

**AGENDA** of the President of the Helmholtz Association

Version: 12 January 2017

**2016 – 2020**

# AGENDA 2016–2020

## of the President of the Helmholtz Association

In keeping with its mission, the Helmholtz Association has worked continuously over the past years to address the complex issues facing science, society and the economy using integrated approaches from basic research through to application, and to provide and implement solutions. This systems expertise is a hallmark of the Helmholtz Association. The Association is currently in a new dynamic phase of its development. Strategy processes are being implemented in all research fields and, at the Association level, we are working to improve our structures and methods in line with the German Council of Science and Humanities recommendations of 2015.

The Helmholtz Association aims to distinguish itself through the outstanding quality of its research, its excellent position in both the national and international science system, its high innovative capacity, and its ability to attract the best and brightest minds in the world.

The overarching goal must be to further strengthen the research capability and systems expertise of the Helmholtz Association. This affects the strategic orientation and governance of the Association and its role in the national and international science system.

### **The following questions guide us in developing our strategic priorities:**

- Where we do want the Helmholtz Association to be in five years?
- Are we well-positioned with our six research fields, also in the long-term?
- Do we have efficient and effective methods and processes?
- Are we focusing on the important topics of the future in order to ensure that we continue to fulfill our mission in the long-term?
- How can we make the Helmholtz Association and its centers even more attractive for talented researchers around the world?

In this paper, we would like to outline the **key areas of focus for the coming years:**

1. **THE ASSOCIATION'S STRATEGIC ORIENTATION**
2. **THE GOVERNANCE OF THE ASSOCIATION**
3. **TALENT MANAGEMENT:  
RECRUITMENT AND CAREER DEVELOPMENT AS  
KEY TASKS OF THE FUTURE**
4. **HELMHOLTZ AS A STRATEGIC PARTNER  
IN THE SCIENCE SYSTEM**
5. **TRANSFER AND INNOVATION:  
HELMHOLTZ AS A PARTNER TO BUSINESS AND SOCIETY**
6. **HELMHOLTZ AS A PARTNER AT INTERNATIONAL LEVEL**
7. **CONTINUAL INVESTMENT IN THE  
RESEARCH INFRASTRUCTURES OF THE FUTURE**
8. **THE INITIATIVE AND NETWORKING FUND**

## 1. THE ASSOCIATION'S STRATEGIC ORIENTATION

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*With its excellent basic research, innovative and interdisciplinary approaches and high transfer potential, Helmholtz has outstanding systems expertise. This expertise must be strategically aligned to the main challenges facing science, society and the economy. The Association's research fields have the important task of establishing the pioneering research areas of the future and developing interdisciplinary system solutions with the best partners.*

The future positioning of our research fields is currently being determined in strategy processes, which will have been completed in the first half of 2017. The resulting portfolio of research topics will be in line with our overall mission and based on the criteria of achieving a globally leading position, a long-term, interdisciplinary approach, and covering the entire spectrum of innovation from basic research to application-oriented research projects.

### **From today's perspective, the substantive challenges include:**

- Energy systems of the future
- Information and data science
- Integrated research of the Earth system
- New materials and substances
- Development of new mobility concepts
- Translation for individualized and data-based medicine; psychological illnesses
- New generations of compact accelerator systems

Over the coming years, we will be promoting these and other topics in various ways. The field of information and data science is a particular priority, and will receive substantial funding from the Initiative and Networking Fund.

### **Helmholtz initiatives in the area of information and data science**

Groundbreaking developments in the area of digital information processing and complex data analysis are opening up entirely new possibilities for data-based research and development. This rapidly developing field presents one of the greatest challenges for the science system and affects all levels of the Helmholtz Association – from the centers to the research fields, research programs, and the Association level. Thanks to its enormous expertise and powerful infrastructure, Helmholtz

is extremely well-positioned in this all-important area. The field covers a broad spectrum of topics from supercomputing, chip and memory development, computer science and software programs to modelling and simulation, artificial intelligence, robotics, and the availability of extensive and complex data sets in all research fields (big data).

The goal is to intelligently bundle this diverse wealth of expertise and focus its synergies in new constellations, enabling the Helmholtz Association to become a driving force of innovation in the field of information and data science.

