

SYMPOSIUM REPORT

Interdisciplinarity

BRUSSELS, 21 NOVEMBER 2018



**SCIENCE
EUROPE**
Shaping the future of research

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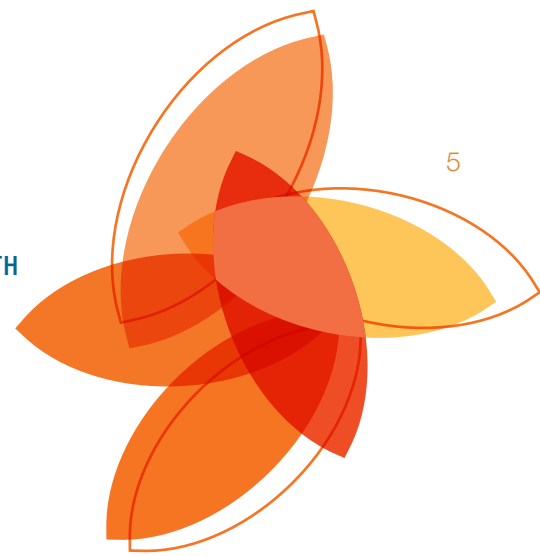
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Interdisciplinarity

SYMPOSIUM ORGANISED BY SCIENCE EUROPE IN COLLABORATION WITH
ITS SCIENTIFIC ADVISORY COMMITTEE



Introduction to the Symposium

Interdisciplinarity is increasingly used to tackle complex scientific questions and address large societal challenges. There is much literature that suggests that combining different academic disciplines and techniques in a single research project has a strong ability to create breakthrough research and innovation.

State-of-the-art research provides new insights that suggest ways of learning and instruments exist that can foster and encourage such interdisciplinary research. At the same time, the evaluation of interdisciplinary research proposals poses a set of problems, ranging from missing common standards and criteria to shortages of peer reviewers with experience in evaluating interdisciplinary research. Issues regarding a negative impact on career prospects of researchers engaging in interdisciplinary research also exist.

At its third Symposium, hosted in Brussels on 21 November 2018, Science Europe and its Scientific Advisory Committee brought together researchers and other experts experienced in interdisciplinarity with high-level representatives from Science Europe's Member Organisations, who fund and perform such research. These organisations have the ability to encourage interdisciplinarity by setting policies and procedures that support it and remove obstacles.

In a number of presentations and dialogues, researchers and other experts shared their experience of what is needed for them to perform excellent interdisciplinary research. Likewise, representatives of research funding agencies presented their initiatives and plans for supporting that type of research.

'Interdisciplinarity' is horizontal to a majority of Science Europe activities and will be mainstreamed into discussions such as open access, peer review, the reward and incentive systems, and careers.

Topics Discussed

The symposium was structured in two sessions that discussed the following topics:

- ▶ Key drivers for interdisciplinarity and its 'renaissance'.
- ▶ Key challenges of interdisciplinarity and necessary breakthroughs.
- ▶ Tools and instruments to support communication and enable interdisciplinary research between peers, as well as collaborations with third parties (such as with industry).
- ▶ Structured dialogue techniques to reveal attitudes, views, values, and beliefs within teams, project groups or different research disciplines.
- ▶ The responsibility of researchers to organise themselves in promoting interdisciplinarity as a discipline in its own right.
- ▶ The leadership role of funding agencies in creating suitable environments, funding schemes, and adequate training for reviewers.
- ▶ Systems to be put in place to promote interdisciplinary research.
- ▶ Presentation of new pilots and outcomes of current programmes of funding agencies (including the ERC) to promote interdisciplinarity.



Welcome and Introduction

BONNIE WOLFF-BOENISCH, HEAD OF RESEARCH AFFAIRS, SCIENCE EUROPE

“Interdisciplinarity is not new, but it has gained increasing traction in the context of the global transformation of societies, the Sustainable Development Goals, and the ‘Mission-oriented research’ concept of the European Commission.”

