

2022

Facts and figures

Annual report of the Helmholtz Association

HELMHOLTZ

Research for
grand challenges

Facts and figures 2022

The annual report of the Helmholtz Association

We are Germany's largest research organization and develop solutions and technologies for the world of tomorrow. In doing so, we ask ourselves key questions: What helps in the fight against life-threatening diseases? How can climate change be slowed down? How will the next quantum revolution change our lives?

Helmholtz's potential lies in its excellent scientists: About 44,000 employees work in the 18 research centers of the Helmholtz Association, use their globally unique research infrastructures and benefit from modern research management. We combine our strengths in six research fields: Energy, Earth and Environment, Health, Information, Aeronautics, Space and Transport, and Matter. We develop specific research programs for these areas, which are evaluated by international experts. Their judgment forms the basis for funding the programs.

We address the big questions of our time - from fundamental discoveries to practical applications. With an annual budget of five billion euros and long-term, interdisciplinary research programs, Helmholtz is one of the leading research organizations, even by international standards: We cooperate with the best institutions worldwide.

This brochure serves as a compact printable PDF version of the annual report online at: www.helmholtz.de/annualreport22. Unless otherwise indicated, the figures refer to the reporting status of the year 2021.

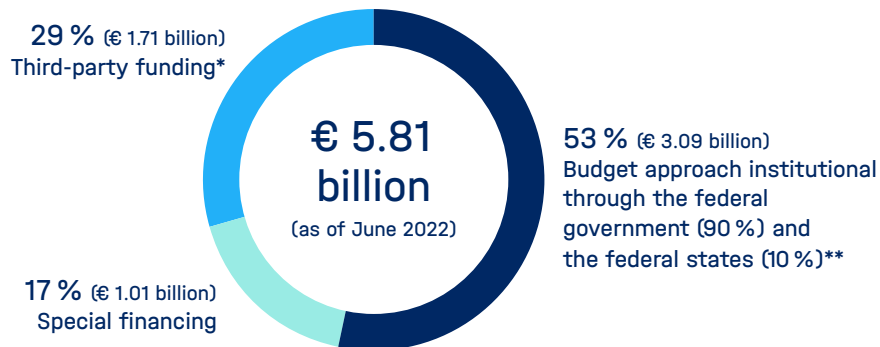
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1. Budget

The Helmholtz Association’s annual budget is about 5.8 billion euros. Approximately 70 percent of the Association’s funds is provided by Germany’s federal and state governments at a ratio of 9 to 1. The Centers raise around 30 percent of the total budget themselves in the form of third-party funding.

