



Funding of Research in Mathematics

German Research Foundation (DFG)

Carsten Balleier – AIMS Senegal – May 2018

Germany – political framework

Implications of federal structure

- ▶ Definition: `Germany is a country consisting of 16 countries`
 - „Bund“: central government and its agencies
 - by Germany's constitution no responsibility for education, i.e. for universities
 - limited responsibility for research
 - relatively stable financial resources
 - 16 „Länder“: states / provinces
 - by definition: responsible for universities
[N.B.: almost no private universities]
 - under financial pressure
- ▶ Consequence: need to cooperate!

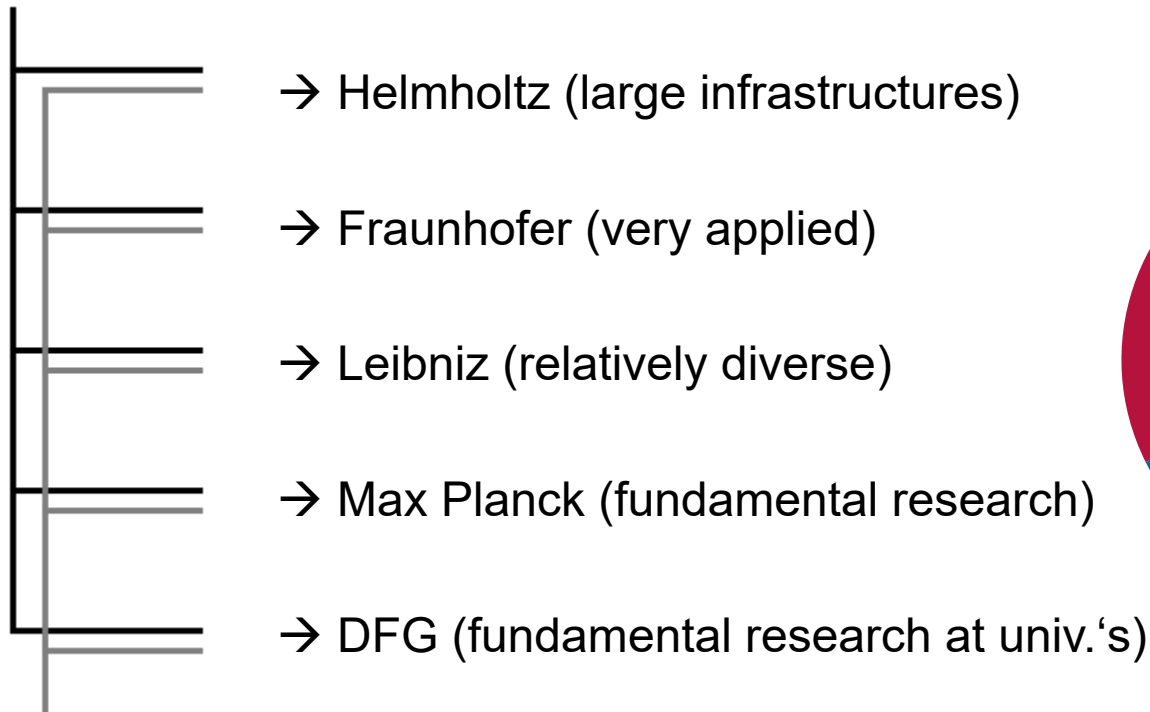


http://commons.wikimedia.org/wiki/File:Germany_location_map.svg, 2014-11-17

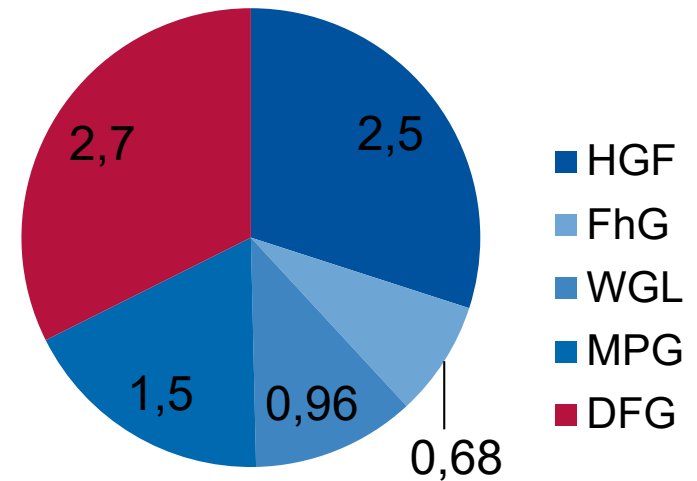
Hierarchy of joint funding – „Bund“ vs. „Länder“

co-funded agencies/research organizations in Germany

„Bund“ → direct funding through BMBF projects



**Base Funding 2013
of German Research
Organizations**



(in billion euros, according to annual reports)

„Länder“ → direct (permanent) funding for universities

Examples (non-DFG, not exhaustive)

