

Research and Innovation in Germany

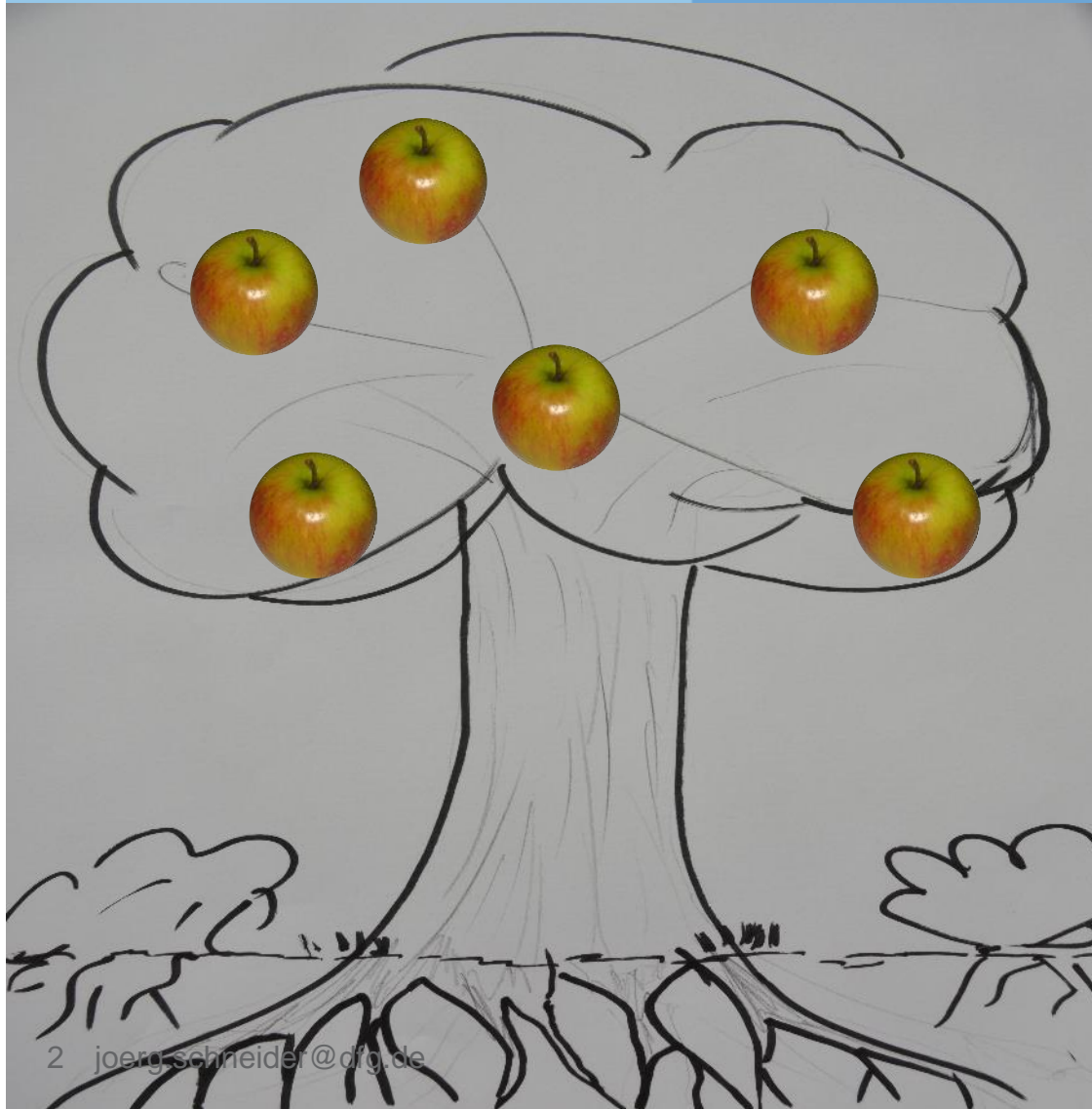
K.N. Toosi, 2018

DFG

Dr. Jörg Schneider
Dorothea Fendel
Deutsche Forschungsgemeinschaft
(German Research Foundation)



The German Innovation System – a healthy tree ...



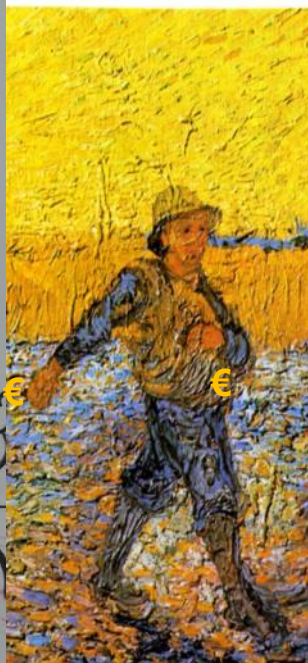
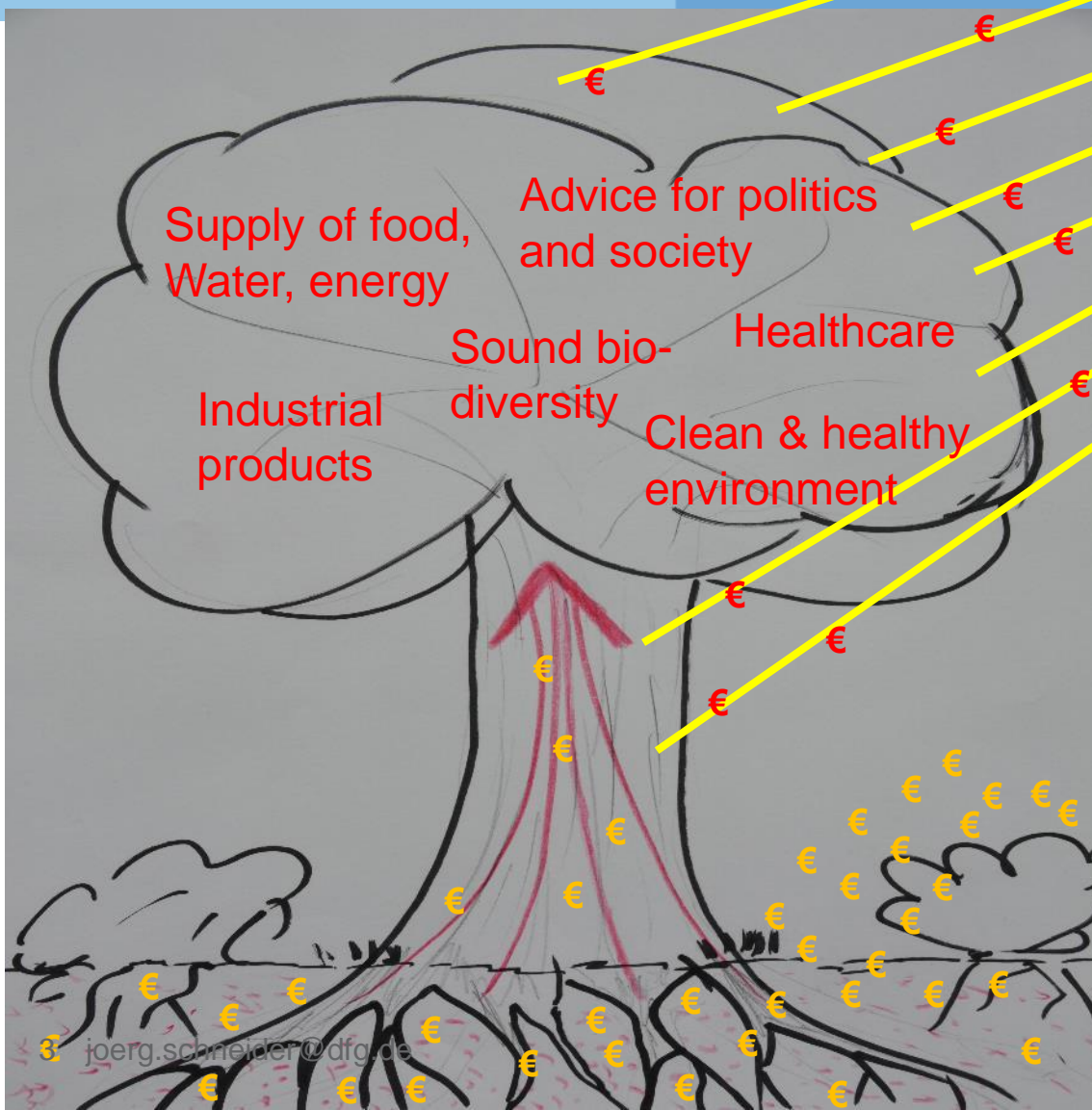
R&D products for
Society, Economy,
Health, Environment...