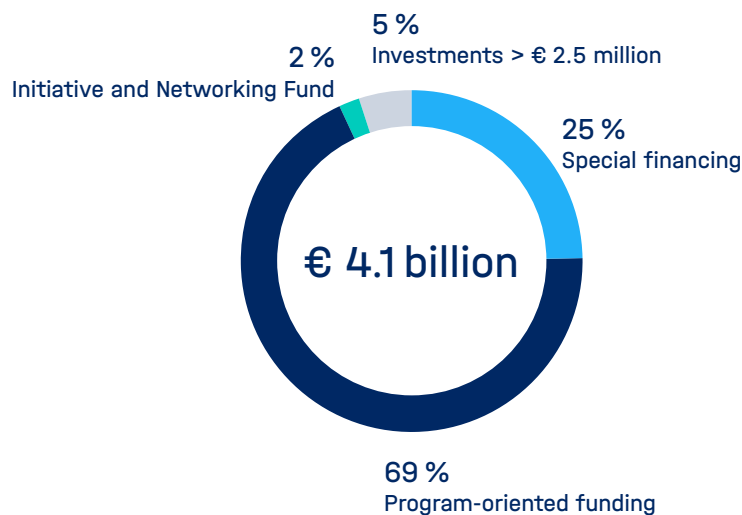
Budget including third-party funds



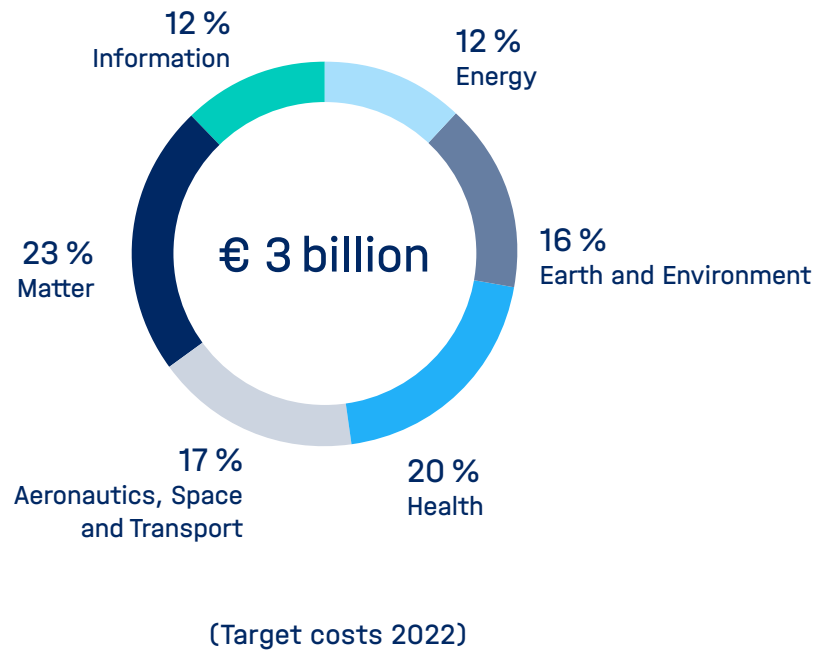
* Including project sponsorships

** As of 2016, the German federal government alone is financing the pact increase so that the federal government’s share is over 90%.