As a first step, an Information and Data Science Incubator needs to be established that will bring together top-level experts from all centers and research fields. These experts will continually design and develop innovative, interdisciplinary approaches and realize them in pilot projects. Formats, innovative concepts and interaction models will be developed as part of a strategic process.

This new innovation platform, which incorporates all levels of the Helmholtz Association, will receive substantial start-up funding from the Initiative and Networking Fund. One of the great advantages of this incubator is that it will operate across all Helmholtz research fields and centers. Another key task will be to train a new generation of interdisciplinary information experts and integrate them into the Helmholtz Association.

## 2. THE GOVERNANCE OF THE ASSOCIATION

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*In many areas of activity, the new challenges also require a rethink with regard to structures and processes within the Association. The future significance of our research fields has already been outlined. The productivity of the Association crucially depends on achieving a fine balance between the activities of the centers, the research fields and the Association level by focusing on improving systems expertise, providing guidance with science-led processes, and offering sufficient organizational and research freedom. In recent years we have laid the groundwork for achieving this balance, and will now focus on its implementation.*

The Helmholtz Association's activities are organized at the level of the research centers, the programs, the research fields, and the Association as a whole. As part of the continued development of the scientific strategy plan and the procedure of program-oriented funding, the governance of the organization also needs readjusting. At the level of the legally independent centers, the important actors are the center executives, the supervisory boards of the Helmholtz Centers, and internationally-staffed scientific advisory boards. At Association level, the key functions are carried out by the Assembly of Members, the President, the Executive Committee and the Senate as the superordinate advisory and coordination body. The important task of coordinating the national and local funding bodies is carried out by the Committee of Financing Partners. Tightening and better defining the governance structure, particularly at the level of the research fields, will further enhance organizational capability in both scientific and strategic terms. It is planned that all research fields will establish a management board consisting of executives from the participating centers, which will serve as a central platform for communications and strategy. This body will not have its own budgets or operational responsibility. A platform within each research field composed of representatives from the Helmholtz Centers, the funding bodies, and the new international strategic scientific advisory boards will enable the strategic coordination with the respective financing partners. It will also prepare key decisions at research field level. The research fields' internationally-staffed strategic advisory boards will play a crucial role in providing strategic advice, evaluating program proposals, and monitoring research activities. With this new structure in place, the decision-making bodies will be more precisely defined in future, better suited to support the strategic alignment, and can thus better serve the needs of the Helmholtz Association. In addition, the new structure will provide the best possible support for the recently refined procedure of program-oriented funding. The introduction of a scientific assessment method of all centers and programs based on agreed uniform standards will enhance the quality of strategy discussions in all research fields. These recommendations also incorporate suggestions made by the Council of Science and Humanities.

### 3. TALENT MANAGEMENT: RECRUITMENT AND CAREER DEVELOPMENT AS KEY TASKS OF THE FUTURE

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*The capability and research success of the Helmholtz Association is strongly dependent on our talented employees. A crucial task in further improving our scientific output, therefore, is to make Helmholtz an even more attractive environment for brilliant minds. The Association has already made considerable efforts to this end, which will be continued and strengthened in the years to come.*

**A set of measures will be developed within the centers, the research fields and the Initiative and Networking Fund that will take a fresh approach to this topic:**

A **first priority** is international recruitment: We are increasing our activities in this area across all organizational levels and are adding additional measures for the targeted recruitment of early career scientists with high potential.

The **second priority** is career assistance and development. We are building an active career development program, which will become a hallmark of the Helmholtz Association. The focus will initially be on career development offers for postdoctoral researchers. We are simultaneously working on a program for the promotion and development of female executive talent in a variety of target groups. Finally, the Helmholtz Management Academy training and career platform for promising leaders will be further expanded.

The **third priority** centers on the already excellent academic promotion of young researchers. The established Helmholtz Young Investigators Groups program will be expanded and developed. In the future, we will also support initiatives for the training of young talent in IT and set up international Helmholtz Research Schools.

Finally, targeted support will be offered to talented women within the Association who show promise either as young researchers or for executive roles, particularly at the stage when they are starting a family.

Initiatives here include flexible formats for Young Investigators Groups, the W2/W3 program for excellent female scientists, and a continuation of the recruitment campaign for foreign female scientists.