...fed by
pre-competitive
applied research,
problem-driven...

... and growing on
basic research,
science-driven

... if provided for adequately!

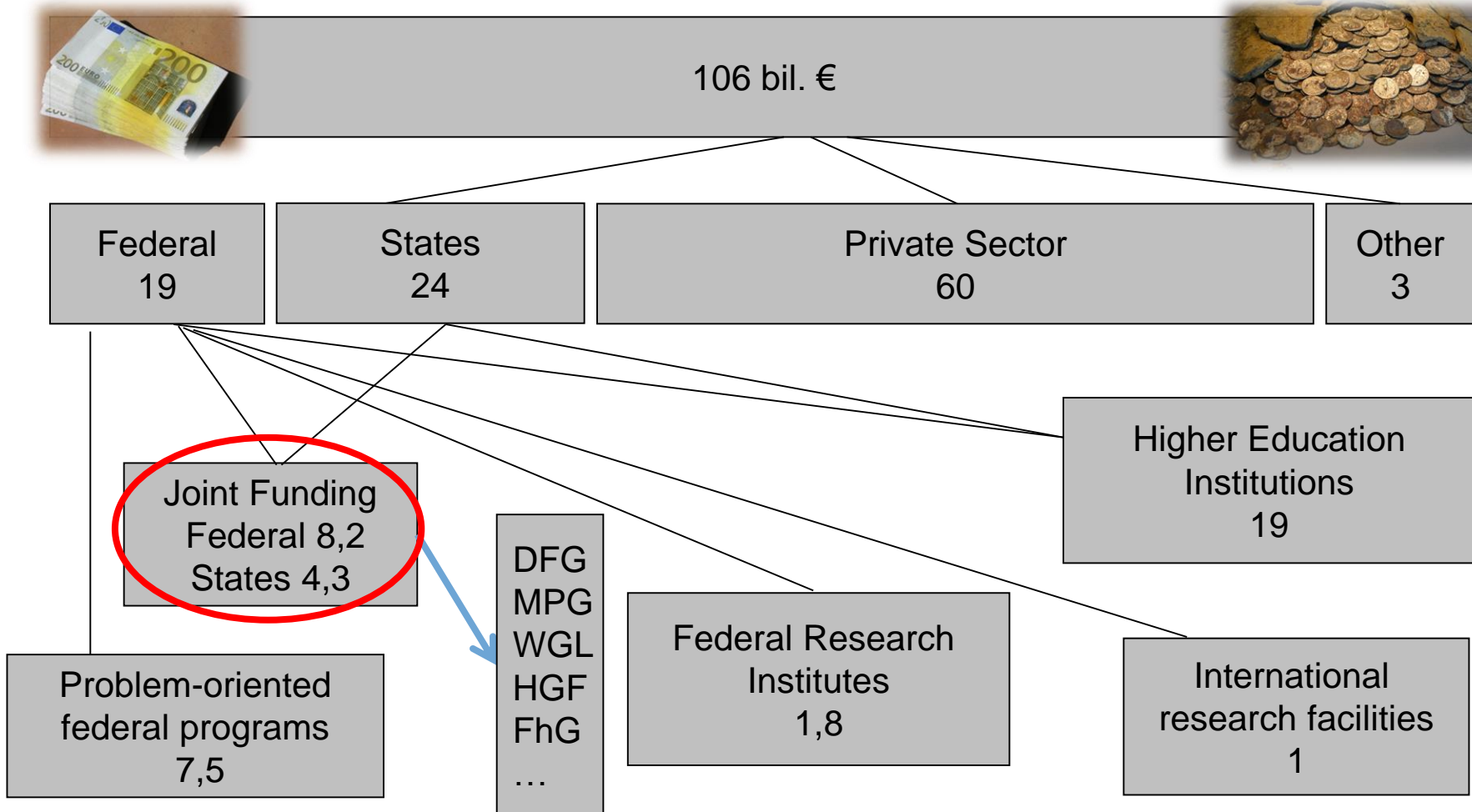
Top down funding, problem-oriented



Bottom up funding, quality-oriented, but no thematic programmatic!

Expenditure for Higher Education, Science & Research 2013 (BMBF Report bi-annual 2016)

Educated „guess“

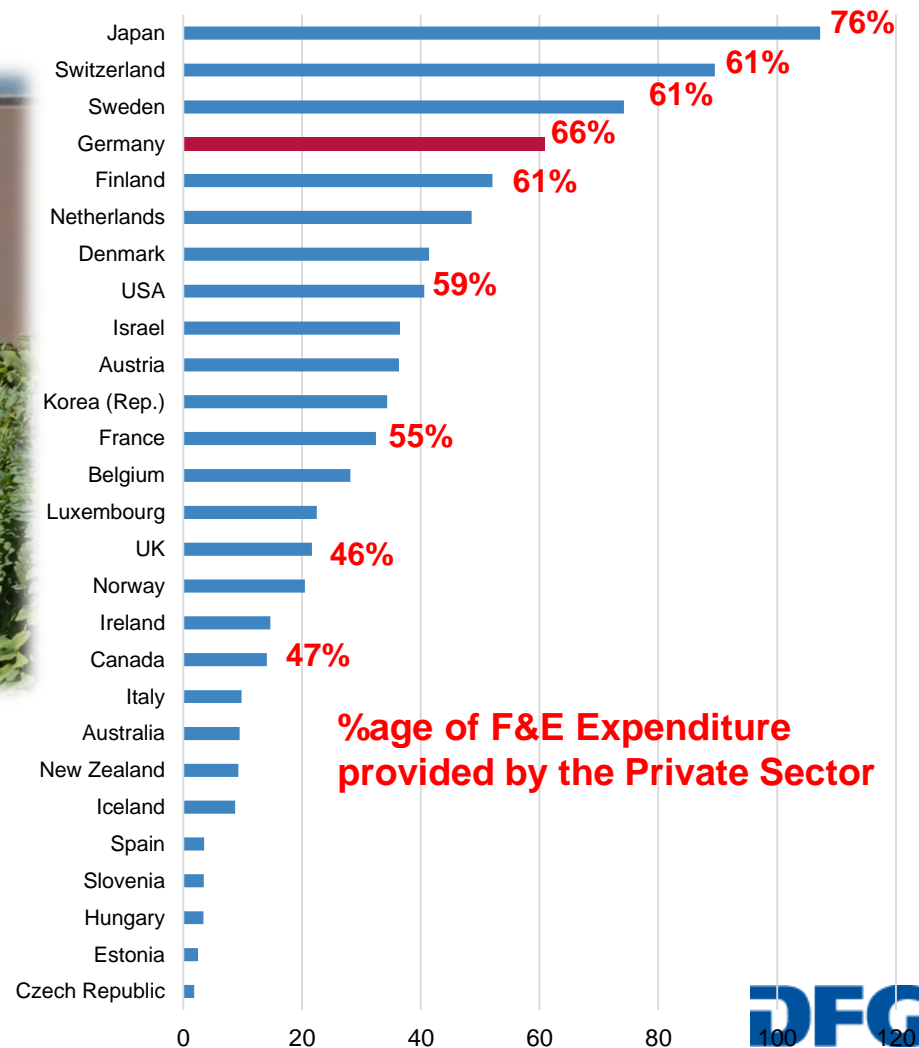


Triadic patent families in selected countries 2011

Private sector has to take responsibility!



number per million inhabitants



Triadic: patents are registered in Europe, Japan & US

Source: OECD (2014)

The complex German Research Ecosystem

(funding by public sector = 32% of all)

Top down funding, problem-oriented

Institutional funding by Governments

www.ressortforschung.de

Supply of food, Water, energy
Advice for politics and society

Industrial products

Sound biodiversity

Healthcare
Clean & healthy environment



Universities



The Federal Government & Federal States
≈ 30bil.€

≈10%

Bottom up funding, quality-oriented, but no thematic programmatic!