Basic funding budget

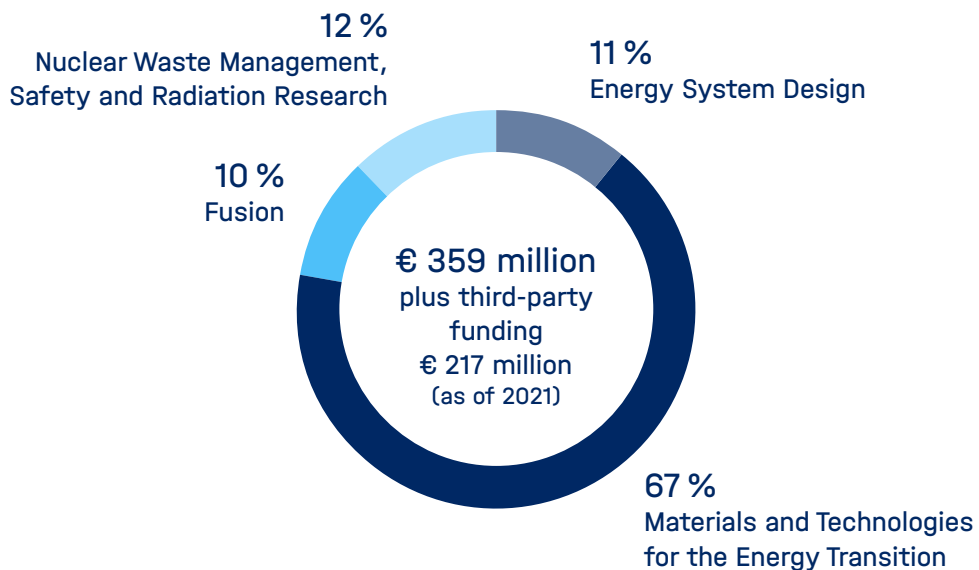


Distribution of the budget across the six Research Fields

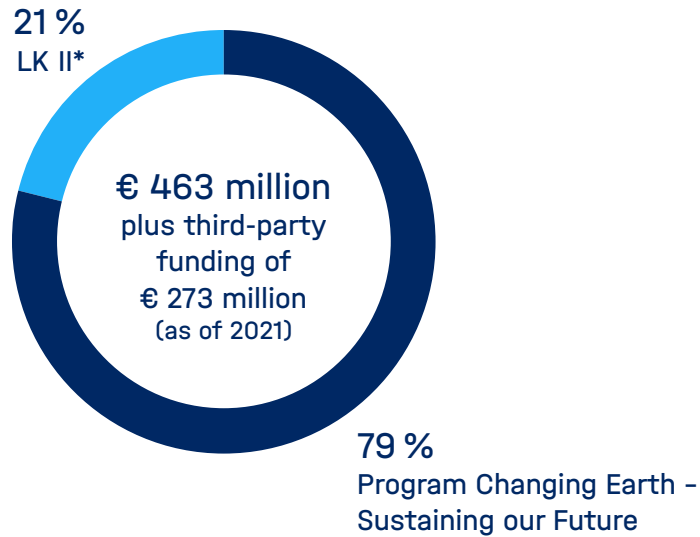


Distribution of the budget across the programmes of the six Research Fields

Research Field ENERGY

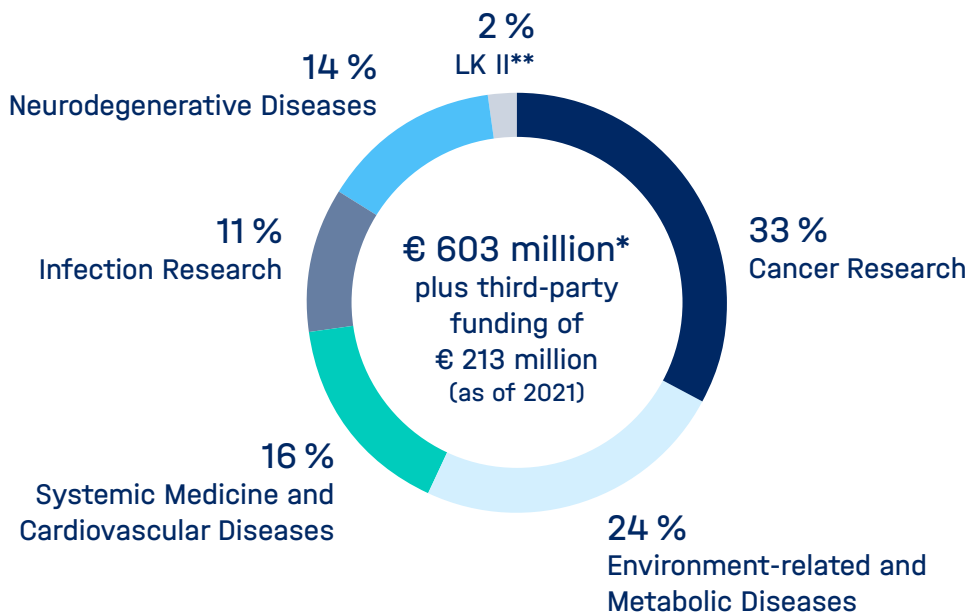


Research Field EARTH AND ENVIRONMENT



*HEINCKE, Coast and seasonal polar stations, NEUMAYER III, Polar Research Planes, POLARSTERN, ALKOR, MESI - Modular Earth Science Infrastructure

