUCAF) www.iucaf.org
 - Oceanic Research (SCOR) <https://scor-int.org/>
 - Space Research (COSPAR) <https://cosparhq.cnes.fr/>
 - Solar Terrestrial Physics (SCOSTEP) www.yorku.ca/scostep
- International **Data Bodies** develop and promote global policy in data science, build data science capacities, and bring together and make openly available relevant global data sets to enable scientific analysis across scientific domains.
 - Committee on Data for Science and Technology (CODATA) www.codata.org
 - World Data System (WDS) www.icsu-wds.org

- Global **Observing Systems** collect global sets of internationally agreed key data, which provide the basis for scientific analysis and assessment and support global modelling and projection activities.
 - Global Climate Observing System (GCOS) <https://public.wmo.int/en/programmes/global-climate-observing-system>
 - Global Ocean Observing System (GOOS) www.goosocean.org/index.php?option=com_content&view=article&id=8&Itemid=109

The work of these initiatives contributes in important ways to the delivery of the ISC's strategic objectives by promoting international, inter- (and, in some cases trans-) disciplinary research and related science-policy interfaces, supporting capacity building, and developing and advocating policy frameworks for national and regional science systems throughout the world. Additional benefits for the ISC of sponsoring these initiatives include:

- Access to wider networks of scientific research and expertise, which strengthens the ISC's capacity to deliver on its own projects and campaigns, and to provide input into global policy processes;
- Visibility for the ISC amongst the scientific and policy communities convened by these bodies; and

- Partnership development opportunities with other international scientific organizations and UN agencies that co-sponsor them.

The ISC's role as a sponsor includes the following responsibilities:

- Strategy and activity development: Contributing to the development of strategic plans, facilitating partnership building and activity-based synergies across ISC sponsored initiatives
- Quality assurance: Conducting regular reviews of scientific quality and impact, monitoring progress on the delivery and outcomes of activities
- Governance and Management: Providing legal hosting facilities and/or managing hosting agreements in support of International Programme Offices or Secretariats, participating in governance meetings and appointing advisory/steering committees
- Resource mobilization: Advising on resource mobilization strategies and funding opportunities (but not assuming direct fundraising responsibilities)
- Communications and outreach: Providing access to UN policy processes, publicizing achievements and events via the ISC website and other media tools

2. International research funding initiatives managed by the ISC

The ISC manages two international funding initiatives, both of which are supported by the Swedish International Development Cooperation Agency (Sida). They include:

- The **Transformations to Sustainability** Programme (T2S): This initiative was established by the International Social Science Council (ISSC) in 2014 with the goal of increasing social science contributions to solving global environmental change and sustainability challenges. The first phase of the programme ended in 2017. A second phase, which was launched in January 2017, is being managed by a consortium of funding agencies from the Belmont Forum and the NORFACE network of European social science funders. With the support of Sida, the ISC is a partner in this consortium, which is supporting 12 international research projects for the period 2018-2021. <https://transformationstosustainability.org/>
- The **Leading Integrated Research for Agenda 2030 in Africa** Programme (LIRA2030): This is a five-year initiative, which was launched by the

International Council for Science (ICSU) in early 2016 and is implemented in collaboration with the ISC's Regional Office for Africa and the Network of African Science Academies (NASAC). The programme seeks to increase the production of high-quality, integrated (inter- and transdisciplinary), solutions-oriented research on global sustainability by early career scientists in Africa. It currently supports 28 collaborative research projects focusing on various issues of sustainable urban development in Africa. <https://council.science/lira2030>

In addition, the ISC currently supports three international projects that were selected for funding under the former ICSU **Grants Programme**. They include:

- A global approach to the gender gap in mathematical and natural sciences: How to measure it, how to reduce it (led by the International Mathematical Union and International Union of Pure and Applied Chemistry)
- Trans-disciplinary research-oriented pedagogy for improving climate studies and understanding (led by the International Unions of Biological Sciences and the International Union of Quaternary Research)

- Utilisation of light source and crystallographic sciences to facilitate the enhancement of knowledge and improve the economic and social conditions in targeted regions of the world (led by the International Union of Pure and Applied Physics and the International Union of Crystallography)

Further information on each of these three projects is available at: <https://council.science/what-we-do/funding-programmes/icsu-grants-programme>

3. The ISC's work with global policy frameworks, assessments and inter-governmental networks

The ISC is a lead coordinator of the UN Major Group for Science and Technology. In this role the Council works with the World Federation of Engineering Organizations (WFEO) to secure a mandate for science at the UN and to integrate science in major global policy processes, assessments and inter-governmental networks, including:

- The 2030 Agenda for **Sustainable Development**
- The UN Framework Convention on **Climate Change** (UNFCCC), the Intergovernmental Panel on Climate Change (IPCC) and the Paris Agreement on Climate Change
- The Sendai Framework for **Disaster Risk Reduction**
- The New **Urban Agenda**
- The Intergovernmental Science-Policy Platform on **Biodiversity and Ecosystem Services** (IPBES)
- The International **Resource** Panel (IRP)
- The Group on **Earth Observations** and Global Earth Observation System of Systems (GEOSS)

The ISC's engagement in these processes includes a wide range of actions related to the following roles and responsibilities:

- Enabling the participation of scientists in inter-governmental meetings that are typically open only to accredited non-governmental organizations

- Representing the international scientific community by participating in UN events and preparing and issuing statements during such events on behalf of the Major Group for Science and Technology
- Convening and coordinating scientific inputs (e.g. briefings, reports, etc.) on the need for evidence-based decision-making and/or relevant scientific expertise on the specific policy domains covered
- Advising the UN on and participating in science-related processes and advisory structures such as the Technology Facilitation Mechanism
- Supporting representatives of the scientific community's direct engagement in global policy processes by providing information on how these processes work and assisting with the identification of UN priority agendas and associated opportunities for engagement, so that they can target their own advocacy or research
- Leading the development of relevant independent activities, which typically involves the design and delivery of expert advisory reports

4. International Events

The ISC endorses or co-sponsors and participates actively in many international scientific events, including **International Years or Decades of Science** initiated and implemented by ISC members and/or partners. Current Years/Decades endorsed by the Council include:

- International Year of the Periodic Table of Chemical Elements: 2019
Organized under the leadership of the International Union of Pure and Applied Chemistry
- International Year of Basic Sciences for Development: 2020
Organized under the leadership of the International Union of Pure and Applied Physics
- UN Decade of Ocean Science for Sustainable Development: 2021-2030
Organized under the leadership of the Intergovernmental Oceanographic Commission of UNESCO

The ISC is also a co-organizing partner of the biennial **World Science Forum**, which was initiated by the Hungarian Academy of Sciences with the support of UNESCO and the International Council for Science, and which now includes as partners the American Association for the Advancement of Science (AAAS), the World Academy of Sciences (TWAS), the European Academies Science Advisory Council (EASAC) and the InterAcademy Partnership (IAP).

5. International Partnerships

Through the various activities outlined in points 1 to 4 above the ISC partners with a wide range of regional and global scientific organizations, as well as specialized UN agencies and programmes. The nature of those partnerships varies, from **co-sponsoring** international initiatives or **co-organizing** international events to **collaborating** in the context of specific joint projects. Partnerships of a more formal nature are held with UNESCO, the Belmont Forum (an international consortium of science funders) and, in the context of a series of Science International initiatives, with the IAP and TWAS.

APPENDIX 2 ISC MEMBERS

The Council's membership provides the foundation for its work. Through its activities, the Council aims to create opportunities for Members to participate in important scientific conversations and activities, to showcase their scientific contributions at the international level, and to connect to each other and to influential networks worldwide. The ISC's unique global membership brings together 40 international scientific Unions and Associations and over 140 national and regional scientific organizations including Academies and Research Councils, listed below:

Member Unions and Associations

4S, Society for Social Studies of Science

IALS, International Association of Legal Science

IASSA, International Arctic Social Sciences Association

IAU, International Astronomical Union

ICA, International Cartographic Association

IEA, International Economic Association

IFSM, International Federation of Societies for Microscopy

IGU, International Geographical Union

IMU, International Mathematical Union

INQUA, International Union for Quaternary Research

IPRA, International Peace Research Association

IPSA, International Political Science Association

ISA, International Sociological Association

ISEE, International Society for Ecological Economics

ISPRS, International Society for Photogrammetry and Remote Sensing

IUBS, International Union of Biological Sciences

IUCr, International Union of Crystallography

IUFoST, International Union of Food Science and Technology

IUFRO, International Union of Forest Research Organizations

IUGG, International Union of Geodesy and Geophysics

IUGS, International Union of Geological Sciences

IUHPST, The International Union for History and Philosophy of Science and Technology

IUIS, International Union of Immunological Societies

IUMRS, International Union of Materials Research Societies

IUMS, International Union of Microbiological Societies

IUNS, International Union of Nutritional Sciences

IUPAB, International Union for Pure and Applied Biophysics

IUPAC, International Union of Pure and Applied Chemistry

IUPAP, International Union of Pure and Applied Physics

IUPESM, International Union for Physical and Engineering Sciences in Medicine

IUPHAR, International Union of Basic and Clinical Pharmacology

IUPS, International Union of Physiological Sciences

IUPsyS, International Union of Psychological Science

IUSS, International Union of Soil Sciences

IUSSP, International Union for the Scientific Study of Population

IUTAM, International Union of Theoretical and Applied Mechanics

IUTOX, International Union of Toxicology

URSI, Union Radio Scientifique Internationale

WAPOR, World Association for Public Opinion Research

WAU, World Anthropological Union

Member Organizations

ACSS, Arab Council for the Social Sciences

Albania, Academy of Sciences

Angola, Foundation of Science and Development

Argentina, National Scientific and Technological Research Council (CONICET)

