



Small- to Medium-sized Nations in International Collaborative Science

Thursday October 13th, 2016

KVAB Forward Look in the context of the Flemish Thinkers Programme

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14:00-18:30

Palace of the Academies

Hertogsstraat 1

Brussels



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Grand challenges able to move the boundaries of our knowledge, or to address major hazards of concern for the whole of Mankind, call for the pooling of resources and the joining of forces at global scale, across borders and across oceans.

Recurrently, large collaborative research programmes, involving inter-governmental and non-governmental institutions and initiatives, universities, research institutes and public-private partnerships over the world, have brought the answer to such challenges.

The spark for such large ventures can ignite in any community, regardless its culture or size. Europe has proven a fertile, multi-cultural ground, and its close partnership with developing countries in Africa, Asia and South America in particular contributes to the shaping of a vast, unique collective pool of creativity. Yet, for small- to medium-sized nations or regions, the step from sparking an initiative to effectively following up and weighing on the geopolitical agenda can be large, despite clear political statements in support of such development.

The KVAB Forward Look "Small- to medium-sized Nations in International Collaborative Science" organized October 13th 2016 in Brussels – cradle of many international collaborative ventures which have brought benefit to Mankind – ambitions to address this question. Several scientists involved in international collaborative science will first reflect on their experience, in domains ranging from cosmology and the nature of matter to global environmental change and Human sciences. Next, a panel discussion between the scientists, delegates from European institutions and the audience will seek to identify pathways and processes which can enhance such development.

The horizon is vast, in scope and time. Collaborative science is considered at global scale, and hence global instruments and pathways will naturally move first into the picture. But it is obvious that for European nations and regions, European programmes and mechanisms form a natural habitat in which they thrive. In this regard, the upcoming mid-term evaluation of the Horizon 2020 Framework Programme for Research and Innovation (2014-2020), which could register messages from the scientific community and consider course corrections where justified, makes such brainstorming exercise timely. But at the considered scale of ventures, the real horizon in Europe is the 9th Framework Programme starting in 2020, for which the scientific community needs to engage the reflection, and engage it now.

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Draft Programme

13:30 **Registration**

14:00-16:00 **Setting the Stage**

International Collaborative Science: Pathways, Instruments and Challenges

Jean-Pierre Henriet (Ghent University, KVAB)

From the germ of Kosmos to Future Earth: 200 years of International Collaborative Science

Francis Halzen (University of Wisconsin-Madison, KVAB)

The shaping of IceCube

Jorgen D'Hondt (Brussels Free University, CERN, Young Academy)

In the heart of the Big Bang: the CMS Experiment at CERN

Bert Vercnocke (Catholic University of Leuven)

Observing Gravitational Waves with The Einstein Telescope

Bert Gielen (University of Antwerp, ICOS Ecosystem Thematic Centre)

The Integrated Carbon Observatory System in Belgium

Jaak Billiet (Catholic University of Leuven, KVAB)

Monitoring Social Change in Europe: the ESS ERIC

16:00-16:30 **Coffee break**

16:30-17:30 **Panel debate between Scientists and Officers of European Institutions**

Small to Medium-Sized Nations in International Collaborative Science: roles to play – opportunities to forge

Introductory Statements & Panel debate

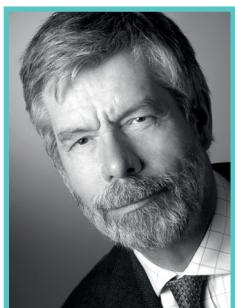
Paul Vossen (European Commission, DG Research and Innovation, Strategy unit of the Climate Action & Resource Efficiency Directorate RTD.I.1)

Jean-Claude Worms (European Science Foundation ESF, Chief Executive Officer)

Karin Metzlaaff (European Plant Science Organisation EPSO, Executive Director; Initiative for Science in Europe, Chair Working Group on Collaborative Research)

17:30-18:30 **Reception**

Participation is free of charge, **registration** in advance is required.