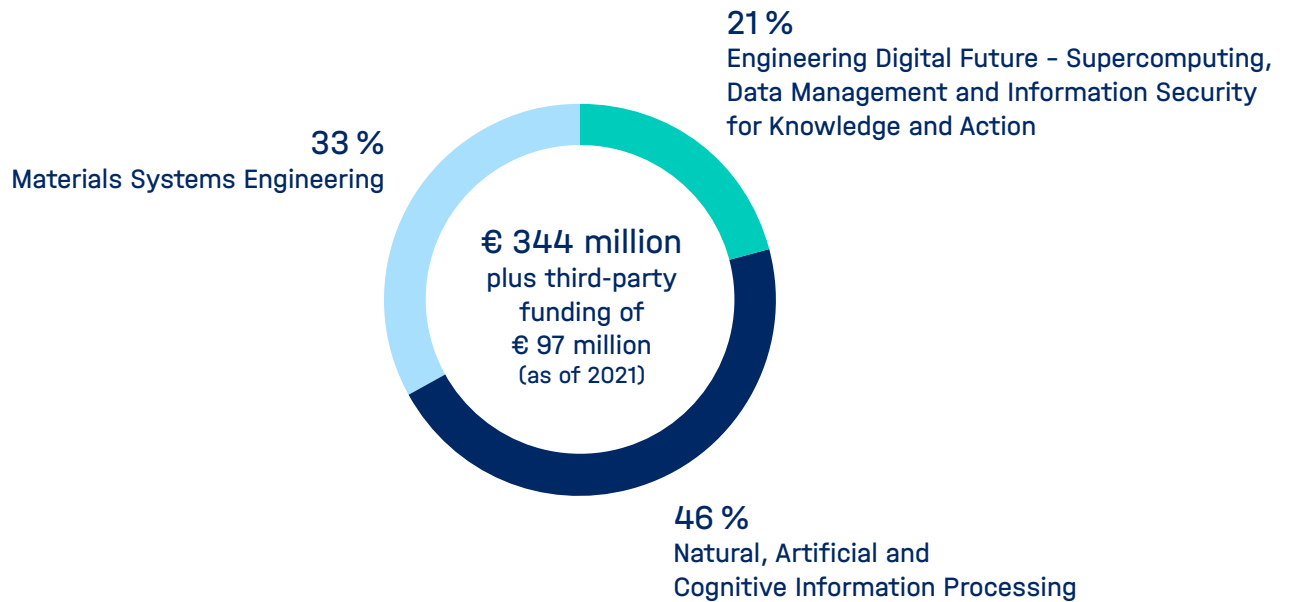
Research Field HEALTH



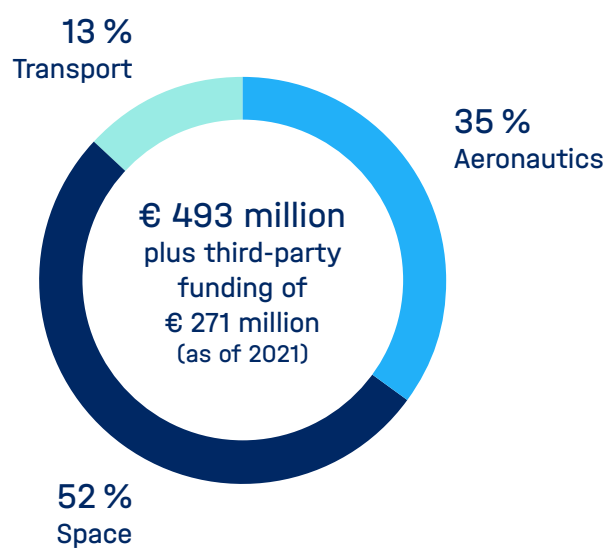
* plus funds of €113 million for the Helmholtz share of the German Centres for Health Research, the Berlin Institute of Health (BIH), the expansion of the National Center for Tumor Diseases (NCT), and the Helmholtz Institutes HIPS and HIOH

