



DFG

# International Research Collaborations with the German Research Foundation

Data Science, Machine Learning and Computational Innovation

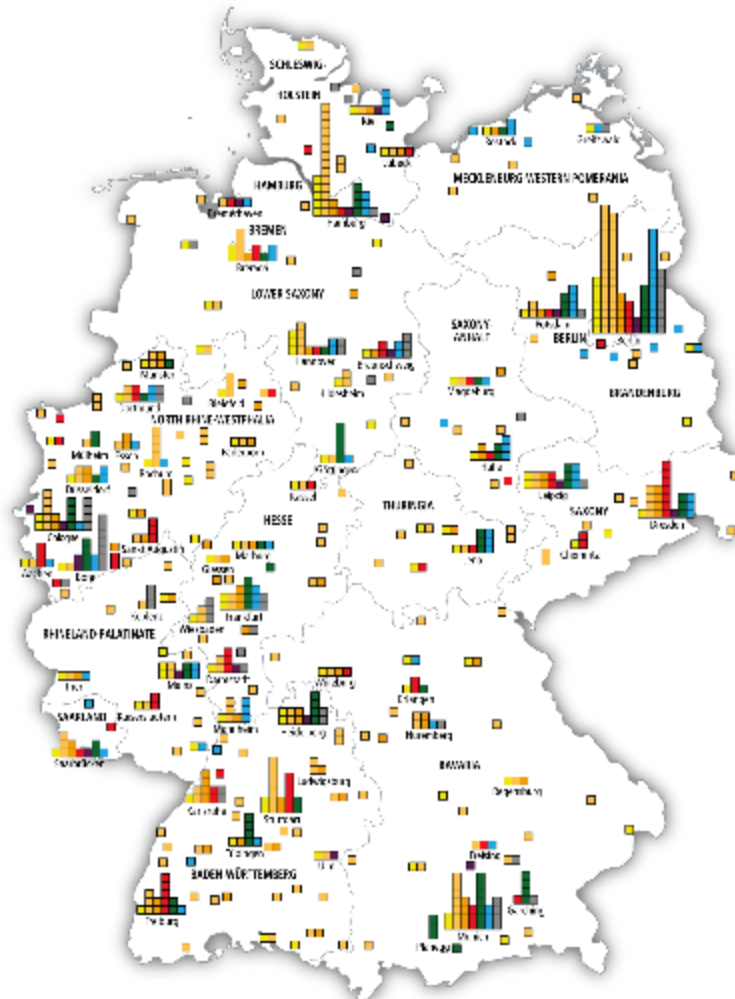
University of Alberta, 18 May 2018

Dr. Rainer Gruhlich, Director, DFG North America Office

# The German Research Landscape









## Type of institution

- Universities
- Universities of applied sciences
- Universities and colleges of theology, music and art
- Fraunhofer-Gesellschaft (FhG)
- Helmholtz Association (HGF)
- Max Planck Society (MPG)
- Leibniz Association (WGL)
- Federal research institutions



# The German Research Landscape

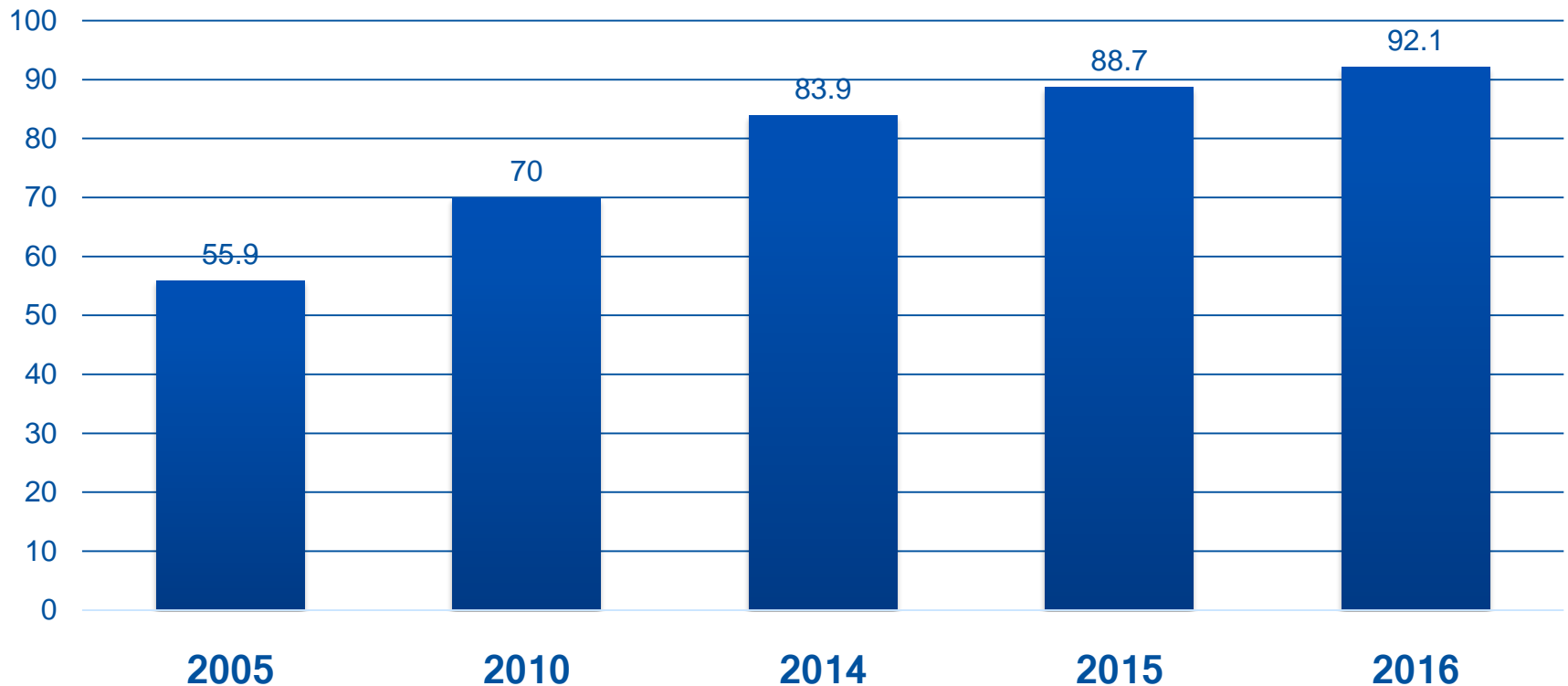
## Alliance of German Science Organizations

| Organization                      | Budget              | Mission                               | Logo  |
|-----------------------------------|---------------------|---------------------------------------|---|
| Alexander von Humboldt Foundation | 111 mill. €         | promote academic cooperation globally | AvH          |
| Fraunhofer-Gesellschaft           | 2.1 bill. €         | applied research                      | FhG          |
| German Academic Exchange Service  | 500 mill. €         | support international exchange        | DAAD         |
| German Research Foundation        | 3 bill. €           | fund excellent research               | DFG          |
| Helmholtz Association             | 4.4 bill. €         | research with large scale equipment   | HGF          |
| Leibniz Association               | 1.8 bill. €         | research, service museums             | WGL          |
| Leopoldina                        | 10.5 mill. € (2015) | nat. academy of sciences              | Leopoldina  |
| Max Planck Society                | 1.8 bill. €         | World-class basic research institutes | MPG        |