≈ 3,7 bil.€



Division of tasks within the public system

	Problem-driven research „applied“	Science-driven research „basic“
Institutional funding	<ul style="list-style-type: none">• Leibniz Institutes• Helmholtz Institutes• Federal Research Inst• Joint Research C. EU• AiF Member Institutes	<ul style="list-style-type: none">• Max-Planck Institutes• Fraunhofer Institutes• CERN• EMBL
	Universities	
Project funding	<ul style="list-style-type: none">• Ministerial Funding Programs (e.g. Water management, Biotech)• EU Funding Prg. (e.g. Car of the Future, Cardiovascular Diseases)	<ul style="list-style-type: none">• DFG• Mobility programs (DAAD, AvH, EU-Marie Curie)• European Research Council (ERC)

Ausgaben für Wissenschaft in Deutschland 2015

(nach Bundesforschungsbericht 2016)

Tab. 4 3/3: Source: Federal Report on Research and Innovation 2016, BMBF

Ressort ¹	Mio. Euro			
	SOLL			
	2015		2016	
	insgesamt	darunter FuE	insgesamt	darunter FuE
Bundeskanzleramt ²	342,6	103,9	386,7	130,1
Auswärtiges Amt	288,7	181,7	295,7	79,0
Bundesministerium des Innern	67,5	43,4	78,6	54,1
Bundesministerium der Justiz und für Verbraucherschutz	6,3	6,3	6,4	6,4
Bundesministerium der Finanzen	1,9	1,9	2,5	2,5
Bundesministerium für Economy and Energy	3.364,2	3.136,4	3.609,2	3.372,9
Bundesministerium für Arbeit und Soziales	96,5	45,3	98,3	45,6
Bundesministerium für Ernährung und Landwirtschaft	705,8	590,5	771,4	652,2
Bundesministerium der Verteidigung	1.030,3	856,3	980,3	802,6
Bundesministerium für Familie, Senioren, Frauen und Jugend	28,4	28,4	27,3	27,3
Bundesministerium für Gesundheit	365,2	170,4	367,0	184,0
Bundesministerium für Verkehr und digitale Infrastruktur	376,7	219,3	437,0	285,6
Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit	413,1	188,0	436,6	203,6
Bundesministerium für Education and Research	12.188,8	8.861,1	13.167,4	9.467,8
Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung	50,6	48,6	50,2	48,2
Allgemeine Finanzverwaltung ⁵	419,1	419,1	469,9	439,9
Ausgaben insgesamt	19.745,7	14.900,5	21.184,7	15.801,9



Tab 5 4/6 Expenditure by the government for science, research and development by funding area and funding priorities¹

Some examples for federal research priorities

Funding area Funding priority		Millions of €			
		Target		Government bill	
		2013 ^{2,3}		2014 ^{2,3,4}	
		Total	Of which R&D	Total	Of which R&D
A	Health research and health economy	2 116.4	1 928.1	2 176.1	1 984.9
AA	Health research and health economy	2 096.9	1 909.3	2 154.3	1 963.8
AB	Radiation protection	19.5	18.8	21.8	21.1
B	Bio-economy	277.6	277.6	281.2	281.1
C	Civilian safety research	104.5	100.5	102.8	98.4
D	Nutrition, agriculture and consumer protection	762.0	662.9	792.5	682.6
DA	Nutrition	30.5	21.0	31.4	21.7
DB	Sustainable agriculture and rural areas	486.8	456.7	497.1	465.0
DC	Health-related and commercial consumer protection	244.7	185.2	264.1	195.9
E	Energy research and energy technologies	1 562.1	1 230.0	1 566.5	1 239.1
EA	Rational energy conversion	538.2	538.0	531.5	531.2
EB	Renewable energies	410.8	409.2	417.6	415.9
EC	Nuclear safety and disposal	278.5	124.7	276.0	127.3
ED	Disposal of nuclear plants	191.5	15.0	192.0	15.2
EF	Fusion research	143.1	143.0	149.4	149.4
F	Climate, environment, sustainability	1 381.8	1 191.7	1 416.1	1 220.0
FA	Climate, climate protection; global change	280.1	279.9	288.4	286.8
FB	Coast, marine and polar research, geosciences	449.9	402.7	462.8	415.5
FC	Environment and sustainability research	343.8	259.9	354.5	267.8
FD	Ecology, nature conservation and sustainable use	308.0	249.2	310.5	249.9
G	Information and communication technologies	852.7	821.9	796.9	771.5
GA	Software systems; science technologies	224.1	224.0	219.7	219.6
GB	Communication technologies and services	101.6	101.4	101.6	101.4
GC	Electronics and electronic systems	307.9	307.5	259.0	258.6
GD	Micro-systems engineering	118.8	118.7	123.6	123.5
GE	Multimedia – development of convergent ICT	100.3	70.4	93.0	68.4

Problem-orientated funding

Source: Federal Report on Research and Innovation 2014, BMBF



Project Management Teams to carry out project funding

DLR as an example

Unsere Auftraggeber

Mit unseren Dienstleistungen zur Förderung von Forschung, Innovation und Bildung unterstützen wir Akteure aus Politik, Wissenschaft und Wirtschaft sowie Bildungsträger. Zu unseren Auftraggebern gehören Landes- und Bundesministerien, die Europäische Kommission, Stiftungen und Verbände.

Bundesministerien:



Weitere Auftraggeber:



Kommission der Europäischen Union
 Generaldirektion Forschung und Innovation,
 Generaldirektion Beschäftigung, Soziales und Integration,
 Generaldirektion Informationsgesellschaft und Medien



Bundesamt für Naturschutz

Ministerium für Innovation, Wissenschaft, Forschung des Landes Nordrhein-Westfalen (MIWF)



Bundesinstitut für Berufsbildung



Landesstiftung Baden-Württemberg



Deutsche Kinderkrebsstiftung



Heinz Nixdorf Stiftung



AOK



Deutsche Krebshilfe



Deutsches Zentrum für Herz-Kreislauf-Forschung e.V.



Eurasia Foundation



Gemeinsamer Bundesausschuss (G-BA)



Gesellschaft für Anlagen- und Reaktorsicherheit (mbH) - GRS



nova-Institut für Ökologie und Innovation, Bereich Nachhaltige Regionalentwicklung und biologische Vielfalt



ZENIT GmbH

DFG is driven by scientific demand

- ▶ DFG acts and funds **bottom up**
- ▶ **no thematic priorities (rare exceptions)**
- ▶ **No calls, no deadlines (rare exceptions)**
- ▶ no regional priorities
- ▶ **no political priorities**
- ▶ no political influence
- ▶ everything decided by scientists
- ▶ everything in competition
- ▶ everything in peer review
- ▶ Funding only if institution agrees on ethical standards

More about us later!