** German National Cohort/NAKO (DKFZ, HMGU, HZI, MDC)

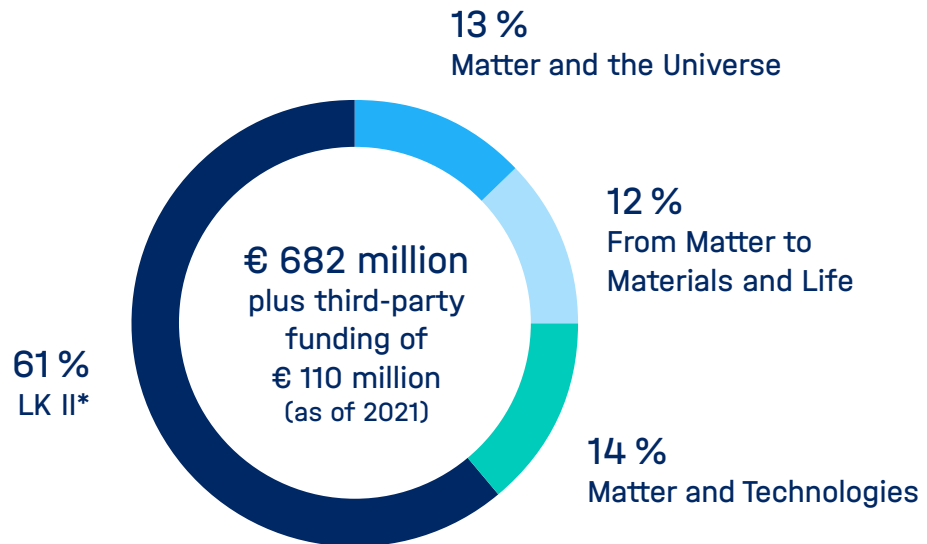
Research Field INFORMATION



Research Field AERONAUTICS, SPACE AND TRANSPORT



Research Field MATTER

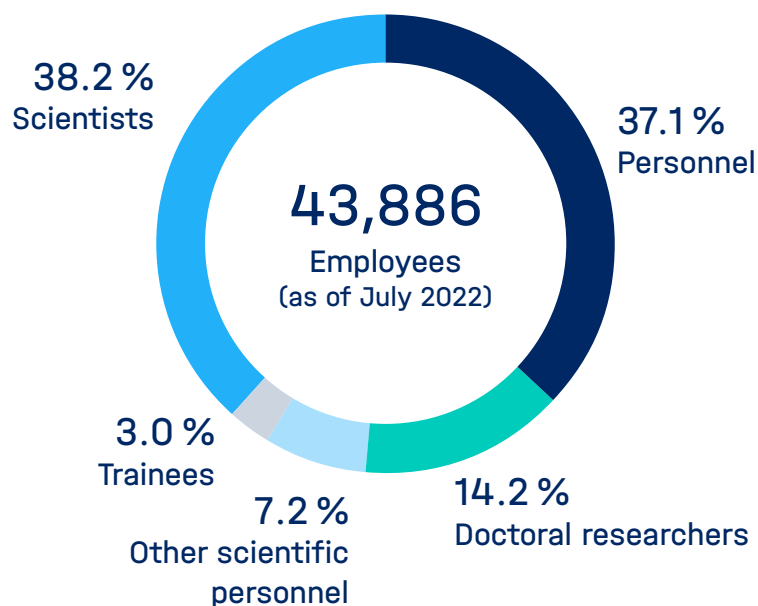


* FLASH, IDAF, PETRA III, TIER II, XFEL (DESY); JCNS (FZJ); FAIR (GSI); BER II, BESSY II (HZB); ELBE, HLD, IBC (HZDR); GEMS (HZG); GridKa (KIT)

2. Staff

The extremely talented and committed employees at Helmholtz are the most valuable resource for the research conducted here. 43,886 employees worked at the 18 Helmholtz Centers in 2020 (as of July 2022).

Employees



Research infrastructures for scientists from all over the world

Helmholtz aims to provide science with access to unique research infrastructures. The design, construction, and operation of large-scale and often unique scientific infrastructure is a key aspect of the Helmholtz mission. The research facilities are exemplary for the cooperation with German as well as foreign universities and research institutions.

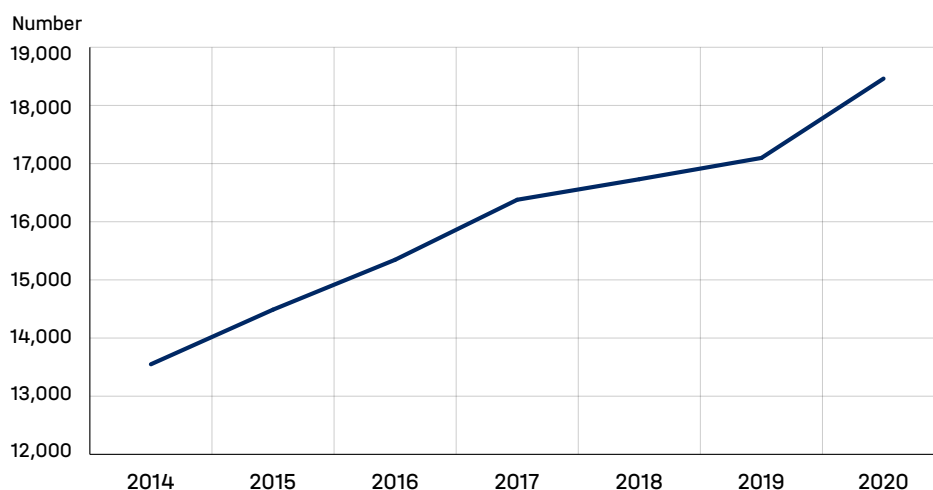
The large-scale devices at the Helmholtz Centers were available on 95 percent of the total operating time in 2021. The national and international scientific community (external researchers) accounted for a majority of the research infrastructure's use, at 68,6 percent. By providing this service, Helmholtz plays an essential role in this area of the scientific system. In 2021, 12,107 internal and external researchers from more than 130 nations used the research opportunities offered by the Helmholtz Centers. Compared to the previous year, this usage corresponds to an increase of 12,2 percent.