# The German Research Landscape

## Total research expenditures in Germany

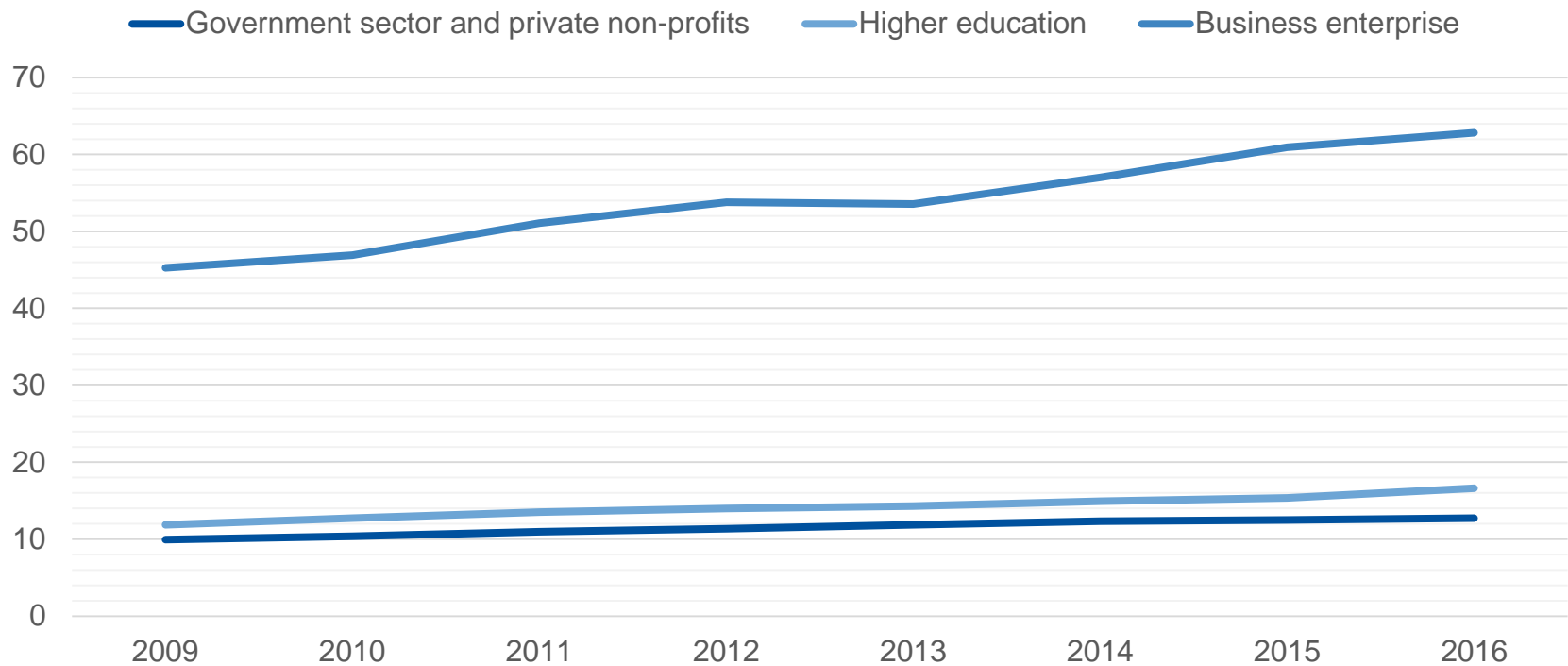
### Total research expenditures in Germany (in billions of euros)



# The German Research Landscape

## Research expenditures by sector, in bn. euros

### Research expenditures by sector (in bn. of euros)



# The German Research Landscape

## Pillars of the German Research Sector

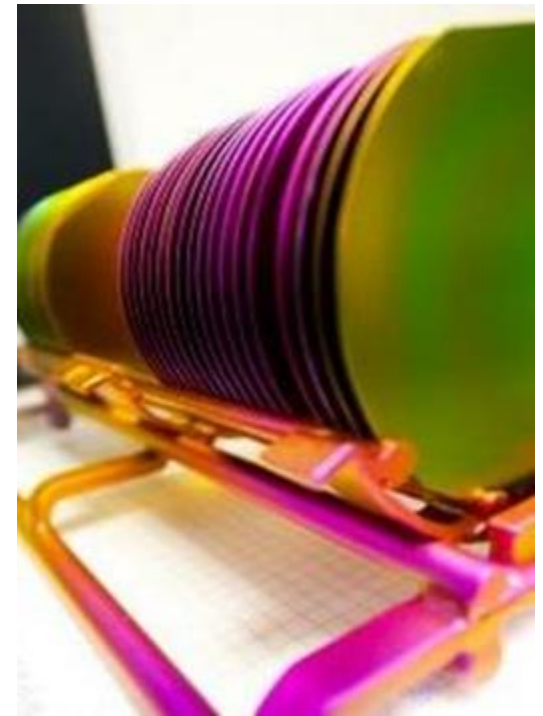
### Universities (HEIs)