Mobility Funding by Federal Government

DAAD

Deutscher Akademischer Austausch Dienst
German Academic Exchange Service

mobility of students/education sector



mobility of researchers

Federal Foreign Office	187 Mio €	41 Mio €
Fed. Min. Education & Research	127 Mio €	59 Mio €
Fed. Min. Economic Coop. & Development	51 Mio €	8 Mio €
European Commission (Erasmus)	102 Mio €	
Other Sources	34 Mio €	8 Mio €
Total Budget	<u>501 Mio € (2016)</u>	<u>116 Mio € (2016)</u>

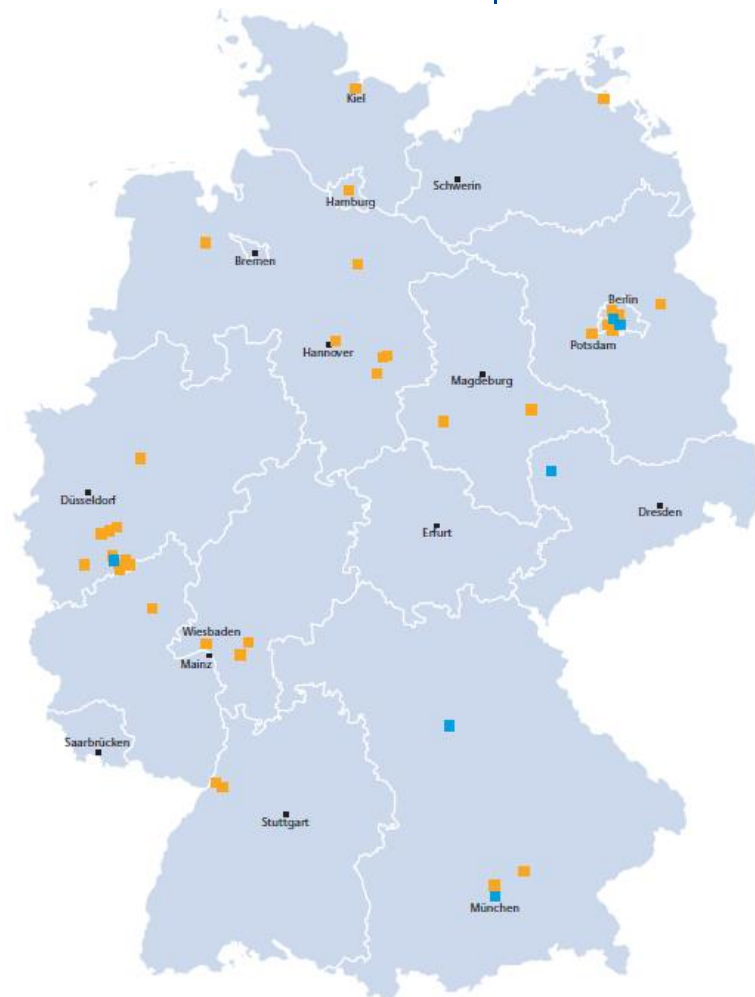
Federal Research Institutes

www | ressort
forschung | de

**Total budget (2014): 2 bil. €
incl. 1 bil. € for F&E**

**43 institutes, working for and
reporting directly to one of 12
(out of 14) federal ministries**

**Roughly 50% research, 50% ad-
vice and support for federal
ministries/government**



Federal Research Institutes

examples

Foreign Affairs (AA)

- ▶ German Archaeological Institute (DAI) (**Tehran!!!**)

Economy (BMW)

- ▶ Federal Institute for Materials Research and Testing (BAM)
- ▶ National Institute for Metrology (PTB)

Health (BMG)

- ▶ Paul-Ehrlich-Institut – Sera and Vaccines (PEI)

Traffic and Infrastructure (BMVI)

- ▶ National Meteorological Service (DWD)

Environment (BMUB)

- ▶ Federal Office for the Environment (UBA)

Defence (BMVg)

- ▶ Institute of Microbiology of the Federal Armed Forces



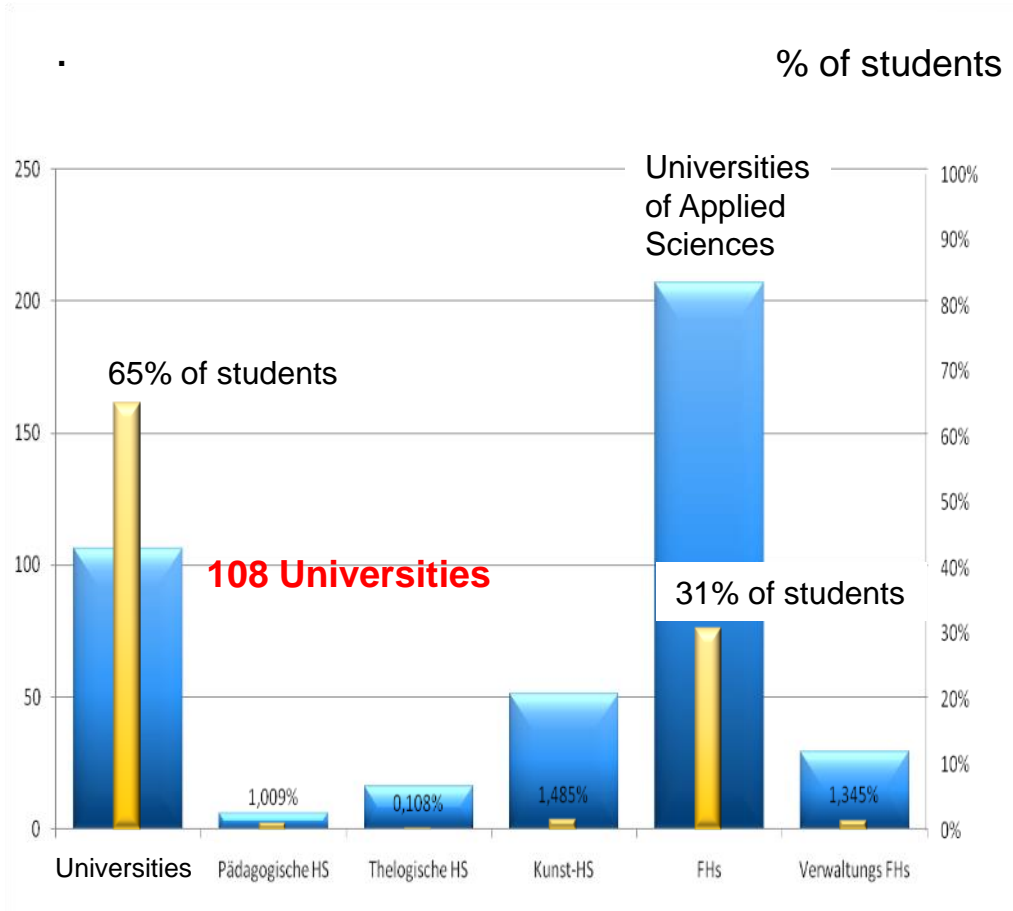
German universities and Fachhochschulen*

*called in English: Universities of Applied Sciences (UAP)

- **Nearly all Universities/UAPs „belong“ to one of the 16 federal states**
- **but they are extremely free in all their decisions!**
- **Universities are the main centres for research in Germany**
- **UAPs usually are less research-oriented but very applied**
- **Humboldt-principle: unity of research and education, Wilhelm, not Alexander**
- **Extra-university research institutes have special missions complementary to university research**



Institutions of Higher Education IHE



In Germany (2016):
427 IHE with 2,7 Mio. students
26 % IHE are universities
(108) with 65% of all students
74% IHE are Universities of
Applied Sciences (AUS) –
Fachhochschulen and similar
46% pupils from one year go to
IHE