3. Scientific performance

Publications are a key measure of scientific productivity, and Helmholtz once again recorded clear growth in this area. In 2021, a total of 20,864 papers were published in ISI or Scopus indexed scientific journals. The number of publications thus grew by 13 percent over the previous year and by a total of 36 percent in the last five years.

At Helmholtz, for example, the already impressively high values of scientific visibility (publication share measured in terms of Germany’s publication volume) and citation impact (success of scientific publications in relation to a benchmark from relevant journals or the associated field) increased further in a comparison of the periods studied, 2011–2015 and 2016–2018 (publication share: from 12.3 percent to 13.4 percent; citation impact from 16.2 percent to 17.7 percent). Here, the combination of national and international collaboration leads to a particularly high proportion of highly cited publications. At the same time, it should be emphasized that the relative share of Helmholtz in the citations of the organizational groups studied clearly exceeds the corresponding publication share. This means that Helmholtz publications are cited more often than average in a domestic comparison.

WoS, Scopus or Open Research Europe indexed publications



A good measure of the quality of research findings is the number of times they are published in prestigious journals. The Nature Publishing Group releases a ranking of the top 200 research organizations worldwide. The “Nature Index” is based on publications in 82 journals that are independently selected as the most important by two panels of scientists from the fields of physics, chemistry, environmental science, and the life sciences. Helmholtz has ranked among the top ten international institutions for years. The table shows the Nature Index for the period September 1, 2020 to August 31, 2021.

Nature index 2020/21

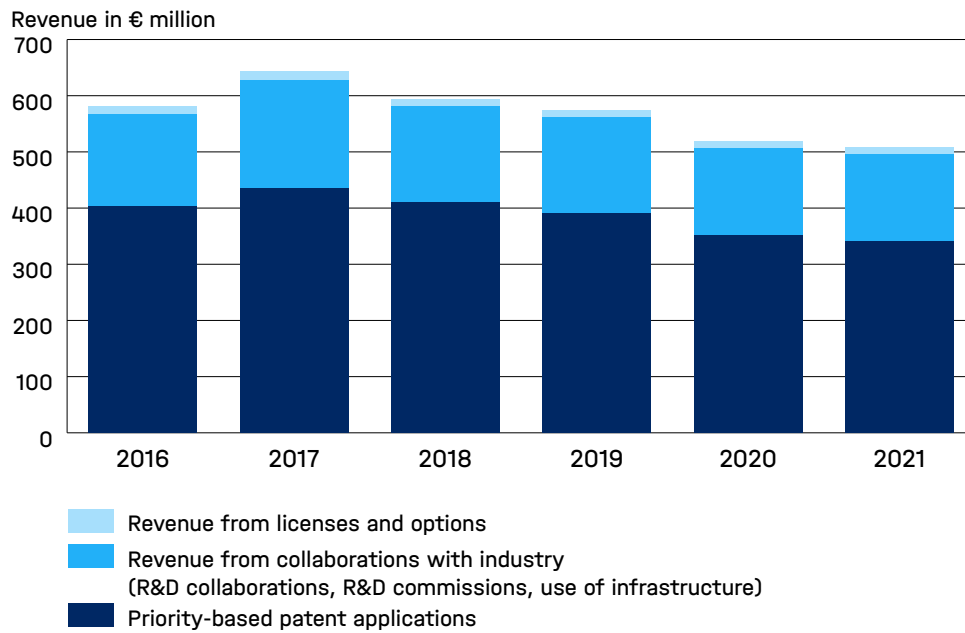
Rank	Institution	FC*
1	Chinese Academy of Sciences (CAS), China	1.957
2	Harvard University, USA	805
3	Max Planck Society, Germany	723
4	French National Centre for Scientific Research (CNRS), Frankreich	603
5	University of Chinese Academy of Sciences (UCAS)	558
6	Stanford University (SU), USA	552
7	Nanjing University (NJU), China	530
8	University of Science and Technology of China (USTC), China	530
9	Peking University (PKU), China	498
10	Massachusetts Institute of Technology (MIT), USA	494
11	Tsinghua University, China	482
12	Helmholtz Association, Germany	481