- Despite the increasing amount of parties and research communities working and writing on interdisciplinarity, confusion about how to effectively collaborate and evaluate remains.
- Interdisciplinary research is a research topic in its own right.
- There are a lot of experts on interdisciplinarity within their respective fields, but very few experts exist on the topic as a whole.
- Experts, with their ‘helicopter view’ and hands-on approach, can provide guidance and reasoning.

Session 1

CHAIR: **SØREN HARNOW KLAUSEN**, MEMBER OF THE SCIENTIFIC ADVISORY COMMITTEE, PROFESSOR AT THE DEPARTMENT FOR THE STUDY OF CULTURE PHILOSOPHY, UNIVERSITY OF SOUTHERN DENMARK

“To properly organise and fund interdisciplinary research, there need to be more tangible elements than principles and unexpected results.”

- Fundamental obstacles are the same for all researchers and funding agencies:
 - Interdisciplinarity has a strange and elusive nature.
 - Scientists and funding agencies agree that interdisciplinarity is a good thing, but nobody is sure how to do it efficiently.
- Monodisciplinary research, like interdisciplinarity, does not have strictly fixed structures.
- It is difficult for scientists to know how to conduct interdisciplinary research and succeed.
- Reviewers need to know what and how to evaluate.

Setting the Scene – Key drivers for Interdisciplinarity

KEYNOTE SPEAKER: **GABRIELE BAMMER**, PROFESSOR OF INTEGRATION AND IMPLEMENTATION SCIENCES, THE AUSTRALIAN NATIONAL UNIVERSITY

“Funding Agencies have a leadership role in making interdisciplinarity a reality.”

- To improve the way interdisciplinarity is conducted, two types of breakthroughs are needed:
 - Acknowledging that multiple types and levels of interdisciplinarity exist.
 - The need to differentiate interdisciplinarity based on four core elements:
 1. Type of knowledge creation, for example applying existing knowledge in a new way or developing new understanding by blending insights from disciplines and/or stakeholders.
 2. Understanding and managing different types of unknowns. For example, coping with the lack of familiarity with best practices in different disciplines, or the lack of knowledge of concerns of different stakeholders.
 3. Dimensions of integration (see below).
 4. Whether or not implementation of research into policy and/or practice change is integral to the research and, if so, whether the target is government, business, or civil society.

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- Integration is central to interdisciplinarity and is key to differentiating various kinds of interdisciplinarity:
 - What is the purpose of the integration?
 - How complex is the integration? In particular, how many disciplines and stakeholder groups are involved, how diverse are their perspectives, and is value conflict involved?
 - How is the integration achieved? For example, is it through dialogue, or building a shared model, or developing a joint product (such as a new technology)?
 - When in the project cycle does integration occur, for example at the beginning, throughout, and/or at the end of the lifetime of a project)?
 - Who (an individual, the whole team, a sub-group) is responsible for the integration?
 - Integration is relatively straightforward in some types of interdisciplinarity: for example, when there are only a small number of closely aligned disciplines that work together to develop a common technology. Integration is much more complicated in other kinds of interdisciplinarity: for example, when there are a large number of disciplines and stakeholders with disparate and conflicting views about a societal problem.
 - The different levels of integration provide a foundation for distinguishing different kinds of interdisciplinarity. This is critical for peer review, to ensure that reviewers are chosen who have experience in the kind of interdisciplinarity that is being assessed.
 - An overarching challenge for interdisciplinary research is fragmentation within the different research communities and the interdisciplinary research landscape. This leads to fragmentation of resources (methods, concepts, and so on), which in turn leads to reinventing the wheel, the use of sub-standard methods and processes, and a lack of continuous quality improvement.
 - A way out would be to establish high-level organisations (colleges of peers, professional associations, and so on) to co-ordinate and to agree on frameworks.

Research Funding Organisations (RFOs) should encourage and support leadership efforts from the interdisciplinary research community, and guide and develop authoritative leadership.