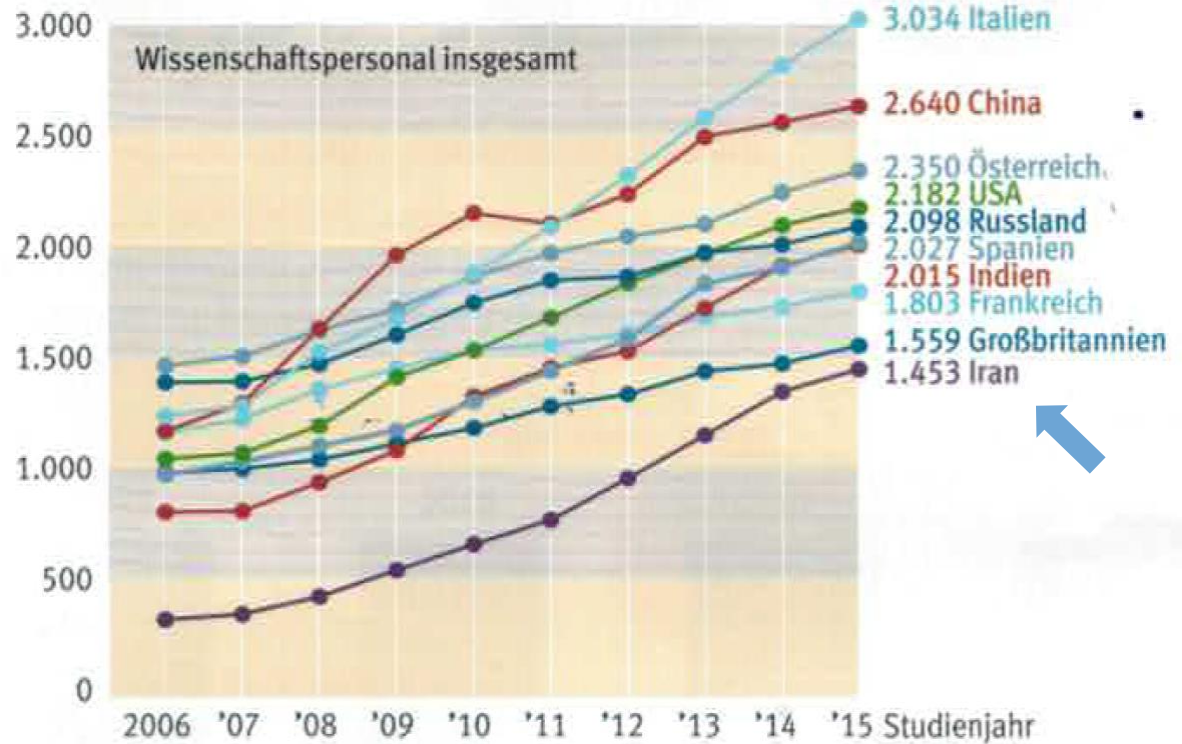
→ PhD can only be granted by
Universities, not by UAS

Source: Federal Statistics Bureau

German Universities are interesting host institutions!

Herkunftsland	Anzahl	Anteil in %
China	32.268	12,8
Indien	13.537	5,4
Russland	11.413	4,5
Österreich	10.129	4,0
Italien	8.047	3,2
Frankreich	7.330	2,9
Kamerun	7.106	2,8
Ukraine	6.941	2,8
Türkei	6.930	2,8
Bulgarien	6.840	2,7
Iran	6.449	2,6
Polen	5.994	2,4
Spanien	5.939	2,4
USA	5.213	2,1
Südkorea	5.140	2,0
Marokko	4.805	1,9
Brasilien	4.586	1,8
Indonesien	4.176	1,7
Luxemburg	3.909	1,6
Pakistan	3.836	1,5
Insgesamt	251.542	100,0

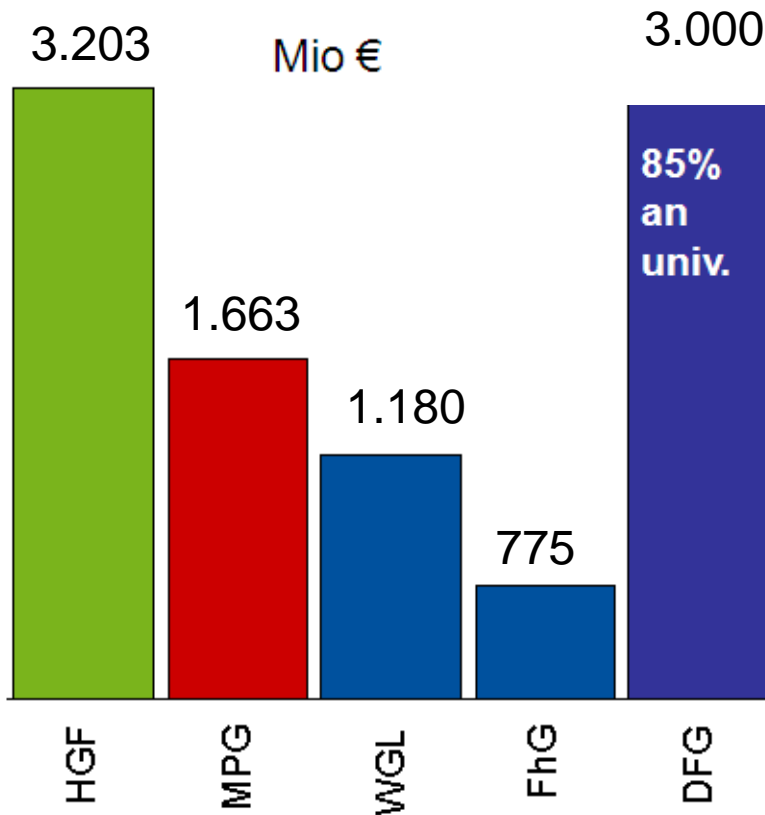
No fees!



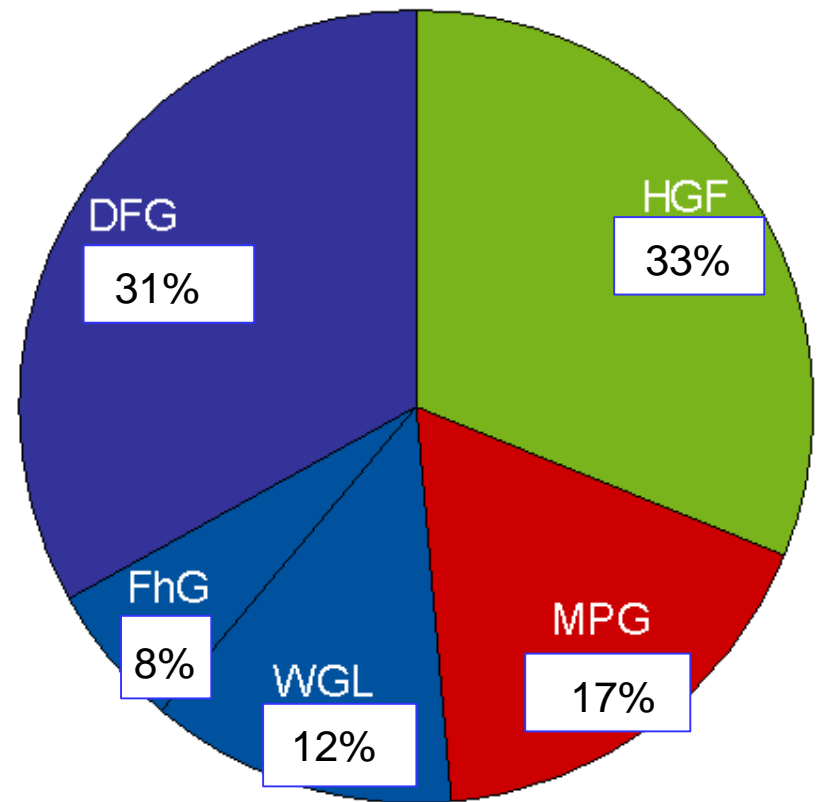
Origin of students and international staff 2015