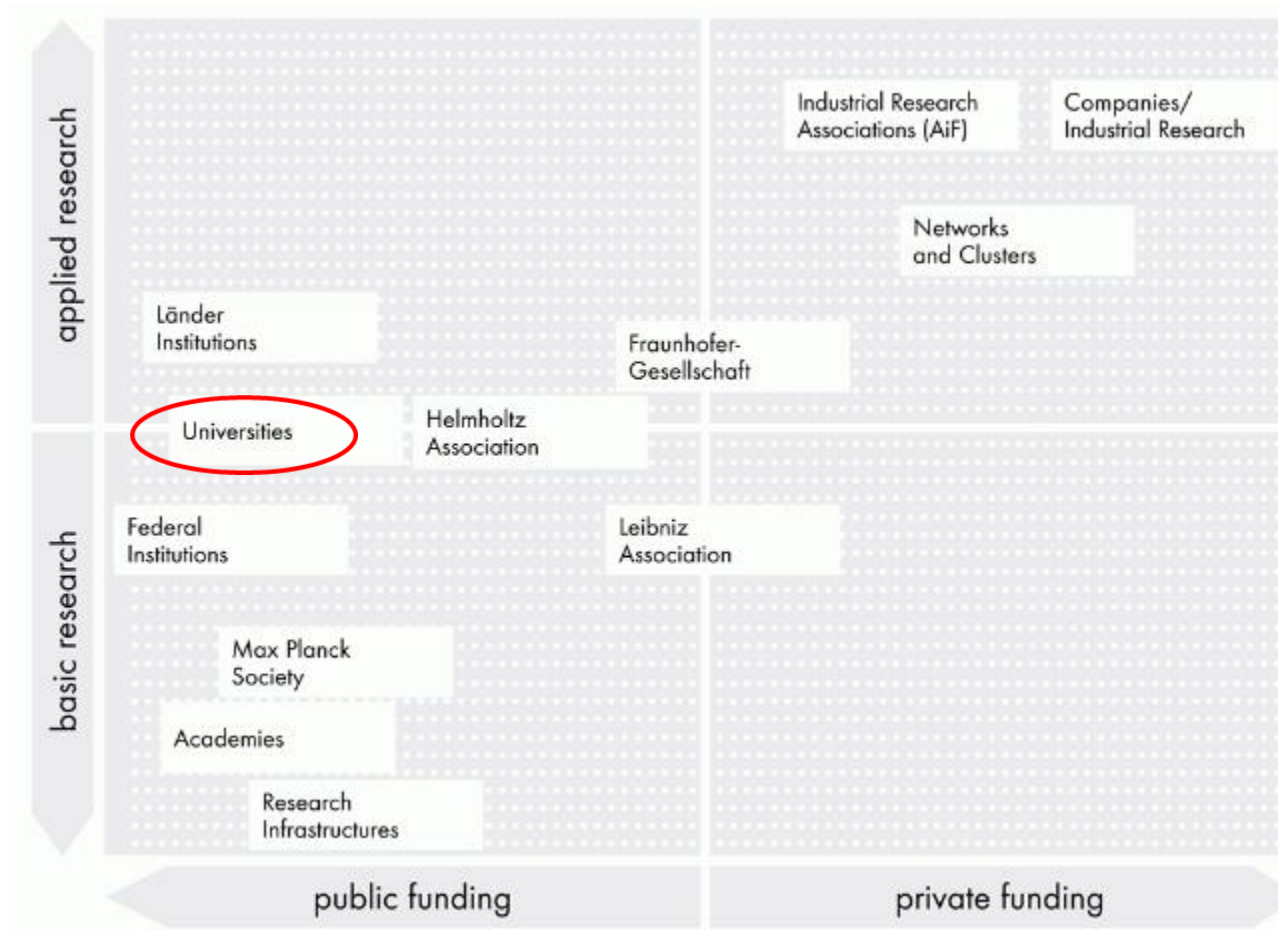
### Non-university research institutes



### Industrial research



# The German Research Landscape



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adaptation: Frankfurter Societäts-Medien GmbH

# The German Research Landscape Universities

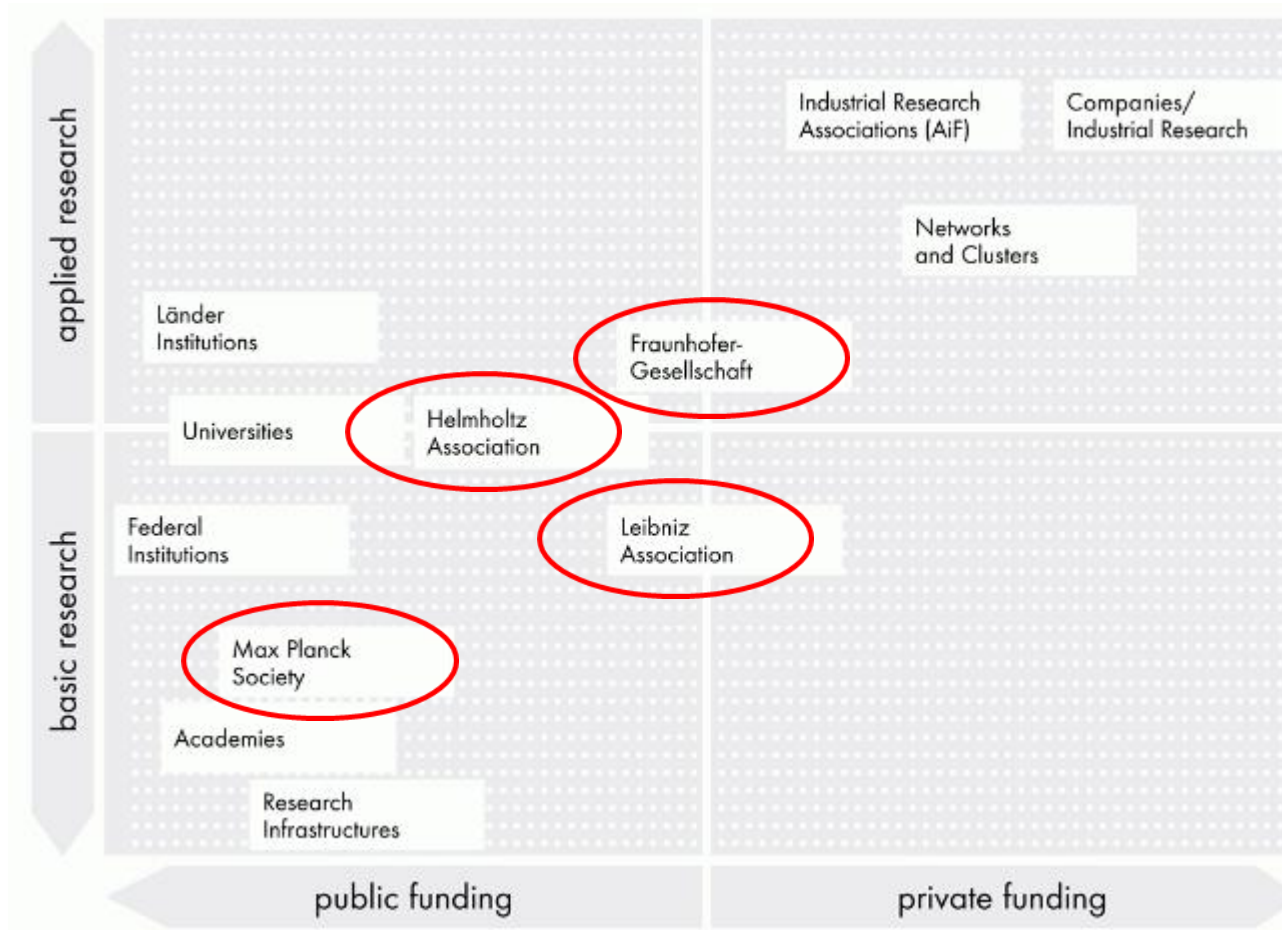
- Approx. 400 HEIs – 148 authorised to confer doctorates
- Almost 26,000 international doctoral candidates
- Principle of uniting learning, instruction and research
- Excellence Initiative = 4.6 bn euros for cutting-edge research