A non-exhaustive list of measures that can be put in place by RFOs and interdisciplinarians:

- Acknowledge that evaluating interdisciplinary research needs investment, long-term view, and persistence in figuring how to best accomplish it.
- Recognise relevant expertise in interdisciplinarity (e.g. integration, implementation, stakeholder engagement, team co-ordination).
- Ensure that assessment is conducted by suitable peers from the research community.
- Pay attention, through peer review, to quality of the methods used and preventing reinvention.
- Design protocols and agree on frameworks for interdisciplinarity research and its evaluation; there is currently no agreed way to write an interdisciplinary methods section for a paper or grant application.
- Support the creation of high-quality publication outlets specialised in publishing interdisciplinary research methods.
- Review how to best train interdisciplinary researchers, as well as integration and implementation specialists.
- Establish appropriate career progression trajectories and rewards.
- Help build repositories that collect interdisciplinary concepts and methods, and support their use.

Additional points raised during the discussion with the audience about the key drivers for interdisciplinarity:

- ▶ Promoting interdisciplinarity needs time, a luxury that researchers do not have; funders need to understand the time (and infrastructure) it takes to create interdisciplinarity.
- ▶ It should be possible for researchers to make different levels of commitment to an interdisciplinary project. Some will want to be deeply involved in the whole process, while others may prefer to only be involved in a sub-project that relies directly on their expertise.
- ▶ There is a need to move towards a more organised way of approaching and building interdisciplinary organisations, projects, and individuals. This involves learning from existing successful interdisciplinary organisations, projects, and individuals.

Designing Interdisciplinary Projects – Can We?

MICHAEL O'ROURKE, INTERIM DIRECTOR OF THE MSU CENTRE FOR INTERDISCIPLINARITY, DIRECTOR OF THE TOOLBOX DIALOGUE INITIATIVE, PROFESSOR AT THE DEPARTMENT OF PHILOSOPHY AND AGBIORESEARCH, MICHIGAN STATE UNIVERSITY, US

“It is important to openly communicate indirect commitments that matter to project decision-making in interdisciplinary research projects.”

- O'Rourke's research team developed the 'Toolbox Dialogue Initiative',¹ which aims to help design interdisciplinary communication and to demystify a part of the interdisciplinary process. Philosophical concepts are used as a base.
- Integration is a critical part of interdisciplinary success. To achieve integration, you need to set up a robust 'ecosystem' of disciplinary inputs which is a system of different elements that interact with each other and with the goal to yield a coherent research response.
- The communication within an interdisciplinary project consists of two sides: a relational side of information exchanges (e.g. calibrate expectations, build trust, listen deeply, reward openness, accept vulnerability) and an informational side of interpersonal exchanges (appreciation for different core beliefs and values, recognition of implicit research communication).
- The clash of different disciplinary cultures can increase interpersonal frustration.
- The desire to agree with one another and achieve consensus may deviate from the critical capacities necessary for discoveries of important methodological, theoretical, and practical differences among the disciplines.
- Unacknowledged differences compromise interdisciplinary research and practice. There are, among others, differences in research disciplines' languages and priorities, values, and cultures.
- It is essential to calibrate expectations when working in an interdisciplinary research group. Any indirect (or not well-communicated) commitments that are relevant for decision making during the project, should be made explicit (openly communicated), so that all group members are aware of them. This is hard work and it can seem like a distraction to spend time talking about processes. However, the investment will reduce the amount of time needed to clarify any later misunderstandings.

Strategies for Synergies – Chances and Challenges of Interdisciplinary Co-operation: Insights from (Research) Practice

MARIE LENA HEIDINGSFELDER, HEAD OF THE COMPETENCE CENTRE PROCESS DESIGN AND TRANSFORMATIVE METHODS AT THE FRAUNHOFER CENTRE FOR RESPONSIBLE RESEARCH AND INNOVATION, GERMANY

“Interdisciplinary innovation arises from the positive effects that occur when crossing the social boundaries in how we structure knowledge.”