Source: DAAD

Joint Research Funding by Federal and States Governments 2017

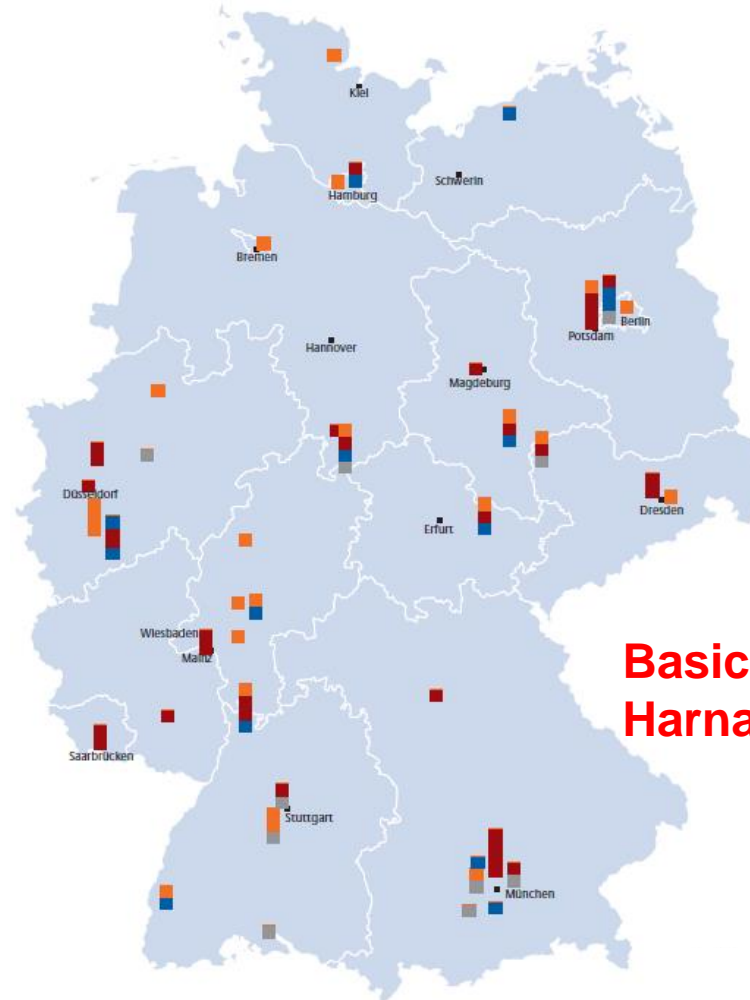


— Außeruniv. Forschung —



Research Organizations: Max-Planck Society

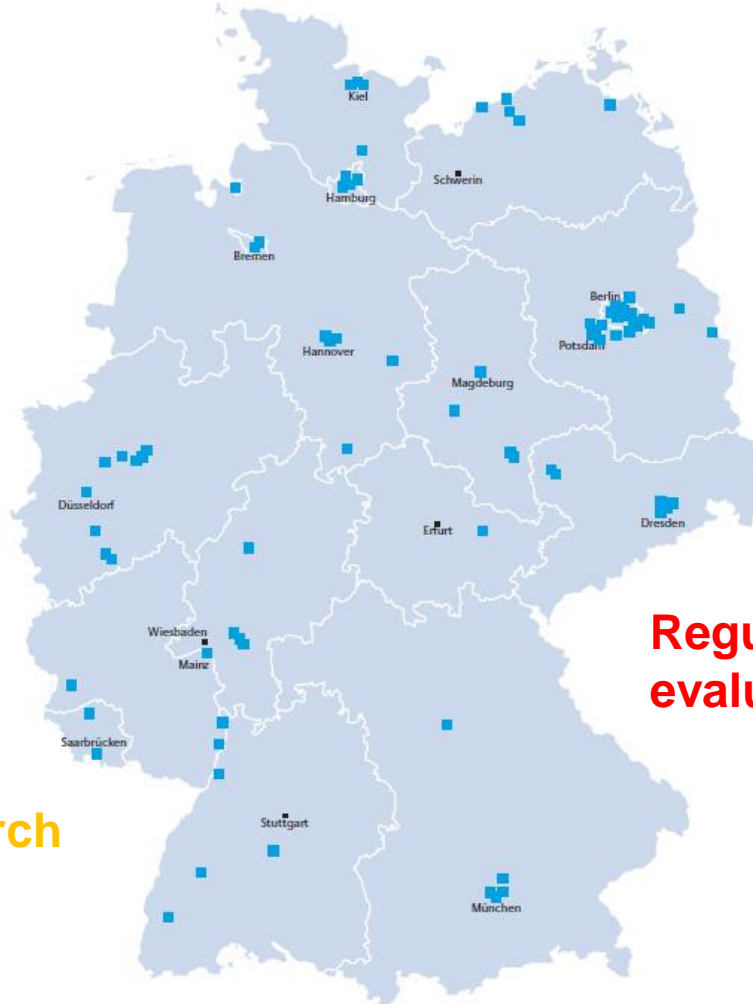
- ▶ 84 Institutes
- ▶ Budget: 2.1 B €
- ▶ 23,000 employees incl.
5,800 young scientists
- ▶ 60 International Max Planck
Research Schools
- ▶ Central Administration with
500 admin. staff
- ▶ **Mission: high quality basic
research - „Nobel Awards“**



**Basic research
Harnack principle**

Research Organizations: Leibniz Association

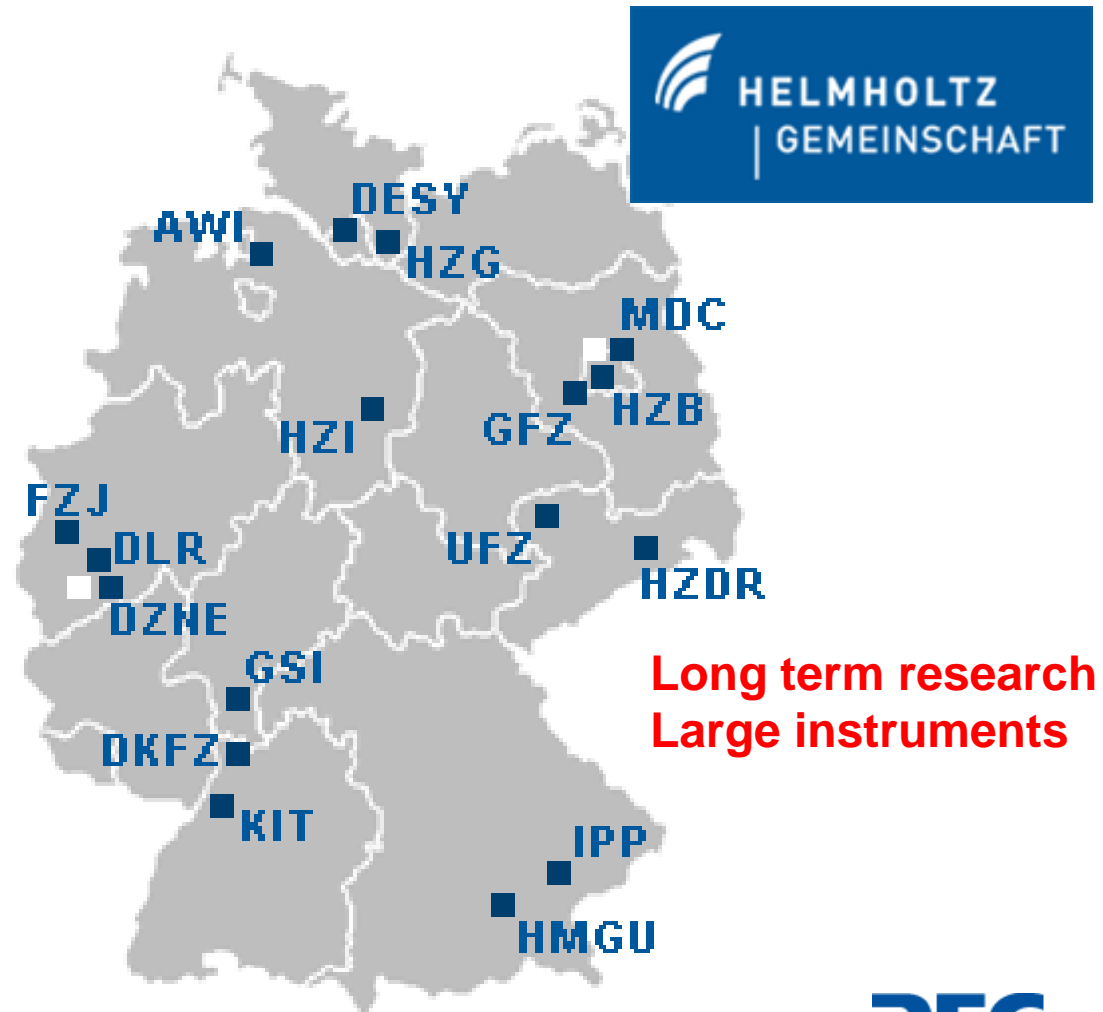
- ▶ 91 Institutes
- ▶ Budget: 1.8 B € (2016)
- ▶ 18,700 employees
- ▶ Incl. 9,500 scientists
- ▶ Central Office with 60 admin. staff
- ▶ **Mission: high quality problem-oriented research**