# The German Research Landscape

## Non-university research



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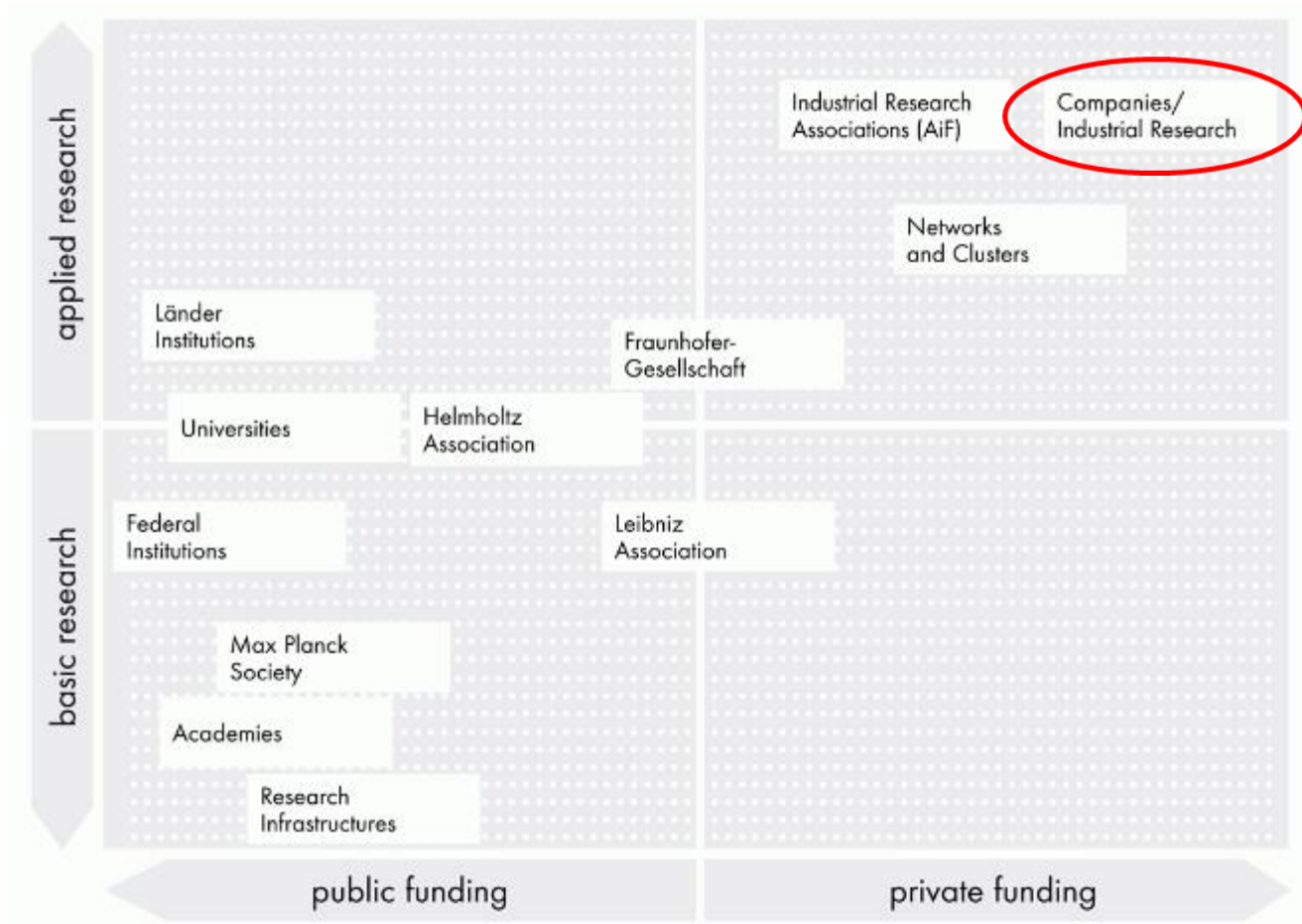
# The German Research Landscape

## Research Funding Organizations

| Institution             | Institutes          | Budget        | Researchers             |
|-------------------------|---------------------|---------------|-------------------------|
| Max Planck Society      | 83 institutes       | 2.2 bn euros  | 13,300                  |
| Helmholtz Association   | 18 research centres | 4.24 bn euros | 14,700                  |
| Fraunhofer-Gesellschaft | 67 institutes       | 2.1 bn euros  | 24,000 (staff in total) |
| Leibniz Association     | 89 institutes       | 1.73 bn euros | 9,300                   |

# The German Research Landscape

## Industrial Research



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# The German Research Landscape

## Industrial Research

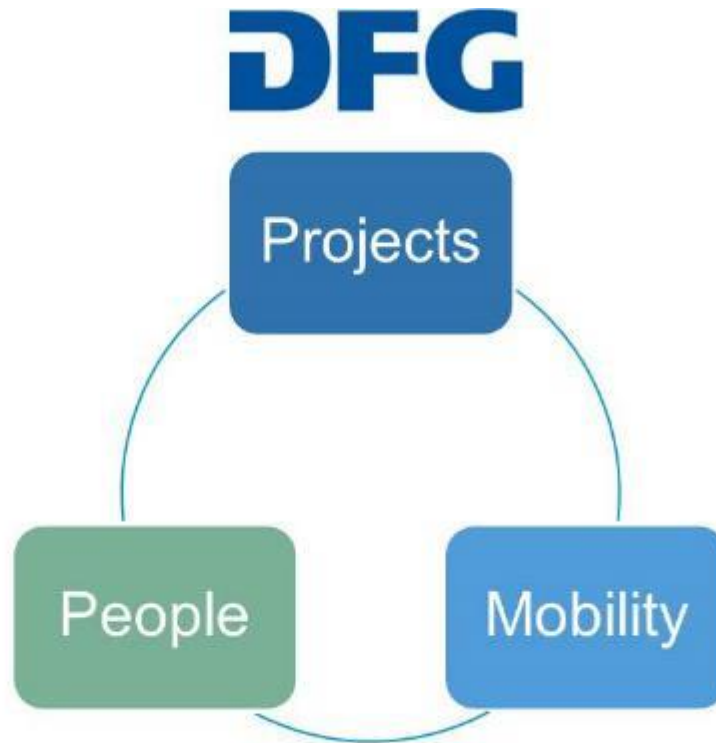
- 66% of all research funding in Germany comes from business and industry
- Innovation-driving sectors: pharmaceuticals, electronics, automotive engineering, mechanical engineering
- Technology transfer – Cluster formation, networks