International Collaborative Science: Pathways, Instruments and Challenges**Jean-Pierre Henriet, Coordinator**

Prof. Dr. Jean-Pierre Henriet is a marine geologist/ exploration geophysicist, trained at Ghent University, Belgium, and at the University of Aarhus, Denmark. As teenager, he got thrilled by the International Geophysical Year, which would determine his career orientation: he would spend more than two years of his professional life at sea. Founder of the Renard Centre of Marine Geology (RCMG) at Ghent University, he played on all EU framework programmes up to FP7 and several ESF EUROCORES programmes. The early ESF polar networks and Belgium's Antarctic Research Programme allowed him to join two Antarctic expeditions on R/V Polarstern (PONAM), as well as ocean drilling (ECOD). He was director of the Marine Geosciences Department of IFREMER in Brest, France 1990-1995. Deep-sea dives (4650m) in Fracture Zone Kane on board of the submarine Nautilus and dives in Lake Geneva with Jacques Piccard. President of the European Association of Exploration Geophysicists 1992 (now EAGE), he founded and chaired the EAGE PACE Foundation (support to international cooperation, initially with geophysical communities of the former Soviet Union). Coordinator of the FP4 coordination action CORSAL-RES which pioneered the scheme of mission-specific platforms in ocean drilling. PI of IODP Expedition 307 which first drilled deepsea carbonate mounds off Ireland. Proposed and successfully defended at the General Assembly of UNESCO in Paris the IOC-UNESCO "Geosphere-Biosphere Coupling Processes" (GBCP) Programme. Steering Committee member of the IOC-UNESCO Training Through Research (TTR) programme on board of R/V Professor Logachev. Presently Member of the Commission Nationale de la Flotte Hauturière (Paris), co-chair EUROFLEETS Science Review Panel, Council Member ECORD (Ocean drilling), alternate Member Executive Committee ICDP (International Continental Drilling Program). Capacity building in Morocco, Ethiopia, Ecuador. Director, Class Natural Sciences, Royal Flemish Academy of Sciences and Arts of Belgium.

Abstract

From the germ of Kosmos to Future Earth: 200 years of International Collaborative Science

History, if viewed as a repository for more than anecdote or chronology, could produce a decisive transformation in the image of science by which we are now possessed. These words of Thomas S. Kuhn, introducing his essay "The Structure of Scientific Revolutions" (1962), are very valid in the analysis of international collaborative science.

Grand challenges able to move the boundaries of our knowledge, or to address major hazards of concern for the whole of Mankind, call for the pooling of resources and the joining of forces at global scale, across borders and across oceans. Recurrently, large international collaborative research programmes, involving inter-governmental and non-governmental institutions and initiatives, universities, research institutes and public-private partnerships over the world, have brought the answer to such challenges.

If we take an initiative of Alexander von Humboldt in the early nineteenth century as the spark which has ignited international collaborative science as we envisage the concept today, we have a time span of over two hundred years over which we can analyze drivers and processes, in support of new insights, initiatives, science policy and the governance and stewardship of our planet, for the present and future generations.

International collaborative science is a multi-actor, multi-equilibrium game. The key to success is the recognition and respect of the role of all actors, and the steady vigilance about the maintenance of multiple equilibria: the balance between competition and collaboration, between public and private stakeholders, between university research laboratories and institutional research institutions, between intergovernmental and non-governmental organizations, between small to medium-sized regions and nations and large nations, between European and overseas actors worldwide, between bottom-up and top-down initiatives, between curiosity-driven exploratory basic research and direct market- and employment-oriented research, between the long-term consolidation of existing valuable programmes and infrastructures and the shaping of space and resources for innovating initiatives, between opportunities offered to young scientists and those consolidating the efforts of senior scientists, between investments in infrastructure and in resources to be made available for core science, and last but not least, between the benefits going to developed nations and those to be shaped for developing nations – knowledge being by definition a common heritage of mankind.