Regular independent evaluation

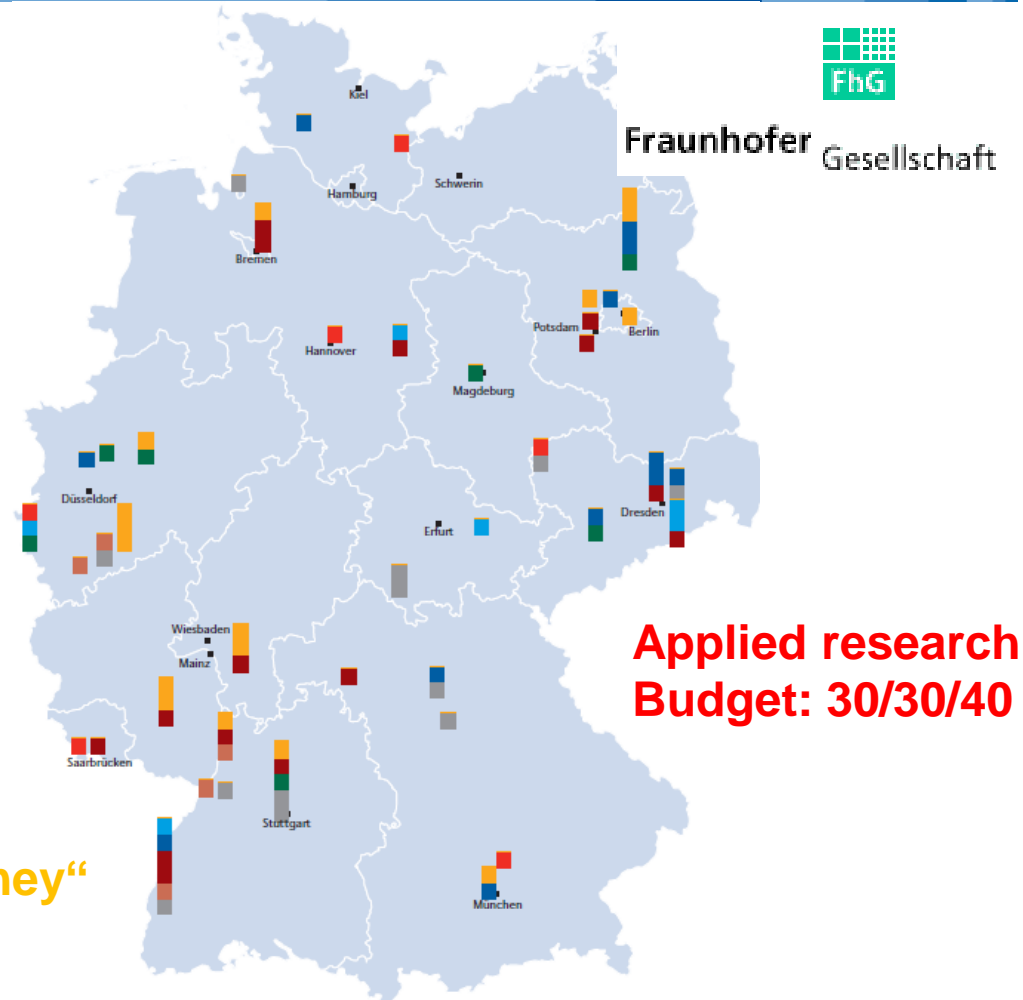
Research Organizations: Helmholtz Association

- ▶ 18 Institutes
- ▶ Budget: 4.4 B €
- ▶ 39,000 employees
- ▶ Incl. 16,000 scientists
- ▶ Central Office with 70 admin. staff
- ▶ **Mission: high quality problem-oriented, long-term research**



Research Organizations: Fraunhofer Society

- ▶ 69 Institutes
- ▶ Budget: 2.1 B €
- ▶ 24,500 employees
- ▶ Central Administration with 300 admin. staff
- ▶ **Mission: high quality applied research - „earn money“**



DFG's support for German-Iranian Cooperation

Tehran, 08.09.2018

Dr. Jörg Schneider
Dorothea Fendel

Deutsche Forschungsgemeinschaft
German Research Foundation



Something for everyone!*

*if a good scientist!

What is DFG? – Setting the scene!

DFG is

- Europe's largest non-governmental research funding organization,
- not performing research itself,
- not running research institutes or facilities
- dedicated to researcher-driven, bottom-up research,
- supporting universities and other publically funded institutions
- not funding private sector institutions!

DFG's major aim: to make excellent research possible in Germany by

- funding excellent research projects and by
- creating framework conditions for the best to cooperate smoothly
- this includes International Cooperation



DFG is driven by scientific demand

- ▶ DFG acts and funds **bottom up**
- ▶ **no thematic priorities (rare exceptions)**
- ▶ **No calls, no deadlines (rare exceptions)**
- ▶ no regional priorities
- ▶ **no political priorities**
- ▶ no political influence
- ▶ everything decided by scientists
- ▶ everything in competition
- ▶ everything in peer review
- ▶ Funding only if institution agrees on ethical standards



DFG 2018: 3 Bil. €

What are the DFG's funding criteria?