* Fractional Count = figure taking into account the percentage of authors from the respective institution and the number of affiliated institutions per article. The calculation assumes that all authors contributed equally to the article, and their sum is 1.0 per article. Count of publications from August 1st, 2021 to July 31st, 2022.

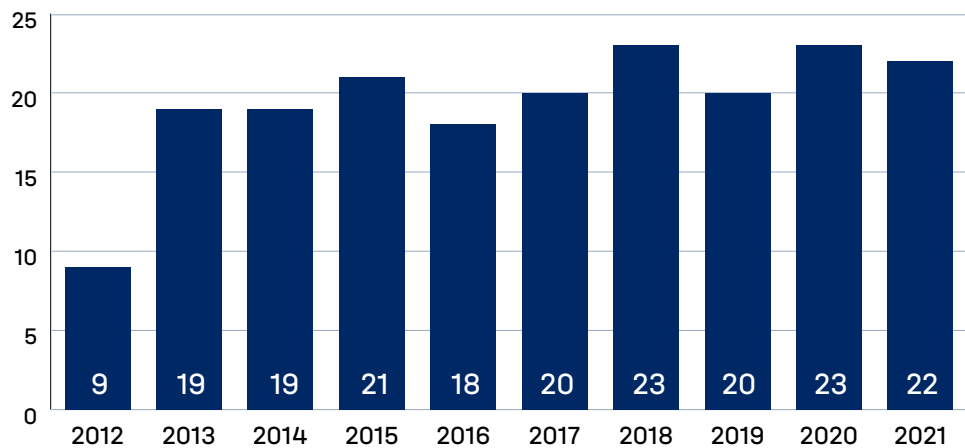
Transfer

Helmholtz researchers significantly boost Germany’s innovative capacity by disseminating knowledge and converting economically valuable results into entrepreneurial endeavors. Accordingly, Helmholtz places an increasing focus on the transfer of knowledge and technology. In the department of transfer and innovation, we work together with the transfer offices of the centers to promote the exchange between science, industry and society through networks, targeted transfer support programs and the development of joint partnerships. Over the last few years, a variety of new instruments and platforms have been established to promote these aims, including the Helmholtz Validation Fund, the Helmholtz Innovation Labs, and the Innovation Funds of the Helmholtz Centers. At 154 million euros, revenues from business collaborations in 2021 are slightly below the level of previous years, as is the number of patent applications at 341. The number of spin-offs is also stable at 22.

Technology transfer: Revenues



Research spin-offs



4. Talent promotion

National collaboration

Scientific excellence requires the best minds—and large-scale collaborative research depends on partnerships with the most effective research institutions in the scientific system. Helmholtz achieves both of these objectives through joint appointments, among other activities. With 729 joint appointments, the number has risen strongly in recent years. In addition, participation in programs of the German Research Foundation (DFG) and the Excellence Initiative demonstrate the extent of national networking in the science system. Helmholtz Centres have been established partners of universities in all funding lines of the Excellence Initiative since 2006. In the “Excellence Initiative,” which ended in 2018/2019, Helmholtz institutions were involved in three-quarters (73 percent) of all institutional strategies, in well over one-third (38 percent) of all funded graduate schools, and in almost half (44 percent) of the “Clusters of Excellence”.