Francis Halzen

Francis Halzen is a theoretical physicist who works at the interface of particle physics, astrophysics and cosmology. He is the Principal Investigator for IceCube, the world's largest neutrino detector, the Director of the Institute for Elementary Particle Physics, and the Hilldale and Gregory Breit Distinguished Professor at the University of Wisconsin-Madison. Among his recent honours are the 2015 Balzan



Prize, the European Physical Society Prize for Particle Astrophysics and Cosmology in 2015; the Smithsonian American Ingenuity Award for Physical Sciences in 2014; the Physics World Breakthrough of the Year Award for making the first observation of cosmic neutrinos; and the International Humboldt Award of the Alexander von Humboldt Foundation in Germany.

Abstract

The IceCube Project

I will present IceCube as an international, interdisciplinary thematic research initiative conceived, designed, built, commissioned and operated by an ad hoc conglomerate of research universities. Operation of the experiment is managed via a memorandum of understanding between the collaborating institutions and the lead university (University of Wisconsin-Madison). All scientific activities are the responsibility of the collaboration board that consists of a representative of each collaborating institution and is chaired by an elected spokesperson. The funding agencies have oversight via yearly meetings of an International Oversight and Finance Group. Novel about the project is that it is not realized and managed by a national laboratory in the US, or by an equivalent institution like CERN in Europe. The model for scientific collaboration is totally flexible and patterned to achieve the scientific goals in an optimal fashion. While details may differ, a similar approach resulted in the successful realizations of the Auger cosmic ray observatory and the LIGO-VIRGO gravitational wave interferometers. The concept has been proven effective at the scale of a billion dollars, e.g. LIGO, as well as for more modest projects like the SOLID experiment at the MOL nuclear reactor. The flexibility of the approach allows smaller countries to contribute at an appropriate level. This includes the opportunity to play a leading and highly visible role, as was the case for the Belgian universities in the IceCube project.



Jorgen D'Hondt

Professor D'Hondt is the VUB-director of the Inter-University Institute for High Energies in Brussels. He is elected as chairperson of the collaboration board of the CMS experiment at the Large Hadron Collider at CERN (Geneva, Switzerland), an experiment with 4400 scientific collaborators from more than 200 institutions in 43 countries worldwide. With this experiment the Higgs particle was discovered in 2012 and was internationally recognised as one of the major discoveries of our times. Towards the start of the LHC he was as well the first coordinator of top quark physics for the CMS experiment, one of the key research lines in particle

physics worldwide. For his contributions Professor D'Hondt was rewarded Young Scientist 2013 by the World Economic Forum, and received several prizes for the communication and valorisation of these achievements. In Flanders he was the first president of the Young Academy, is promoter of several large-scale projects and promoted numerous PhD's that obtained international prizes. Internationally he serves in major panels and committees for scientific assessments, advises, reviews and/or organisations. He is also member of the SoLid collaboration to measure the properties of neutrinos with an experiment deployed at the BR2 reactor in SCK-CEN (Mol, Belgium).



Bert Vercnocke

Bert Vercnocke works on black holes and cosmology. He obtained his PhD at KU Leuven in 2010 and held postdoctoral positions at CEA/Saclay, Stanford University and Amsterdam University. He recently returned to Belgium as a senior postdoc at the KU Leuven where he is building a research group with Prof. Thomas Hertog that studies the subtle effects in gravitational wave signals predicted by fundamental theories that combine quantum mechanics with gravity.

Abstract

Observing Gravitational Waves with The Einstein Telescope

Earlier this year the LIGO Observatory in the US announced the first experimental discovery of gravitational waves. The signal appeared to come from the merger of two distant black holes more than a billion years ago. This discovery opens up a new observational window onto the universe with enormous scientific potential, with implications and applications ranging from astrophysics to quantum gravity.

I will briefly describe the science of gravitational waves and sketch the current landscape of gravity research in Belgium. Then I will discuss a very exciting new opportunity for science and international collaboration in this area that is enfolding: the Einstein telescope, a next generation gravitational wave observatory, for which the region around the Dutch - Belgian - German border has been identified as a promising location.