Volker Lannert/DAAD

# The German Research Landscape

## Support of International Cooperation



**Alexander von Humboldt**  
Stiftung/Foundation



The German Research Foundation  
**DFG – Deutsche Forschungsgemeinschaft**

# The DFG

## – Who We Are and What We Do

Who we are:

- ▶ **Central public funding organization** for basic research in Germany
- ▶ A **self-governing body** of science and research
- ▶ **Member organization** (universities, academies, research organizations)
- ▶ The **budget** in 2016: **€ 3 billion in direct research funding**, provided primarily by the federal government and the 16 German Länder



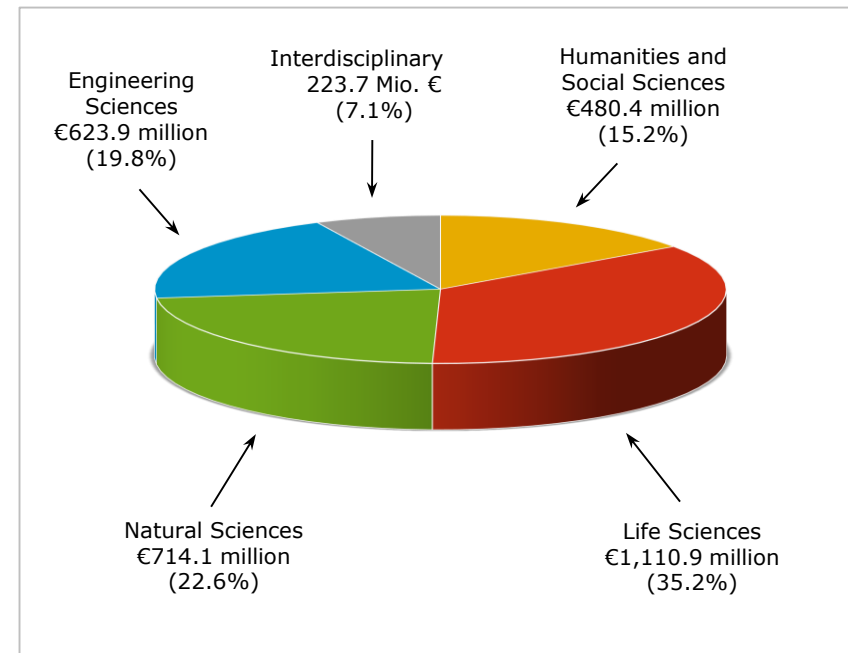
# The DFG

## – Who We Are and What We Do

### The DFG

- ▶ serves **all branches of science and the humanities**
- ▶ fosters **scientific excellence** through competition
- ▶ supports **international cooperation in research**
- ▶ **advises** political and social decision-makers
- ▶ supports the **transfer of knowledge** between science and industry

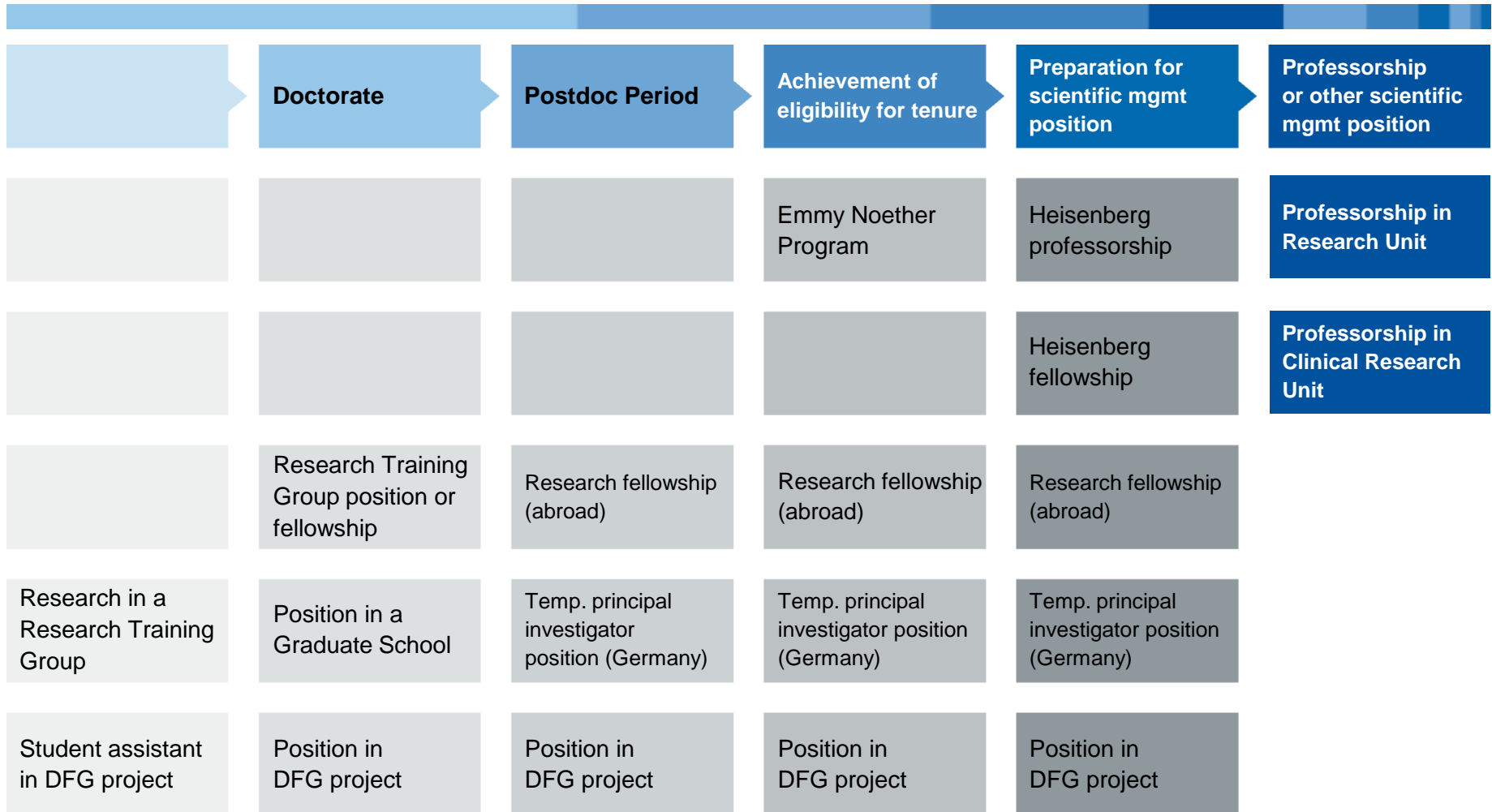
### Funding in 2017, by scientific discipline