- The Fraunhofer Centre provides interdisciplinary perspectives with input from scientists from different disciplines who raise different questions and bring in different approaches.
- The value proposition of interdisciplinarity in problem solving or product development is using different skills and analytic perspectives by making use of different repositories of knowledge, framing problems, developing richer solutions, and increasing the likelihood of radical innovation.
- The value proposition of interdisciplinarity in academic, curiosity-driven research is establishing new conjunctions of different interests and perspectives by creating new insights and fostering breakthroughs by serendipity.
- The 'Quadruple Helix model'² responds to the evolving need for a hybrid, transdisciplinary exchange among science, industry, government, and society.

- Interdisciplinary innovation makes use of different repositories of knowledge – but this knowledge is structured in silos. Different disciplines often have different languages, core values, priorities and goals, working processes, time horizons and different attitudes towards other disciplines.
- For a new interdisciplinary team to become effective, it must develop shared values and culture. Three major principles for successful interdisciplinary research:
 - Enable exchange, knowledge creation, and co-design beyond the limits of language through design-based methods.
 - Avoid misunderstandings and create a common ground helped by transformation and translation.
 - Value different perspectives and approaches and create spaces for co-creation.

Additional points raised during the discussion with the audience on practical points on designing interdisciplinary research projects:

- ▶ The success of interdisciplinarity also depends on what kind of people are involved, regardless of what country they come from, or which different organisational structures exist to further and undertake interdisciplinary research in different countries.
- ▶ There needs to be clarity on what kind of outcomes end users and stakeholders can expect from interdisciplinary research projects. Finding stakeholders to become involved is no issue when the benefits are properly defined.

Teaser ‘Beyond Disciplinarity’: Deep Learning to Apply Real-World Circumstances and to Solve Novel Problems

OLA ERSTAD, CHAIR OF THE SCIENTIFIC ADVISORY COMMITTEE, PROFESSOR AND HEAD OF DEPARTMENT OF EDUCATION, OSLO UNIVERSITY, NORWAY

“Deep learning will be one of the key competences to address real-world problems and to solve new problems.”

- New educational curricula and a transformation of competences are needed to prepare the young generation of school students and early-career researchers for the 21st century, including emerging trends in digitalisation and artificial intelligence, changing labour markets, and the role of science for knowledge creation in our societies.
- In such a context, fundamental questions arise about science and education, such as how to deal with knowledge, how to raise issues of uncertainty, or what other ways exist to acquire competences.

What is Deep Learning?

- Deep learning is about complexity: integrating disciplinary knowledge to solve real-world problems.
- Learning and integrating concepts and principles of disciplines and knowledge domains.
- Acquiring transferable/transversal competences.
- There is a need for research about educational transformations and skill developments for interdisciplinary approaches.
- Transferable skills and competences need to be taught to enhance early-career researchers’ employability and competitiveness.
- Those skills will help students to be able to better integrate different elements in the way that they solve problems.

In Finland and Norway, curriculum changes in schools and universities focus on moving from disciplinary knowledge towards deep learning.

Session 2: How Should Funders Facilitate, Stimulate, and Support Interdisciplinarity?

Interdisciplinary Research Funding at the Swiss National Science Foundation (SNSF)

ANGELIKA KALT, DIRECTOR OF THE SWISS NATIONAL SCIENCE FOUNDATION

“Research is increasingly interdisciplinary and funding instruments have to take it into account.”

On 15 November 2018, an internal Workshop on Interdisciplinarity of the Specialised Committee on Interdisciplinary Research of the SNSF took place. Some of the points raised there dealt with:

- The recognition and careers in the interdisciplinary space.
- The need for bridge builders between, and translators of, disciplines.
- The need to finance or create space for people to meet and develop their projects.

Steve William Fuller of the University of Warwick, UK, guest speaker at the SNSF workshop, stated that “disciplines are artificial constructs.”