Bert Gielen

Bert Gielen obtained a PhD in plant ecology at the research group of Vegetation and Plant Ecology (PLECO) at the University of Antwerp in 2011. His dissertation thesis focused on the energy and carbon balance of forest ecosystems using a combination of eddy covariance and biometric measurements. After his PhD he studied the relation between forest structure and carbon uptake of forest ecosystems at the Laboratoire des Sciences du Climat et de l'Environnement (LSCE) in Paris. Currently he is coordinating the Ecosystem Thematic Center of the Integrated Carbon Observation System (ICOS) at the University of Antwerp.

Abstract

The Integrated Carbon Observatory System in Belgium

Atmospheric concentrations of greenhouse gases (GHG) such as carbon dioxide (CO₂) and methane (CH₄) are increasing due to emissions related to human activity, affecting the global climate. Natural sinks remove a fraction of the GHG anthropogenic excess at the global level. The characterization of greenhouse gases atmospheric burden and fluxes, both anthropogenic and natural, are needed at the global and regional scale, making use of all available information in an integrated framework. The Integrated Carbon Observation (ICOS) research infrastructure will address this issue by providing the community with systematic measurements of a suite of atmospheric, terrestrial ecosystem and oceanic measurements. The ecosystem network comprises three station classes, for which variables are collected with different intensity. These stations are well distributed among the major European ecosystem types and cover most climatic zones in Europe. The Ecosystem Thematic Center (ETC) is coordinating the ecosystem network providing assistance with instruments and methods, testing and developing new measurement techniques and associated processing algorithms; also ensuring a high level of data standardization, uncertainty analysis and database services in coordination with the ICOS carbon portal. This presentation will focus on the current state of the ICOS ecosystem network, on the data products and the potential user community.

Jaak Billiet

Jaak Billiet was until 2007 full professor in social methodology at KU Leuven. He was from 2001 until 2011 member of the Central Coordination Team of the European Social Survey (ESS). The ESS team obtained in 2005 the prestigious Descartes Prize for collaborative research in Europe. Jaak Billiet also played a central role in the implementation of the fourth wave of the European Value Study in 2008-2010. He received in 2015 the biennial Award for Outstanding services to Survey Research of the European Survey Research Association. His methodological research deals with quality improvement of survey research, in particular validity assessment, response effects, modelling measurement error, and measurement equivalence. This research is usually carried out in the context of substantial research in the domains of ethnocentrism, political attitudes, and religious orientations. It has increasingly a longitudinal and comparative character. Jaak Billiet occupied the Francqui chair at the Free University of Brussels in 1993, and he is member of the Royal Flemish Academy of Belgium for Science & the Arts.



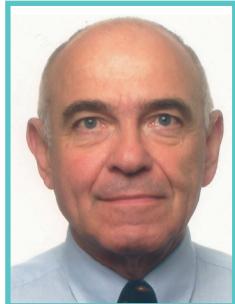
Abstract

Monitoring Social Change in Europe: the ESS ERIC

The European Social Survey was since 1995 prepared by an expert group, and commissions in the context of the Standing Committee for the Social Sciences of the European Science Foundation (ESF). It started in 2001 as an European FP5 program, directed and coordinated by a central team with researchers of six European countries. Between 22 and 32 European participated in the biennial surveys that were set up the National coordinators. The central organization and coordination was until 2008 supported by EU PF6 programs. The surveys, infrastructure, organization were (and still are) subsidized by national research bodies (often national sciences foundations, or statistical offices). Rounds 5 and 6 were funded in the context of the preparation of an European infrastructure program (+/- 50,000 respondents in each survey). This choice was made in order to secure the continuation of ESS since, apart from between country comparison, the study of change is essential this enterprise. From 2013 on ESS survived as ESS-ERIC (the survey of 2014, and actual 2016 survey). This transformation from EU project to ERIC had a number of implications. This, and other challenges of comparative and longitudinal survey research are discussed. The presentation also informs about the goals, design, and methodology of ESS, and an overview of the substantive issues of the 'rotating' modules is offered. Some challenges of this combined cross-country and longitudinal research are discussed.