#### 4. HELMHOLTZ AS A STRATEGIC PARTNER IN THE SCIENCE SYSTEM

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*In order to find the most effective formats for collaboration within the German research system we will deploy a portfolio of strategic partnerships in a more targeted way. We also plan to make use of the options provided by the reform of Article 91b of the German Basic Law with a view to establishing further models for long-term collaboration between Helmholtz and universities.*

**Cooperation with universities was constantly expanded during the terms of both pacts and new cooperation models were developed:**

On the one hand these are large long-term merger and cooperation projects, for example the Karlsruhe Institute of Technology, the Berlin Institute of Health, the Jülich Aachen Research Alliance and the National Center for Tumor Diseases in Heidelberg and Dresden; and on the other, flexible and dynamic cooperation formats on an individual project basis. The Helmholtz Institutes are a particularly interesting tool in this regard and we plan to continue using them beyond 2020 to establish strong long-term partnerships to address specific topics of significance for the future. The Association hopes that the evaluation of the German Health Research Centers by the German Council of Science and Humanities in 2018 will provide useful recommendations for further developing the centers beyond 2020. New interactions with non-university research organizations will also be trialed to strengthen collaboration with these partners.

**New cooperation formats in the context of Article 91b of the Basic Law:**

In future, the Association will strive to set up topic-specific world-class facilities and integrate university and non-university partners into nation-wide consortia designed to address other key future fields, such as marine research, energy research and the important topic of information & data science, in order to ensure that the outstanding research carried out in Germany can be fully competitive at international level. The Helmholtz Association also firmly supports the further development of KIT, a research university unlike any other in the German scientific landscape.

## 5. TRANSFER AND INNOVATION: HELMHOLTZ AS A PARTNER TO BUSINESS AND SOCIETY

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*Promoting innovation, technology transfer, and business partnerships are paramount to the Helmholtz Association. Our unwavering priority for the future is to establish early strategic alliances between Helmholtz Centers and integral business partners. We will also strengthen our exchange with society through greater participation and increased knowledge transfer activities.*

The topics of technology transfer, promoting innovation, and strategic business alliances are paramount to the Helmholtz Association, with its high level of system expertise. In recent years, significant effort has been made to establish technology transfer activities and to systematically promote transfer success. Funding instruments like a Validation Fund, fast-start funding for start-ups, an Innovation Fund, or Innovation Labs at Helmholtz Centers are already bearing fruit. They require, however, sustained promotion and support.

The association has recently become exceptionally successful in the area of spin-offs, with an impressive portfolio of patents and licenses, which is inherently subject to significant fluctuations in revenue. Early strategic alliances between the Helmholtz Centers and integral business partners will gain further importance in the future. To achieve this, we must identify suitable partners, define common goals, and maintain established strategic alliances on a long-term basis. Promising examples can be found in the research fields of health, energy, matter, and key technologies. However, the full potential remains greatly untapped. We will, therefore, establish new communication platforms which allow business and Helmholtz research partners to meet and exchange on a regular basis.

We also want to further strengthen our interaction with society. We view knowledge transfer as an explicitly bidirectional and dialogue-oriented process. This includes public engagement in the planning, design, and communication of our research activities with members of the public, who are interested in science, as well as with civil society organizations. We also value increased public involvement in scientific processes (Citizen Science). There are already considerable knowledge transfer activities such as information and consulting formats like public health information services, exchange platforms, for example, regarding climate change, and student laboratories at nearly all Helmholtz Centers. We will advance the further development and strategic implementation of concrete knowledge transfer activities in and with society. For this purpose, we will promote model projects in knowledge transfer and record and communicate activities at our Centers even more extensively.

## 6. HELMHOLTZ AS A PARTNER AT INTERNATIONAL LEVEL

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*The Helmholtz Centers have an extensive network of international collaborations and partnerships. This network needs to be reviewed, reduced to the most promising approaches, and extended with specific measures.*

Particular attention must be given to collaborations that involve the best international partners, genuine win-win situations between the parties concerned, and the international exchange of young talent. Strong long-term partnerships have already been established with China, Canada, Russia and the US, among others. Our large research infrastructures foster internationalization, as does the involvement of Helmholtz Centers in foreign or international research facilities. Our success in competing for funding from the EU's Framework Programme and in international recruitment also ensures that the quality of the Association's research follows a consistent upward trend.