Activities on Interdisciplinarity at the SNSF

The SNSF runs an annual interdisciplinary programme called Sinergia. This funding scheme promotes the interdisciplinary collaboration of two to four research groups proposing transformative or breakthrough research. Applicants need to justify that an interdisciplinary approach is needed, but otherwise a ‘no strings attached’ approach is taken by the SNSF: any topic and any constellation of researchers can be funded.

Although interdisciplinary research can be funded in other programmes – the majority of proposals received by the SNSF is in fact already collaborative – Sinergia specifically allows for the integration of young scientists as PIs and has a much higher rate (around 1/3rd) of applicants who focus solely on interdisciplinary research. Over the past 10 years, the budget of the programme has increased. It currently has a success rate of 25–30%.

Challenges of Sinergia

- Not all of proposals are high-risk or ground-breaking.
- Evaluators are concerned about the career chances of the people that are employed in these projects.

The SNSF is considering text and data mining tools to either conceive of or evaluate interdisciplinary research in the future.



The Role of Funders in Supporting Interdisciplinary Research: Implications for Peer Review and Academic Careers

CATHERINE LYALL, PROFESSOR OF SCIENCE AND PUBLIC POLICY, SCIENCE, TECHNOLOGY AND INNOVATION STUDIES, SCHOOL OF SOCIAL AND POLITICAL SCIENCE, UNIVERSITY OF EDINBURGH, UK

“There is a need to take responsibility for the promotion and careers of scientists working in interdisciplinary research when interdisciplinarity is encouraged.”

- The paradox of interdisciplinarity is that it is encouraged at a policy level, but subsequently poorly rewarded.
- There is a risk that universities may only pay nominal lip service to interdisciplinarity in order to be eligible for funding allocated to interdisciplinary research.
- Funders who encourage interdisciplinarity should also recognise the implications for researchers' careers and ensure that an appropriate career structure and opportunities are available.
- To assess interdisciplinary research, people with an appreciation of interdisciplinary research methods are needed. It may not always be possible to identify key milestones, slightly longer application forms may be necessary, more external reviewers might be needed, and the review process should be more of a dialogue between applicant and evaluator than in traditional research.
- Additional costs for networking and conferences should be built as a legitimate costs into budgets for interdisciplinary research projects.

Addressing Interdisciplinary Research at the European Research Council (ERC)

BENJAMIN TURNER, POLICY ANALYST AT THE EUROPEAN RESEARCH COUNCIL EXECUTIVE AGENCY

“Interdisciplinarity as it exists can be accommodated by research funders using existing mechanisms, but for truly interdisciplinary sciences to flourish, it would need more fundamental and structural changes in the research and education systems.”

- Since the setup of the ERC in 2007, interdisciplinarity has been included in its definition of excellence.
- Both previous and existing peer review panel structures have been set up to encourage interdisciplinarity.
- Between 2008 and 2011, about 13% of the total allocated budget was reserved for interdisciplinary projects (cross-panel and/or cross-domain research projects and research with the potential to open up new fields of research).
- Calls for Synergy Grants have been issued in the past: in 2012, and recently in 2018. ERC Synergy Grants intend to foster research at the intellectual frontiers by enabling a small group of two to four Principal Investigators and their teams to bring together complementary skills, knowledge, and resources in new ways to jointly address ambitious research problems. The aim is to promote substantial advances at the frontiers of knowledge, to cross-fertilise scientific fields and to encourage new productive lines of enquiry and new methods and techniques, including unconventional approaches and investigations at the interface between established disciplines. This should enable transformative research not only at the forefront of European science, but also to become a benchmark on a global scale.
- Research proposals of a multi- and interdisciplinary nature are strongly encouraged throughout the ERC's schemes. Proposals of multi- and interdisciplinary nature are evaluated by the ERC's regular panels with the appropriate external expertise. It is no longer considered necessary to establish an indicative percentage budget to fund proposals of a cross-panel and/or cross-domain nature.
- Funding for such proposals will come from the regular panels that perform the evaluation.