Panel debate

Small to Medium-Sized Nations in International Collaborative Science: roles to play – opportunities to forge



Paul Vossen

Paul Vossen graduated at Ghent University as an Agricultural Engineer in 1976. In 1989 he completed his PhD in Agricultural Sciences. His main areas of expertise lay in applied climatology (agricultural production forecasting), food security, international cooperation in research and development cooperation. His professional career is an exciting mix of hand-on field work for the World Meteorological Organization in Africa (1977-1987), applied research at the EC's Joint Research Centre (1988-1997), research-policy interface at the Scientific Steering Committee of the European Commission (1997-2003), development cooperation programming (Niger, Burundi, 2005-2010, 2012-2015) and research programming and international science cooperation at the EC's Research & Innovation Directorate General (2003-2005, 2010-2012, 2015-). Since 2015 he is the EC's liaison officer with the Belmont Forum, an international grouping of 22 agencies funding research in the area of global environmental change. This Belmont Forum experience, enriched with his field experience in developing countries forms the basis for his panel contribution.

Panel contribution

The international setting for scientific cooperation has significantly evolved over the past years. This new setting is characterized by a renewed and fast increasing importance of partnerships organised on the basis of thematic interests or objectives (e.g. supporting trans-disciplinary research, research/policy interfacing,) as compared to formal geographical (bi-lateral or bi-regional) agreements and conventions. Thematic science cooperation partnerships as such are not new, as clearly shown in the Position Paper prepared by the Royal Academy / Prof. Henriet. But more than before they frame in a globally growing vision that science, technology & innovation should be explicitly recognized as strong tools for supporting sustainable development; and that these tools need to be available both for regions where the already achieved development level jeopardizes the balance between available environmental resources and what they can sustain, and in developing countries where environment disturbing mistakes should be avoided whilst recognizing their right to reach an acceptable level of welfare and wellbeing.

Key new scientific partnerships established in recent years are the international Belmont Forum of agencies funding environmental change challenges research (co-chaired by the European Commission), the Future Earth initiative for global sustainability research, the S&T Alliance for Global Sustainability Research and the Group on Earth Observations (GEO). In addition an even higher number of networks – formal or not – addressing sustainable development in a broader context have been established more or less recently. Some of them can be directly linked to the 2030 Development Agenda with its SDGs adopted by the UN in September 2015. The World Business Council for Sustainable Development, the Sustainable Development Solutions Network, the Global Development Network, the Green Growth Knowledge Platform are just a few examples. This international setting has a strong potential for providing a significant international multiplier effect to the outcomes and impacts of national science, technology and innovation efforts, outside the strict context of formal bilateral or bioregional Conventions.

This new setting needs thus to be monitored closely: because additional research funding opportunities as such become available, and because it offers new – and sometimes quite innovative – opportunities for multiplying national scientific assets. Larger countries – France, Germany and the United Kingdom, to fix the ideas – have and maintain the capacity to pro-actively monitor and respond to such developments. But this is much less the case for small- to medium-sized nations that quite often simply don't have the human or financial resources or lack the drive to do the same.

Today's KVAB Forward Look Event is therefore an excellent opportunity to explore how small- to medium-sized nations could jointly convert this changing international setting into concrete opportunities for multiplying their individual assets. This is not an easy task because the setting is not always compatible with the programming cycles and the financial and administrative rules and procedures most of us should comply with. But "not easy" not necessarily equals "not possible", especially not for scientists.

Jean-Claude Worms

Jean-Claude Worms is Chief Executive of the European Science Foundation (ESF) where he leads a dedicated team of science professionals committed to the success of the European Research Area. In his 28 year career to date, Jean-Claude has contributed at the highest levels of European science and internationally, with a deep understanding of the needs and priorities of the science community, policy makers, organizations and institutions.