Armenia, National Academy of Sciences of the Republic of Armenia

Australia, Australian Academy of Science

Austria, Die Österreichische Akademie der Wissenschaften

Azerbaijan, Azerbaijan National Academy of Sciences

Bangladesh, Bangladesh Academy of Sciences

Belarus, National Academy of Sciences (NASB)

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

Bolivia, Academia Nacional de Ciencias de Bolivia (ANCB)

Bosnia & Herzegovina: ANUBiH, Academy of Sciences and Arts of Bosnia and Herzegovina

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

Botswana, Ministry of Infrastructure Science and Technology

Brazil, Academia Brasileira de Ciências (ABC)

Brazil, Association Nacional de Pós-Graduação e Pesquisa em Ciências Sociais (ANPOCS)

Bulgaria, Bulgarian Academy of Sciences (BAS)

Burkina Faso, Centre National de la Recherche Scientifique et Technologique (CNRST)

Cameroon, Cameroon Academy of Sciences

Canada, National Research Council of Canada

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

Caribbean, Caribbean Academy of Sciences (CAS)

Chile, Academia Chilena de Ciencias

China: CAST, China Association for Science and Technology (CAST)

China: Chinese Academy of Social Sciences (CASS)

China: Taipei, Academy of Sciences located in Taipei

CLACSO, Consejo Latinoamericano de Ciencias Sociales

CODESRIA, Council for the Development of Social Science Research in Africa

Colombia, Academia Colombiana de Ciencias Exactas, Físicas y Naturales

Costa Rica, Academia Nacional de Ciencias

Côte d'Ivoire, Académie des Sciences, des Arts, des Cultures d'Afrique et des Diasporas Africaines (ASCAD)

Cuba, Academia de Ciencias de Cuba

Czech Republic, Czech Academy of Sciences

Denmark, Royal Danish Academy of Sciences and Letters

Dominican Republic, Academy of Sciences of the Dominican Republic

Egypt, Academy of Scientific Research and Technology (ASRT)

El Salvador, Viceministerio de Ciencia y Tecnología de El Salvador

Estonia, Estonian Academy of Sciences

Ethiopia, Ethiopian Science and Technology Agency

Finland, Council of Finnish Academies

FLACSO, Facultad Latinoamericana de Ciencias Sociales

France, Académie des Sciences

Georgia, Georgian Academy of Sciences

Germany, Deutsche Forschungsgemeinschaft (DFG)

Ghana, Ghana Academy of Arts & Sciences

Greece, Academy of Athens

Guatemala, Academia de Ciencias Médicas Físicas y Naturales de Guatemala

Honduras, National Academy of Sciences of Honduras

Hungary, Hungarian Academy of Sciences

India, Indian Council of Social Science Research (ICSSR)

India, Indian National Science Academy

Indonesia, Indonesian Institute of Sciences (LIPI)