# The DFG Funding Chain

Appropriate funding options at each career stage



# How Does the DFG Fund International Cooperation?

**All DFG funding programs** generally allow the integration of international components as e.g. **travel allowance, exchange of students/scientists.**

**Special programs** are:

- ▶ Research Fellowships for Postdocs
- ▶ Funding for the initiation of international cooperation
- ▶ Individual Grants Program & Joint Calls with Partners
- ▶ International Research Training Groups

**Mercator Fellowships as module available in most programs!**

DFG support for projects with international partners is generally based on the principle of mutual responsibility.



# How Does the DFG Fund International Cooperation?

## Research fellowships

### Purpose

To carry out a defined research project abroad in order to become acquainted with new scientific methods or to complete a larger project

### Eligibility

Young researchers from all disciplines who have completed their doctorates

### Duration

Usually two years

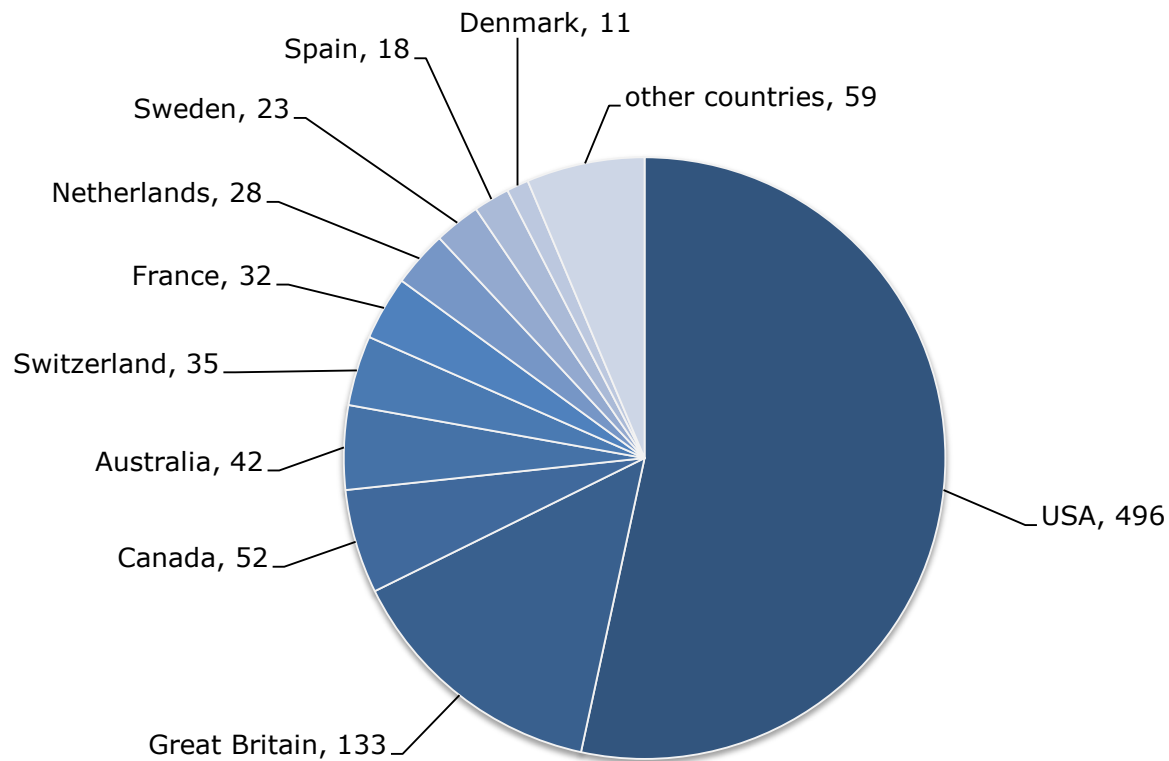
### Particular features

Six-month return grants are also available



[www.dfg.de/forschungsfoerderung/nachwuchsfoerderung/stipendien](http://www.dfg.de/forschungsfoerderung/nachwuchsfoerderung/stipendien)

# Research Fellowships\* - Destinations for Research Visits\*\* (outside of Germany) 2017



\* Based on ongoing research fellowships in 2017, without return grants

\*\* Recipients of research fellowships can undertake more than one research visit

# How Does the DFG Fund International Cooperation? Program: Initiation of International Cooperation

## Objective

To support the initiation of international collaboration with the modules „Bilateral Workshops“, „Trips Abroad“ and „Guest Visits “

## Type and Extent of Funding

The modules can be combined

- ▶ Trips abroad of up to three months or research stays at partner institutions. Researchers from doctoral candidates to professors may take advantage of these
- ▶ Joint workshops

Funding is available for a maximum of 1 year. The program relies on *matching funds*. Funding is applied for by the German partner university.



# How Does the DFG Fund International Cooperation?

## Individual Grants Programme

### Purpose

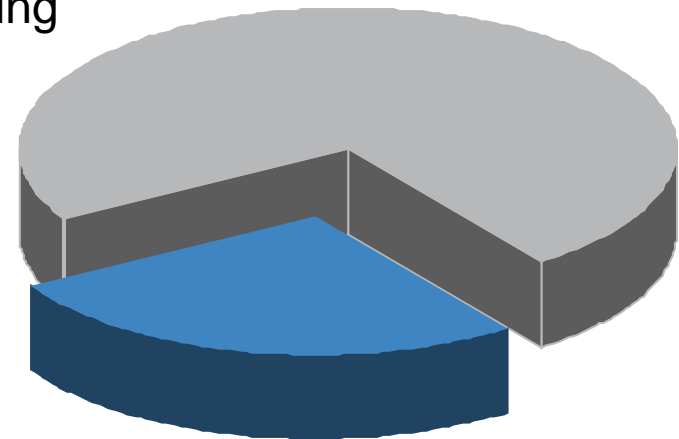
To carry out a thematically defined research project within a specific time frame

### Eligibility

Researchers from all disciplines at German research institutions who have completed their scientific training (in most cases by achieving their doctorates)

A research grant can be used to

- staff
- scientific instrumentation
- consumables
- travel and publications
- Mercator Fellow as module



Part in total funding volume: 30, 6% (2014)

# How Does the DFG Fund International Cooperation?

## Module: Mercator Fellows

This module is available within the Individual Research Grant Program and for coordinated programs.