His experience ranges from research management and strategic planning, to assessing the programmatic aspects of agencies and research councils, co-ordinating policy and strategy at national and international level, and working with officials, executives and scientific interest groups worldwide. Jean-Claude is involved in European Space Agency (ESA) high-level science advisory structures and has participated with an observer status to ESA's Ministerial Conferences since 1999. He is also a member of the European Commission Space Advisory Group and he co-chairs the Science Advisory Group of the International Space Exploration Coordination Group (ISECG). He holds a PhD in physics (astronomy and space science) from the University Pierre et Marie Curie (Paris) and has over fifteen years of research experience in international space research projects. Jean Claude joined ESF in 1994, contributing strongly to the growth and development of the organisation in a career path which led to his appointment as CEO in 2015. Since 2011, he has been instrumental in planning and implementing the change management programme for the ESF. This has seen the successful transformation of ESF into an expert sciences services organisation, serving the European Research Area.



Karin Metzlaff

Executive Director, European Plant Science Organisation, EPSO

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Career

Executive Director, European Plant Science Organisation, BE, since 2000

Research Projects Manager, John Innes Centre Norwich, UK, 1998-1999

Post-doctoral Research Scientist JIC Norwich, UK, 1993-1998

Scientific Assistant Federal Health Office, Inst. Veterinary Medicine, Jena, DE, 1992-93

Post-doctoral Scientist Martin-Luther-University Halle, DE, 1991-1992

PhD in plant genetics and molecular biology, Martin-Luther-University Halle, DE, 1991

Selected Recent Activities

Chair ISE Working Group Horizon 2020 / H20+ (since 2015)

Member High-Level Steering Board of the EC's European Innovation Partnership on Agriculture (2013-14)

Observer for EPSO in the ERA-Net on Molecular Plant Sciences (since 2012)

Deputy-representative of EPSO in the Global Plant Council, GPC (since 2009)

Board & Steering Council, European Technology Platform "Plants for the Future" (since 2006)

Representative of EPSO in the Initiative for Science in Europe, ISE (since 2004)

Research interests

Developmental biology, plant genetics and molecular biology

Panel contribution

ISE statement on Collaborative Basic Research as part of the research and innovation cycle in Horizon 2020 and H20+

Work by ISE and other stakeholders (LERU, Science Europe,...) suggests that due to the focus on higher technology readiness levels, the societal challenges part of Horizon 2020 misses out the potential from projects that include or focus on basic research and would likely lead to ground breaking solutions for today's and future challenges. Compared with FP6 and FP7, there is a steady increase of support for applied research and demonstration actions and a steep increase of support for innovation actions. However, support for basic research has dropped dramatically, especially from FP7 to Horizon 2020. This is in contrast to the legal text of Horizon 2020 which stresses in Part III, Priority 'Social challenges' that "activities shall cover the full cycle from basic research to market".

Recommendation

Future Societal Challenges work programmes should give more equal consideration to basic research in relation to the other components (applied research, demonstration and innovation actions) of the research and innovation cycle. This could be achieved in various ways, such as: Include in the Societal Challenges pillar projects that include or focus on collaborative basic research and broaden the scope of ERA-Nets again (by addressing several related goals, thereby reducing the number of ERA-nets). All these will at the same time widen participation incl. from underrepresented countries, increase mobilisation of national and EU resources and contribute to resolving gaps on collaborative research.

About

ISE, the Initiative for Science in Europe, is an independent platform of European learned societies and scientific organizations whose aim is to promote mechanisms to support all fields of science at a European level, involve scientists in the design and implementation of European science policies, and to advocate strong independent scientific advice in European policy making.
www.initiative-science-europe.org

EPSO, the European Plant Science Organisation, is an independent academic organisation that represents more than 220 research institutes, departments and universities from 31 countries, and 3.300 individual Personal Members, representing over 28 000 people working in plant science. EPSO's mission is to improve the impact and visibility of plant science in Europe, to provide an authoritative source of independent information on plant science, and to promote training of plant scientists to meet the 21st century challenges.
www.epsoweb.org



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