Iran, Islamic Rep. Of, University of Tehran

Iraq, Ministry of Science and Technology

Ireland, Royal Irish Academy

Israel, Israel Academy of Sciences and Humanities

Italy, Consiglio Nazionale delle Ricerche

Jamaica, Scientific Research Council

Japan, Science Council of Japan


Jordan, Royal Scientific Society	Moldova, Academy of Sciences of Moldova	Philippines, Philippine Social Science Council (PSSC)	Sudan Republic of, National Centre for Research	Uzbekistan Republic of, Uzbekistan Academy of Sciences	ICA, International Commission for Acoustics
Kazakhstan, National Academy of Sciences of the Republic of Kazakhstan	Monaco, Principauté de, Centre Scientifique de Monaco	Poland, Polish Academy of Sciences	Swaziland, National Research Council	Vatican City State, Pontificia Academia Scientiarum	ICIAM, International Council for Industrial and Applied Mathematics
Kenya, Kenya National Academy of Sciences	Mongolia, Mongolian Academy of Sciences	Portugal, Academia das Ciencias de Lisboa	Sweden, Royal Swedish Academy of Sciences	Venezuela, Fondo Nacional de Ciencia, Tecnología e Innovación	ICLAS, International Council for Laboratory Animal Science
Korea Democratic People's Republic of, State Academy of Sciences	Montenegro, Montenegrin Academy of Sciences and Arts	Romania, Academia Româna	Switzerland, Swiss Academy of Humanities and Social Sciences (SAHS)	Vietnam, Vietnam Union of Science and Technology Associations	ICO, International Commission for Optics
Korea Republic of, Korean Social Science Research Council (KOSSREC)	Morocco, Hassan II Academy for Science and Technology	Russian Federation, Russian Academy of Sciences	Switzerland, Swiss Academy of Sciences	Zambia, Zambia Academy of Sciences	ICSTI, International Council for Scientific and Technical Information
Korea Republic of, National Academy of Sciences of the Republic of Korea	Mozambique, Scientific Research Association of Mozambique (AICIMO)	Rwanda, Kigali Institute of Science and Technology (KIST), Rwanda	Tajikistan, Academy of Sciences of the Republic of Tajikistan	Zimbabwe, Research Council of Zimbabwe	IFDO, International Federation of Data Organizations for Social Science
Lao PDR, Lao National Science Council	Namibia, National Commission on Research, Science and Technology (NCRST)	Saudi Arabia Kingdom of, King Abdulaziz City for Science and Technology (KACST)	Tanzania, Tanzania Commission for Science and Technology	Affiliated Members	IFIP, International Federation for Information Processing
Latvia, Latvian Academy of Sciences	Nepal, Nepal Academy of Science and Technology (NAST)	Senegal, Association des Chercheurs Sénégalais	Thailand, National Research Council of Thailand	AAS, African Academy of Sciences	IFLA, International Federation of Library Associations and Institutions
Lebanon, National Council for Scientific Research	Netherlands, Koninklijke Nederlandse Akademie van Wetenschappen	Serbia, Serbian Academy of Sciences and Arts	Togo, Chancellerie des Universités du Togo	AASSA, Association of Academies and Societies of Sciences in Asia	IFS, International Foundation for Science
Lesotho, Department of Science and Technology	New Zealand, Royal Society of New Zealand	Seychelles, Seychelles National Parks Authority	Tunisia, Université Tunis El Manar	Academy of Social Sciences, United Kingdom	IIASA, International Institute for Applied System Analysis
Lithuania, Lithuanian Academy of Sciences	Nigeria, Nigerian Academy of Science	Singapore, Singapore National Academy of Science	Turkey, Scientific and Technical Research Council of Turkey	ASTC, Association of Science-Technology Centers	ISA, International Studies Association
Luxembourg, Fonds National de la Recherche	Norway, Norwegian Academy of Sciences and Letters	Slovak Republic, Slovak Academy of Sciences	Turkey, Turkish Academy of Science (TÜBA)	CIE, Commission Internationale de l'Eclairage	ISDE, International Society for Digital Earth
Macedonia, Former Yugoslav Rep. Of, Macedonian Academy of Sciences and Arts	Norway, Research Council of Norway	Slovenia, Slovenian Academy of Sciences and Arts	Uganda, Uganda National Council for Science and Technology (UNCST)	EADI, European Association of Development and Training Institutes	IUVSTA, International Union for Vacuum Science, Technique and Applications
Madagascar, Ministère de l'Enseignement Supérieur et de la Recherche Scientifique	Norway, University of Bergen, UiB	South Africa, Human Sciences Research Council of South Africa (HSRC)	Ukraine, National Academy of Sciences	ECPR, European Consortium for Political Research	IWA, International Water Association
Malawi, National Commission for Science and Technology	Oman, Sultanate of, Research Council of Oman	South Africa, National Research Foundation (NRF)	United Kingdom, British Academy	FIG, Federation Internationale des Geometres	PSA, Pacific Science Association
Malaysia, Academy of Sciences Malaysia	OSSREA, Organization for Social Science Research in Eastern and Southern Africa	South Pacific, University of the South Pacific	United Kingdom, Economic and Social Research Council (ESRC)	IAAP, International Association of Applied Psychology	SSRC, Social Science Research Council
Mauritius, Mauritius Research Council	Pakistan, Pakistan Association for the Advancement of Science	Spain, State Secretariat for Research, Development and Innovation (SEIDI)	United Kingdom, Royal Society	IAHR, International Association for Hydro-Environment Engineering and Research	TNI, Transnational Institute
Mexico, Academia Mexicana de Ciencias	Panama, Universidad de Panama	Sri Lanka, National Science Foundation	United States, National Academy of Sciences	IASC, International Arctic Science Committee	TWAS, The World Academy of Sciences
Mexico, Consejo Mexicano de Ciencias Sociales, COMECOSO	Peru, Academia Nacional de Ciencias		Uruguay, Comisión Consejo Nacional de Innovación Ciencia y Tecnología (CONICYT)		UIS, Union Internationale de Spéléologie
	Philippines, National Research Council				

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

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