- In cases where panels determine that a proposal is of a cross-panel or cross-domain nature, panels may request additional reviews by appropriate members of other panel(s) or additional referees.
- The mainstreaming of interdisciplinary research within all fields and domains since 2012 has led to a decrease of cross-panel proposals: from 2011 to 2017, they went from 37% to 14% for Starting Grants, and from 32% to 16% for Advanced Grants.
- At step 1 of the ERC evaluation process, the success rate of cross-panel proposals has consistently been slightly lower across the main ERC calls (average of 23% for cross-panel proposals versus 28% for single-panel proposals). At step 2, the success rates have been 44% and 46%, respectively.

Interdisciplinarity as it exists can be accommodated by research funders using existing mechanisms, but for truly interdisciplinary sciences to flourish, it would need more fundamental and structural changes in the research and education systems. If peoples' careers depend on excellence in a specific discipline and they have been trained to think and work that way for many years, it is unlikely that tweaking criteria for funding will change much or yield the kind of results policy makers say they want.

New Initiatives on Interdisciplinarity at the Austrian Science Fund (FWF)

UWE VON AHSEN, HEAD OF DEPARTMENT STRATEGY & DEVELOPMENT NATIONAL PROGRAMMES, FWF

“Pilots for interdisciplinary research provide learning for all stakeholders involved regarding definitions and scopes of interdisciplinarity.”

- In the last few years, FWF has observed trends towards team-oriented research and increasing interdisciplinarity (15%) according to discipline classification.
- The approval rate of interdisciplinary project applications is (slightly) lower than that of other programmes.

Young Independent Research Groups

Young Independent Research Groups (YIRG) is an FWF postdoc programme for innovative, interdisciplinary teams. It targets early-career postdocs (0–4 years after doctorate) to engage in a medium-term (4 years), interdisciplinary research collaboration on a complex, innovative topic with a mixed team of 3–5 researchers. Gender balance is taken into account.

Expressions of Interest are checked against the eligibility of the applicants and of the suggested research topic. Proposals that make it through this selection are reviewed by three external reviewers before making it to a jury for final approval or rejection. This jury consists of a Chair with ample experience in interdisciplinary research, around 12 renowned scientists/scholars, and 4 researchers who represent each FWF department.

There is enormous interest in the YIRG programme from both national and international early-career researchers and scholars. Some preliminary observations from the programme:

- The level of interdisciplinarity varies among projects.
- Teams tend to be composed of around 30–50% women researchers.
- Proposals evaluated as excellent were commended for their highly innovative, truly interdisciplinary research topics.
- Proposals that did not pass the threshold for selection had comments in terms of overambitious research design, lack of elaboration on the methodology, or insufficient description of the integration of the different research disciplines.

Lessons Learnt from the YIRG Programme:

- Programme design: interdisciplinarity requires experience – integrate senior researchers as mentors or partners.
- Pilot, application, and recommendations from the jury and reviewers provide feedback to the community on the definition and scope of interdisciplinarity.
- Networking possibilities should be offered to facilitate idea complementation, matchmaking across disciplines, and learning how to organise the integration process.
- Also increase awareness of transdisciplinary research (in contrast to interdisciplinary research).

Lessons Learnt and How the Academy of Finland is Implementing Bottom-up and Thematic Funding Instruments

TIINA JOKELA, SENIOR SCIENCE COUNSEL, ACADEMY OF FINLAND

“Multidisciplinarity is key for Finland to maintain and renew its knowledge base.”

The Academy of Finland (AKA) is experimenting with new methods to analyse multidisciplinary in proposals by using algorithm-based analysis. Several examples of thematic funding were given:

- **Strategic research:** Funding for long-term programme-based research.
 - Top-down multidisciplinary is required.
 - Project teams must consist of researchers from at least three different research fields and two different organisations.
 - The objective is to achieve both societal and scientific impact.
 - This type of funding builds on high-quality research and promotes continuous dialogue between researchers and those who need research-based knowledge.
- **Academy Programmes:** Support the regeneration of Finnish science by providing funding for research into specific themes.
 - Typical characteristics: Science-driven, multidisciplinary, promoting science renewal, international outlook.
 - The instrumental goal of interdisciplinarity in the Academy Programme of Computational Science has largely been achieved. The funded research projects have successfully applied computational methods to understand and solve complex problems in various domains of science and society, including domains that have not yet fully exploited advanced computing capabilities. The added value of the programme was the multi- or interdisciplinarity and unlimited collaboration.
- **Academy Projects:** Support for bottom-up research.
 - The algorithms used for analysis identified that the majority (85%) of bottom-up research proposals (2,357 in total) in 2017 were multidisciplinary, compared to 15% monodisciplinary research proposals.
 - This raised questions concerning the robustness of the data and the used methods.
 - Next steps are to validate the algorithms used, to compare the results of algorithm-based analysis with qualitative study, to systemically monitor development of multidisciplinary in proposals, and to identify novel combinations of research fields included in proposals, which may indicate development of new research areas.

Additional points raised during the discussion with the audience about interdisciplinarity, research careers, and peer review:

- The French National Research Agency (ANR) experiments with interdisciplinarity: every year, out of 42 panels, 13 are inter-sectorial. Results lead to readjustments in the structure or the way the panels operate.

- UK Research & Innovation (UKRI) provides dedicated training for panellists and reviewers, especially regarding bias.
- In Lithuania, it is difficult to assess all 2,000 proposals per year on interdisciplinarity. However, some experiments and studies were undertaken that focussed on computational sciences only.
- Austria reviews about 2,500 proposals per year. It will be challenging to adapt to the new requirements for peer review processes regarding interdisciplinarity. A major motivation for Austrian scientists to undertake peer review is to stay in contact with science developments. It is not clear how they would react to be asked to follow trainings.
- Sharing of good practices is critical to learn from one another.
- Training of peer reviewers is important.

Concluding Remarks

CHAIR: **MARC LEMAN**, MEMBER OF THE SCIENTIFIC ADVISORY COMMITTEE, RESEARCH PROFESSOR IN SYSTEMATIC MUSICOLOGY AND DIRECTOR OF THE RESEARCH CENTRE OF THE MUSICOLOGY DEPARTMENT (IPEM) AT GHENT UNIVERSITY, BELGIUM

“Interdisciplinarity is the norm: disciplines have to argue why they exist.”

- All ‘wicked problems’ (those difficult or impossible to solve because of incomplete, contradictory, and changing requirements that are often difficult to recognise) are interdisciplinary.
- Silos in research disciplines may exist, but we must be open to ‘new silos’ (new research disciplines, interdisciplinarity, and so on).
- The paradox of interdisciplinarity is that it is encouraged, but poorly rewarded.
- To be serious with regard to interdisciplinarity, universities should consider reorganising their departments.
- Scientists need to organise themselves according to interdisciplinary research groups to promote interdisciplinarity.
- Research Funding Organisations should support and guide efforts from the interdisciplinary research community to develop authoritative leadership.

STEPHAN KUSTER, SECRETARY GENERAL OF SCIENCE EUROPE

“Interdisciplinarity is horizontal to many Science Europe activities.”

The Symposium is an important place for the research community to discuss important topics with Science Europe members. This year’s topic demonstrated its timeliness, highlighting in how many different initiatives of Science Europe and its member organisations, interdisciplinarity plays a role. It does so in, for example, topics such as peer review and evaluation, open science practices, career perspectives, and in rewards and incentives within the scientific system.

Interdisciplinarity also cuts across other areas that Science Europe members are involved in. Interdisciplinary collaboration and team science are relevant for the funding of solutions for the Grand Challenges and Sustainable Development Goals, and for promoting breakthrough research and innovation.

Acknowledgement to Scientific Advisory Committee

Stephan Kuster and Marc Schiltz, President of Science Europe, thanked the members of Science Europe’s Scientific Advisory Committee for hosting the event on behalf of Science Europe. They also recognised their contributions during the committee’s two-year mandate, which ended in late 2018.