Mercator Fellows are supposed to

- ▶ Strengthen **research (and teaching) in Germany**
- ▶ **Contribute to the objective** of the research project
- ▶ Support **early-career scientists**



Researchers can apply (through the German host institution) for funding for a research stay of 3 to 12 months (may be divided into 3-month blocks).

# How Does the DFG Fund International Cooperation?

## Temporary Positions for Principal Investigators

### Eligibility

- excellent Postdocs

### Requirements

- **Applicants from abroad:** Please include a supporting statement from a researcher at your German host institution
- Projects at non-university institutions are possible but they require a cooperation agreement with a university

### Funding

- salaries based on the salary level for postdoctoral researchers
- personnel, consumables, travel costs, lab equipment, publication costs ...





# How Does the DFG Fund International Cooperation?

## International Research Training Groups

### What is a Research Training Group?

- ▶ structured PhD program at a university (single-site principle)
- ▶ no “Graduate School”: small, focused unit of 5-10 PIs
- ▶ excellent, coherent research program
- ▶ specific qualification program
- ▶ innovative supervision concept
- ▶ promotion of early independence and international mobility



# How Does the DFG Fund International Cooperation?

## International Research Training Groups

### What is a Research Training Group?

- ▶ aims (mainly) at the doctoral phase
- ▶ builds on an innovative and focused **research programme** as framework for excellent thesis projects
- ▶ enhances and expands doctoral researchers' competencies by a **structured qualification program**
- ▶ installs **transparent and structured supervision**  
- instead of mere “apprenticeship”
- ▶ encourages **interdisciplinarity**
- ▶ promotes and supports **international cooperation**



# Research Training Groups

## Funding is available for...

### ► People

- PhD students (10-15, maximum 3 years of funding) (fellowships) => employment position
- Postdocs (0-2)
- Research students

### ► Resources

- consumables, literature, documentation...
  - travel funds
  - costs for qualification program, visiting scientists (e.g. Mercator module)
  - support for coordination, recruitment, sabbaticals etc.,
- a maximum of 9 (=2 x 4.5) years, as block grant

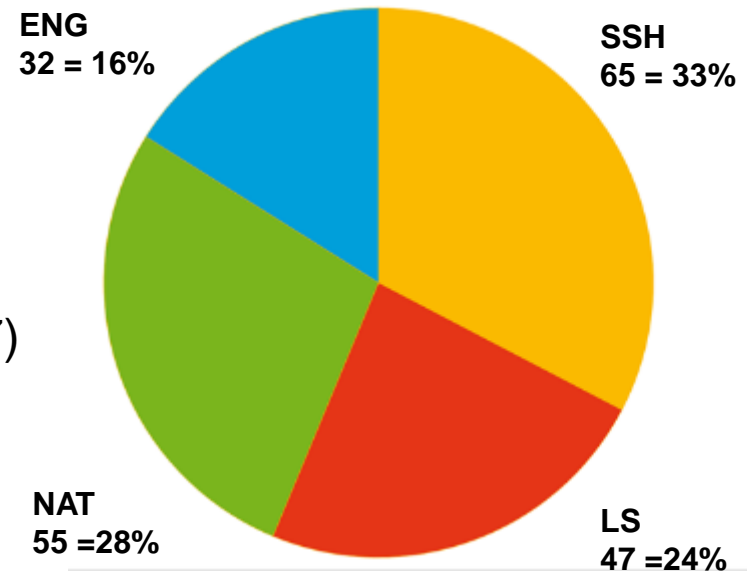


# Research Training Groups

## Key data

- ▶ **open for all fields** of science & humanities
- ▶ **no disciplinary quota**, bottom-up principle
- ▶ approved through scientific **peer-review**
  
- ▶ Budget **~204.7 M€**; 6.5% of DFG total (2017)
- ▶ **2016** RTGs funded
- ▶ **~25 - 30** new grants per year

RTG by field (May 15)



# International Research Training Groups

## Taking cooperation one step further

### Idea:

symmetric international collaboration in Research Training!

### Set-Up:

- ▶ **bilateral** program - two sites
- ▶ 5-10 PIs and 10-15 doctoral students on each side
- ▶ Added value through **complementarity** of expertise and resources
- ▶ systematic **cooperation on three levels**  
Research - Qualification Program - Supervision
- ▶ **Reciprocal research stays** of PhD students (~6-12 months)
- ▶ **complementary funding** required



# International Research Training Groups

## Taking Cooperation one step further



Funded by  
DFG

- ▶ Common research interest
- ▶ Complementary expertise
- ▶ Cohesive joint research program



- ▶ Exchange of PhD students
- ▶ Exchange of faculty members
- ▶ **Joint** supervision
- ▶ **Joint** publications
- ▶ **Joint** degree (ideally...)