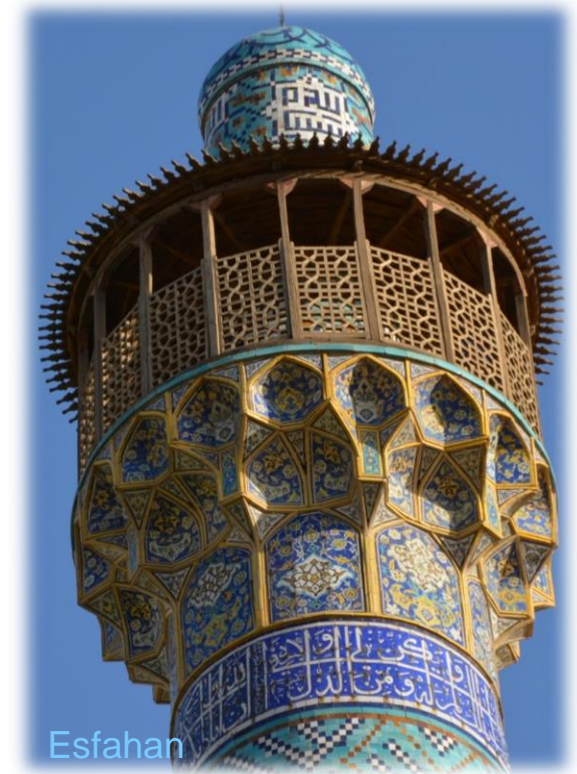
- ▶ everything in competition
- ▶ everything in peer review
- ▶ DFG reviewers evaluate proposals based on
 - ▶ projects' scientific merit
 - ▶ applicants' qualifications
 - ▶ goals and work program
 - ▶ proposed use of funding
 - ▶ quality and added value of the cooperation



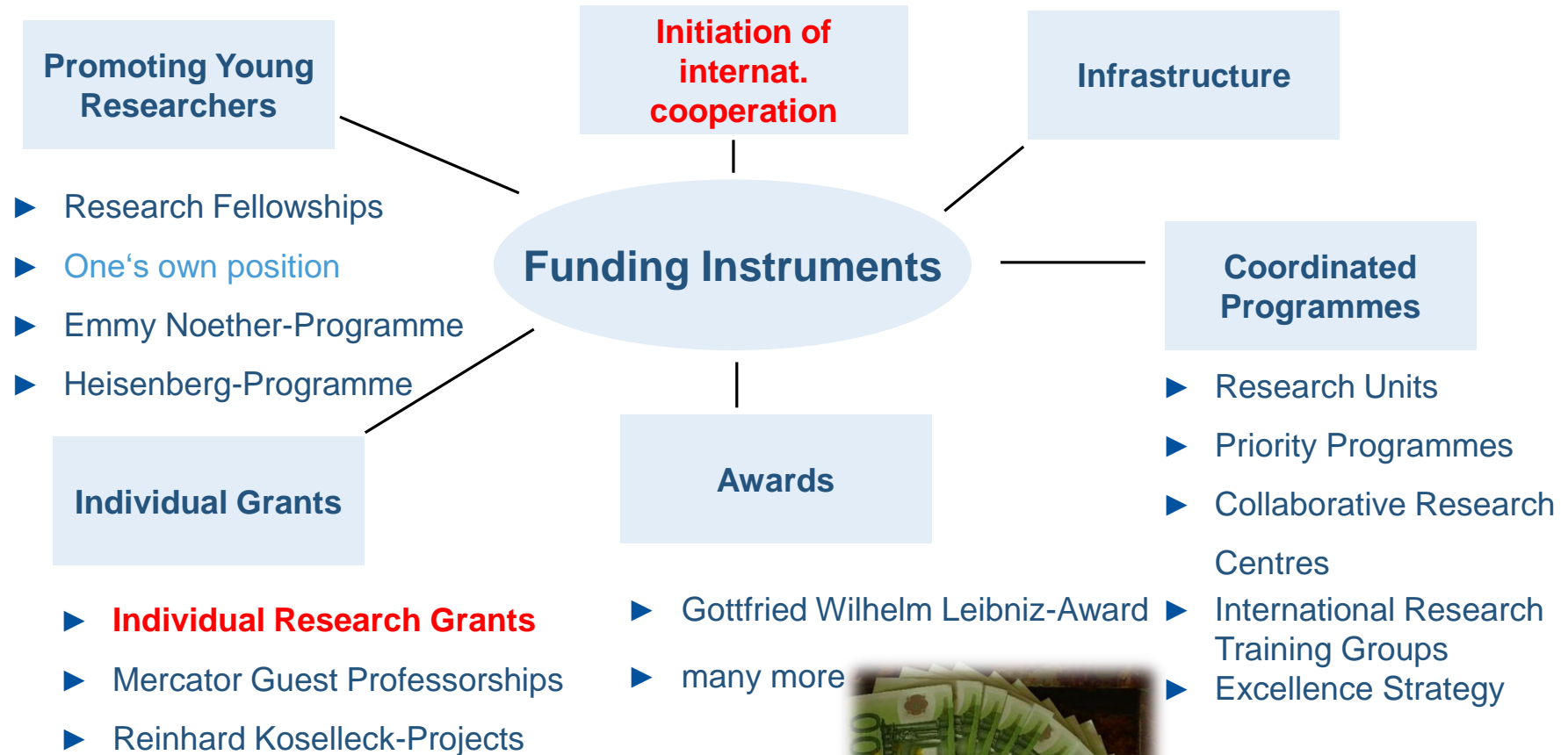
DFG's Funding Instruments – all open to international co-operation and to foreign researchers working in Germany

Watch out:

**Proposals to DFG can only be submitted by a
researcher working or going to work in Germany !**



DFG's Funding Instruments – all open to international co-operation and to foreign researchers working in Germany



Diversity
Flexibility
Global View



Initiation of International Cooperation

- **Mobility funding** to get to know each other,
- establish mutual trust and understanding,
- and to prepare a joint project proposal

- Very lean and easy proposal
- Partner in Germany can cover all costs for international partners

- Workshops in Germany or abroad
- Short individual visits in Germany or abroad
- Visits up to three months in Germany or abroad



Individual Research Grants

Purpose

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

Eligibility

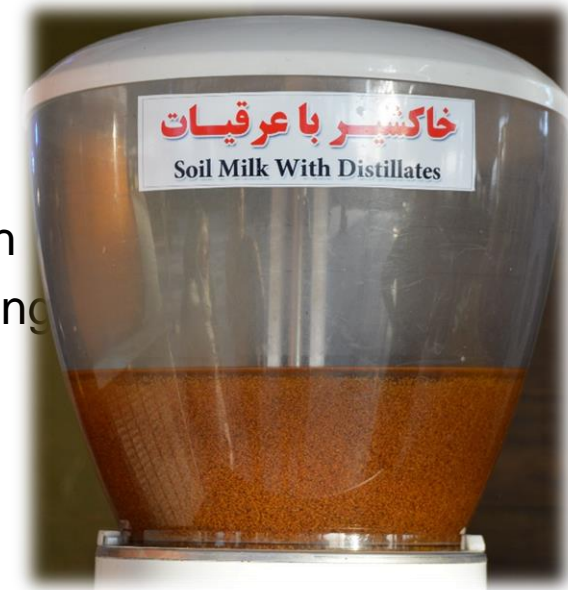
Researchers from all disciplines at German research institutions who have completed their scientific training (in most cases by achieving their doctorates)

Duration

Project-specific (usually three years)

Funding

- ▶ staff funding (PhD-students, post-docs; not permanent staff!)
- ▶ funding for direct project costs and consumables
- ▶ travel allowances



Iranian – German projects can be co-funded.... ... currently by INSF, NIMAD, and ICHTO



Prof. Malekzadeh
MoHME - NIMAD

Ambassador Dr. Majedi



Vize-Minister Prof. Salaramoli



Vize-Presidency



DFG

Prof. Strohschneider

INSF

Prof. Zargham



ICHTO



MoE/NRI



DFG funded German-Iranian Projects since 2015

- 21 Initiation of International Collaboration
- 7 Research Grants



	Initiation	Research Grants
Humanities and Social Sciences	1	3
Life Sciences	3	2
Natural Sciences	9	1
Engineering Sciences	8	1
	21	7

Please contact us on specific questions
on Iranian-German cooperation!

Thank
you for
your
attention!

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Further Information

- ▶ On DFG
- ▶ On German research institutions
- ▶ On projects funded by DFG
- ▶ On German research landscape



www.dfg.de

www.dfg.de/foerderatlas

www.dfg.de/gepris

<http://research-explorer.de>



DFG