Notes and References

1. <http://tdi.msu.edu/>
2. Etzkowitz, Henry; Leydesdorff, Loet (1995-01-01). "The Triple Helix — University–Industry–Government Relations: A Laboratory for Knowledge Based Economic Development". Rochester, NY:
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2480085
Carayannis, E.G. and Campbell, D.F.J. (2009). "'Mode 3' and 'Quadruple Helix': toward a 21st century fractal innovation ecosystem". Int. J. Technology Management. 46(3/4): 201–234:
https://edisciplinas.usp.br/pluginfile.php/3572572/mod_resource/content/1/8-carayannis2009.pdf

Other Materials

- More information on the event and a copy of the presentations can be found on the Science Europe website:
<https://www.scienceeurope.org/sac/symposium-2018/>
- More photos of the event can be found on the Science Europe Flickr account:
<https://www.flickr.com/photos/145577965@N05/sets/72157701046600472>
- Bammer, G., 2017, Should we discipline disciplinary?, in Palgrave Communications 3:
<https://www.nature.com/articles/s41599-017-0039-7>



Wednesday 21 November 2018 // BluePoint Conference Centre, Brussels**14.00–14.10 Welcome and Introduction**

Welcome

Ola Erstad, Chair of the Science Europe Scientific Advisory Committee, Professor and Head of Department of Education at Oslo University, Norway

Introduction to the Symposium

Bonnie Wolff-Boenisch, Head of Research Affairs at Science Europe

14.10–15.45 Session 1

Chair

Søren Harnow Klausen, Member of the Scientific Advisory Committee, Professor at the Department for the Study of Culture Philosophy, University of Southern Denmark

Setting the Scene

Improving Interdisciplinarity Needs Three Breakthroughs

Gabriele Bammer, Professor of Integration and Implementation Sciences, The Australian National University

Designing Interdisciplinary Projects – Can We?

Designing Interdisciplinary Communication

Michael O'Rourke, Professor at the Department of Philosophy and AgBioResearch, Michigan State University, Interim Director of the MSU Centre for Interdisciplinarity, Director of the Toolbox Dialogue Initiative, US

Strategies for Synergies – Chances and Challenges of Interdisciplinary Co-operation: Insights from (Research) Practice

Marie Lena Heidingsfelder, Head of the Competence Centre Process Design and Transformative Methods, Fraunhofer Centre for Responsible Research and Innovation, Germany

Teaser 'Beyond Disciplinarity'

Deep Learning to Apply Real-world Circumstances and to Solve Novel Problems

Ola Erstad, Professor and Head of Department of Education, Oslo University, Norway, Chair of the Scientific Advisory Committee

16.15–18.05

Session 2: How Should Funders Facilitate, Stimulate, and Support Interdisciplinarity?

Chair

Marc Leman, Member of the Scientific Advisory Committee, Research Professor in Systematic Musicology and Director of the Research Centre of the Musicology Department (IPEM) at Ghent University, Belgium

Interdisciplinary Research Funding at the SNSF

Angelika Kalt, Director of the Swiss National Science Foundation

The Role of Funders in Supporting Interdisciplinary Research: Implications for Peer Review and Academic Careers

Catherine Lyall, Professor of Science and Public Policy at the University of Edinburgh, UK

Addressing Interdisciplinary Research at the European Research Council

Benjamin Turner, Policy Analyst at the European Research Council Executive Agency

New Initiatives on Interdisciplinarity at the Austrian Science Fund

Uwe von Ahsen, Head of Department Strategy & Development National Programmes at the Austrian Science Fund

Multidisciplinarity in Funding Instruments at the Academy of Finland

Tiina Jokela, Senior Science Counsel, Academy of Finland

18.05–18.15

Conclusion and Closing

Concluding Remarks and Closing of the Symposium

- **Stephan Kuster**, Secretary General of Science Europe
- **Ola Erstad**, Chair of the Scientific Advisory Committee
- **Marc Schiltz**, President of Science Europe

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