Joint appointments

	2016	2017	2018	2019	2020	2021
Joint appointments with universities (W2 und W3)	623	633	653	653	736	729

DFG

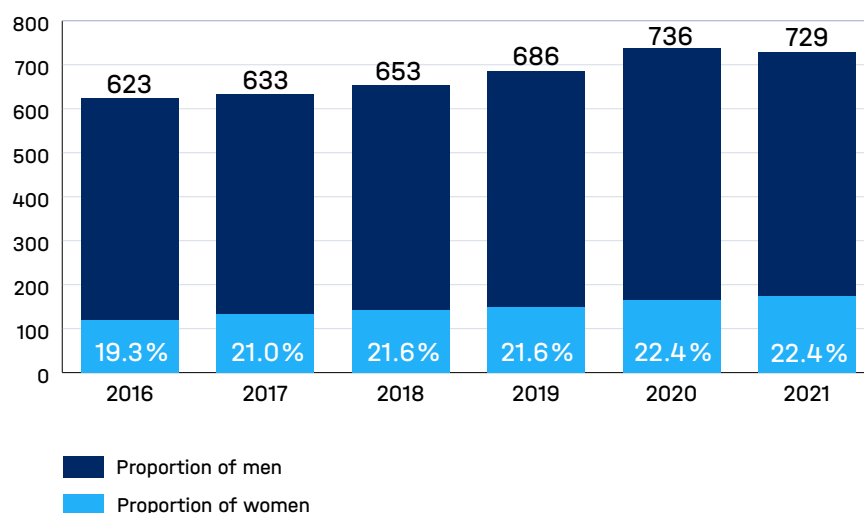
Number in the year	2016	2017	2018	2019	2020	2021
Research Centers	1	1	1	1	1	1
Collaborative Research Centers	69	74	91	87	95	108
Priority Programs	51	52	56	56	57	59
Research Units	46	41	37	43	47	46

In certain programs, Helmholtz researchers can obtain funding from the DFG. In such cases the Helmholtz Centers serve as important strategic partners to universities when applications are submitted to the DFG — especially for structural initiatives.

Equal opportunities

Improving equal opportunities is a key priority at Helmholtz. This aspect is firmly rooted in the Helmholtz mission and is an integral part of the talent management. It is a topic that is systematically integrated into all of our programs and activities. The striking effects of this approach can be seen in the staffing of W3 professorships, for example. The proportion of women among new appointments was 34.5 percent in 2021. In the reporting year 2020, the quota for the appointment of women to W2 positions was 32,2 percent. Furthermore, the proportion of women in jointly appointed W2/W3 professorships has risen steadily in recent years to 22.4 percent in 2021.

New W2/W3 appointments



Talent management

Fostering the development of young scientists is central to securing both the Helmholtz Association's future and the viability of Germany as a center of research and science. It is therefore part of the Helmholtz mission. In the first two periods of the Joint Initiative for Innovation and Research, Helmholtz developed numerous overarching funding instruments within the framework of the Initiative and Networking Fund. It also supported these instruments with substantial funding from the Joint Initiative, in addition to advancing the careers of young scientists at the Helmholtz Centers. The instruments have evolved into a comprehensive strategic talent management system that offers attractive conditions to the best young researchers at every stage of their careers:

- Doctoral training at graduate schools and colleges
- Postdoc programs providing funding immediately upon completion of PhDs
- Helmholtz Young Investigator Groups for top international talent
- W2/W3 program for recruiting and supporting young female scientists
- Recruiting initiative to attract internationally renowned researchers for the Helmholtz Centers.

Doctoral degrees

	2016	2017	2018	2019	2020	2021
Number of supervised doctoral candidates*	8,054	8,456	8,587	8,785	9,044	9,438
Number of doctoral candidates employed	5,105	5,076	5,257	5,668	6,215	6,313
Number of complete doctoral degrees	1,249	1,257	1,174	1,142	912	957

*Including candidates who use the Helmholtz Association's research infrastructure.

Imprint

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Sitz der Helmholtz-Gemeinschaft

Ahrstraße 45, 53175 Bonn
Telefon 0228 30818-0
E-Mail info@helmholtz.de, www.helmholtz.de

Geschäftsstelle Berlin

Kommunikation und Außenbeziehungen
Anna-Louisa-Karsch-Straße 2, 10178 Berlin
Telefon 030 206329-57

Responsible under the German Press Act

Franziska Broer

Diagrams

Helmholtz-Gemeinschaft

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