In future, the portfolio should focus on intensifying partnerships and international activities with a proven impact. We want to focus more on nations that conduct excellent research, such as Israel and the US, as strategic partners by using various cooperation models. In addition, we plan to gain experience with the international Helmholtz laboratories at foreign institutions and establish joint international Helmholtz Research Schools for doctoral training. A further aspect is that the centers and the Association will participate even more strongly in initiatives at European level within the framework of Horizon 2020 (particularly in coordinating joint projects and at the ERC) and in the upcoming Framework Programme 9 (FP9). Potential topics in this regard include the establishment of European consortia and initiatives for development partnerships, e.g. with institutions in Eastern, Central and Southern Europe.

## 7. CONTINUAL INVESTMENT IN THE RESEARCH INFRASTRUCTURES OF THE FUTURE

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*Designing, constructing and operating large research infrastructures and unique large-scale devices is a unique feature of the Helmholtz Association. Some of the increasingly complex facilities require new operator models, international alliances, and efficient project monitoring which we are in a very good position to perform.*

The Helmholtz Centers have a vast amount of technological and organizational know-how and plenty of highly qualified research staff for planning, constructing and operating large research infrastructures along their entire life cycle. The increasing number of highly complex infrastructures that are realized through international consortia leads to new demands in terms of governance and international operator models. The Helmholtz Association is ideally positioned for future developments in this respect. The selection of outstanding research projects regarding the use of these research infrastructures also presents an ongoing challenge.

### **The following aspects currently need to be granted special attention:**

Strategic planning has to be coordinated with national and international roadmap processes and with national and international partner organizations. In addition, new financing models for the construction and operation of large research infrastructures need be established, as does a life-cycle management system guided by Helmholtz project committees. We are also planning to set up on-site application laboratories for the implementation of outstanding research projects. These infrastructures will also require qualified employees, so training and supporting the next generation of scientists and infrastructure experts is a matter of great importance.

## 8. THE INITIATIVE AND NETWORKING FUND

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*The Initiative and Networking Fund is a valuable instrument for all the strategic projects outlined in this paper. The fund is systematically based on four key pillars and allows sufficient scope for innovative ideas and initiatives that are of significance to the Association to be taken up at short notice.*

In the upcoming phase of dynamic development, it will be crucial to support pioneering measures and initiatives with targeted funding from the President's Initiative and Networking Fund. The centers and research fields have announced that they are willing to provide a proportional share of the funding of successful initiatives and to finance them in the long-term through program-oriented funding (POF). A considerable budget of around €90 million is currently available for providing the appropriate incentives. The bodies within the Association and the financing partners have agreed to simplify the instruments used and to focus on the following four strategic areas:

- Strategic future fields of research
- Strategic partnerships
- Innovation and collaboration with business and industry
- Talent management

Particular attention will be given to: start-up financing for forward-looking projects in developing research areas; the Helmholtz incubator in the area of information and data science; new strategic alliances in the context of the Excellence Initiative; early development partnerships between Helmholtz Centers and complementary businesses; innovative measures in the field of talent management and career development. The final point in particular has plenty of development potential, which Helmholtz will seek to actively tap over the coming years.

## SUMMARY

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“Since its foundation, the Helmholtz Association has undergone a dynamic process of development” said the German Council of Science and Humanities in its evaluation of the Association’s program-oriented funding in 2015. We want to maintain and grow this momentum by further developing our research programs, improving our governance structure, and expanding our systems expertise. We will push ahead in cutting-edge research fields, prioritize talent management, recruitment and career development, and position the Helmholtz Association as an even more important strategic partner in the science system. The Initiative and Networking Fund will play an important role in these efforts.

We are committed to strengthening the position of the Association through new formats for promoting innovation and strategic partnerships with business and industry, and to raising the visibility of Helmholtz as a partner at the international level. We will also strive to secure continual investment in the research infrastructures of the future.

Over the coming years, the Helmholtz Association will do everything in its power to fulfill its mission and its tasks within the German science system: as a producer of knowledge, driver of innovation, cooperation partner, talent magnet, and research infrastructure operator.