Funded by  
Partner  
organization  
or institution

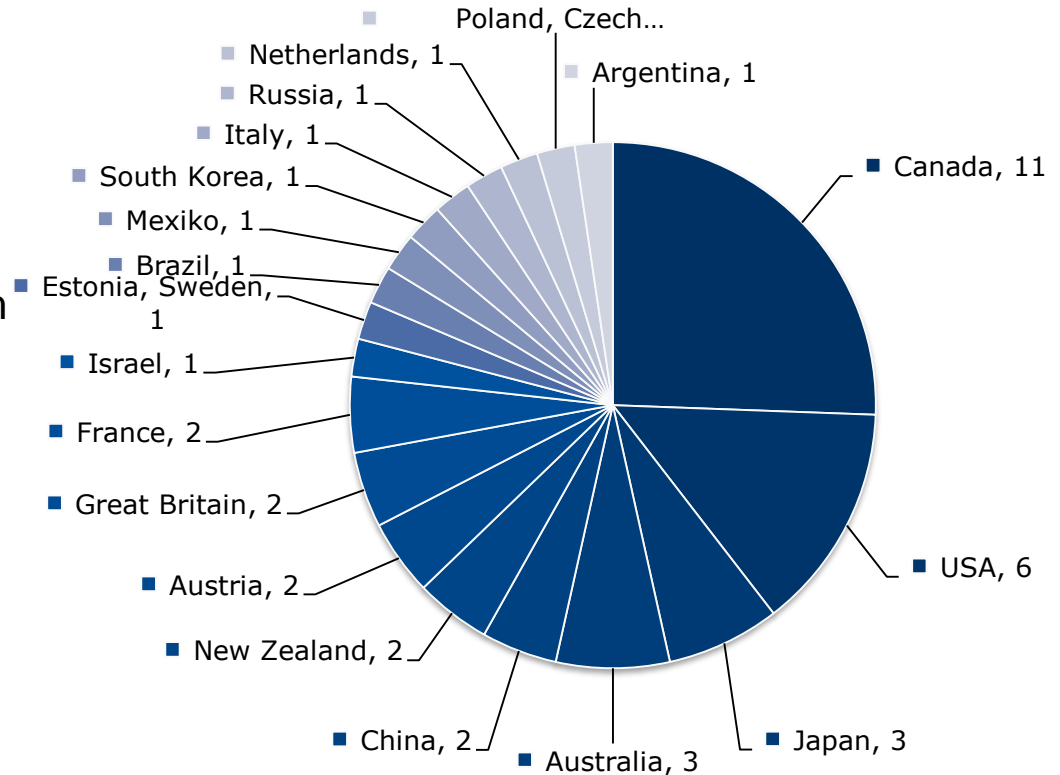
Added value for PhD students and faculty  
Internationally trained next generation of researchers  
Scientific progress through knowledge transfer

# How Does the DFG Fund International Cooperation?

## International Research Training Groups

### Global Diversity

- ▶ **41 IRTG = 19%** of 241 RTGs
- ▶ partners in **19** countries
- ▶ IRTGs and RTGs are funded from the same program budget
- ▶ no disciplinary/regional priorities
- ▶ *long-distance*-IRTGs increasingly attractive
- ▶ strongest partner country: **Canada!**



# International Research Training Groups

## Scientific Diversity

- IRTG 1830:** **Complex membrane proteins in cellular development and disease** (Kaiserslautern/Saarbrücken – Alberta, 2012)
- IRTG 1864:** **Diversity-Mediating Difference in Transcultural Spaces** (Trier/Saarbr.–Montreal, 2013)
- IRTG 1901:** **The Brain in Action** (Gießen/Marburg – Toronto, 2013)
- IRTG 1904:** **ArcTrain-Processes and impacts of climate change in the North Atlantic Ocean and the Canadian Arctic**(Bremen – Montréal, 2013)
- IRTG 2022:** **ATUMS –International Graduate School for Environmentally Responsible Functional Hybrid Materials**(Technical University Munich – Alberta, 2015)
- IRTG 2027:** **New Trends in Molecular Activation and Catalysis** (Münster – Ottawa; Toronto, 2015)
- IRTG 2078:** **Integrated engineering of continuous-discontinuous long fiber reinforced polymer structures** (KIT – Hamilton; London; Toronto; Windsor, 2015)
- IRTG 2079:** **Cold Controlled Ensembles in Physics and Chemistry** (Freiburg – UBC Vancouver, 2015)
- IRTG 2101:** **Guided light, tightly packed: novel concepts, components and applications** (Jena – Quebec City; Toronto; Varennes, 2015)
- IRTG 2172** **PRoTECT – Plant Responses to Eliminate Critical Threats** (Göttingen; UBC Vancouver, 2016)

→ **DFG Funding 2012-2019: 13.9 Mio Euro**

\* **IRTG 1830, 1904, 1906, 2022, 2101:** co-funded by NSERC – **IRTG 1864:** co-funded by SSHRC



# International Partners and Agreements

## Partnerships with North American Organizations



In order to carry out its activities in the interest of research, the DFG maintains partnerships and relations with a large number of partner organizations on all continents.

### Formal Agreements:

National Science Foundation (NSF)



National Endowment for the Humanities (NEH)



National Science and Engineering Research Council (NSERC)



But we also work together with many organizations on an ad-hoc basis to facilitate the cooperation of German researchers with their counterparts abroad!

# How Does the DFG Fund International Cooperation?

## Cooperation with North American Partner Organisations

### NSF PIRE—IRTG Cooperation

- Opening funding opportunities to (International) Research Training Groups for collaboration with PIRE initiatives



### DFG—NSERC Cooperation

- Supporting collaboration of research teams (CREATE/IRTG)
- Additional collaborative activities (individual grants, CFREF)?



### NEH/DFG Bilateral Digital Humanities Program

- Supporting collaborative projects designed to establish or further develop digital information infrastructures



### Trans-Atlantic Platform (T-AP)

- Funders from Latin and North America and Europe
- Addressing common challenges and emerging priorities and facilitating the formation of networks (“Digging into Data”)



# Where Can I Find a Partner for Cooperation?

- **Research Explorer** (interactive map of German research landscape)

[http://www.research-explorer.de/research\\_explorer.en.html](http://www.research-explorer.de/research_explorer.en.html)



- **Funding Atlas 2015** (contains key data on publically funded research in Germany)



<http://www.dfg.de/sites/fundingatlas2015/>

- **GEPRIIS** (online database on current DFG-funded projects)

<http://gepris.dfg.de/gepris/OCTOPUS?language=en>



# DFG Representation in North America



Washington DC



New York City



## Tasks of the North America Offices

- Advocacy
- Funding
- Monitoring
- Outreach

# DFG Office North America

## Advocacy and Funding

- follow and assess **science and research policy developments** in Canada and the United States in fields relevant to the DFG with respect to basic research
- support and expand **cooperation** with partner organizations in Canada and the USA



# DFG Office North America

## Monitoring and Outreach



- **inform** researchers based at Canadian and US institutions about Germany as a location of science and research and about opportunities for research collaboration
- maintain and extend **contacts** with current and former DFG award holders, partner PIs and alumni in Canada and the United States
- **Research Marketing**



The image shows the letters 'DFG' in a large, white, 3D font against a blue background. The letters are slightly blurred and appear to be floating or attached to a surface. Below this is a horizontal bar with a blue gradient.

# Thank you very much for your attention!

## Further Information

- ▶ On DFG: <http://www.dfg.de/en/>
- ▶ On all funded projects: <http://www.dfg.de/gepris>
- ▶ On more than 17,000 German research institutions:  
[http://research-explorer.dfg.de/research\\_explorer.en.html](http://research-explorer.dfg.de/research_explorer.en.html)