Mathematical centres under different funding schemes

► Leibniz Association (WGL):

- Mathematisches Forschungsinstitut Oberwolfach
- Weierstraß Institute Berlin (N.B.: hosting permanent office of IMU)

► Max Planck Society (MPG):

- Max Planck Institute for Mathematics Bonn
- Max Planck Institute for Mathematics in Sciences Leipzig

► Fraunhofer Society (FhG):

- Fraunhofer Institute for Industrial Mathematics Kaiserslautern
- Fraunhofer Institute for Algorithms and Scientific Computing Bonn/St. Augustin

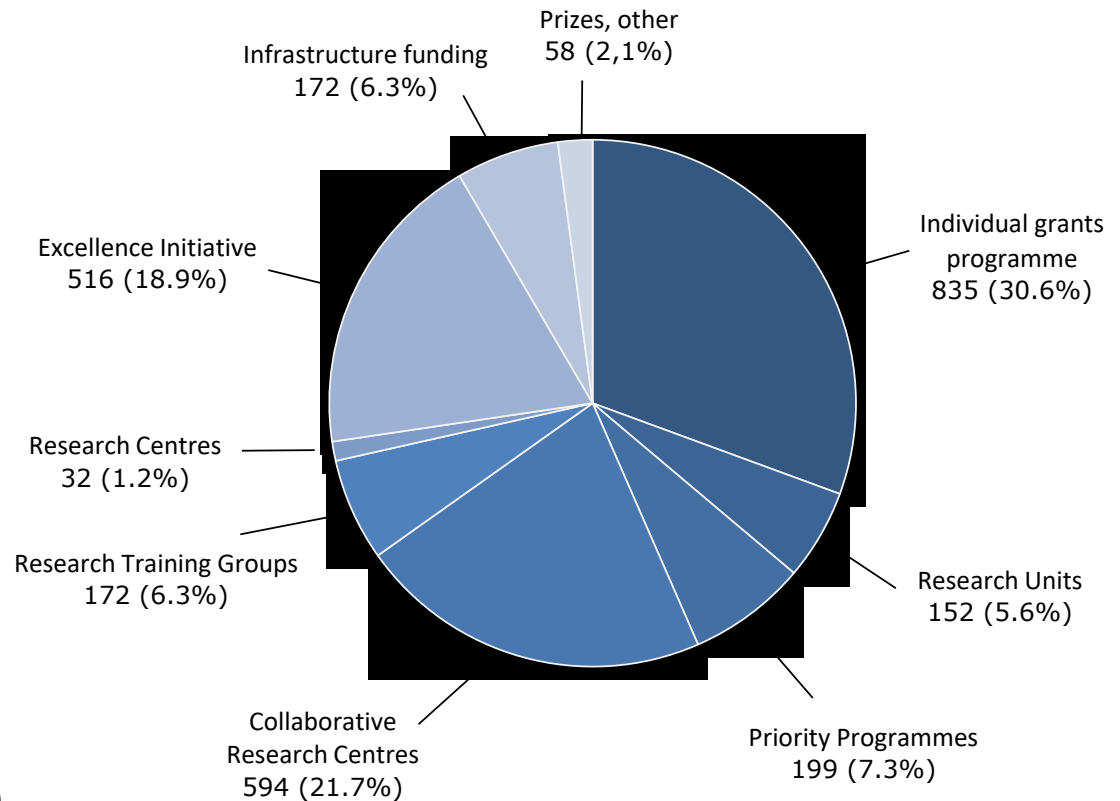
► further players are DAAD and Alexander von Humboldt foundation

- both depend on Foreign Affairs; independent from BMBF

German Research Foundation

mission, principles, numbers

- ▶ DFG is the self-governing organization for science and research in Germany.
- ▶ It is formally independent from politics.
- ▶ It serves all branches of science & humanities.
- ▶ All decisions need to be science-driven.
- ▶ Budget: 3 bn euros p.a.
- ▶ Fair success rates, e. g., 25-30% (individual grants)



DFG's international policy and activities

build on DFG's national activities

- ▶ DFG aims to facilitate international research cooperation through organizational support and funding
- ▶ DFG cooperates with major established funding agencies (e.g., U.S. NSF) and offers support to recently founded agencies
- ▶ DFG pushes forward the 'Global Research Council'
- ▶ DFG is represented in Brussels, the U.S., China, Japan, India, Russia, and South America
- ▶ DFG has an international unit in its head office which observes all parts of the world and takes up initiatives from the communities

The DFG-AIMS Initiative

- First contacts between DFG and AIMS representatives established in summer 2014
- decision to set up a small programme to explore the chances of cooperation between mathematicians from Germany and African countries (AIMS)
- establishment of a scientific steering committee (3 scientists/mathematicians nominated by DFG, 3 nominated by AIMS)
- May 2015 first meeting of this SC in Bonn giving the advice to organise a first **DFG-AIMS workshop in Mathematics** with six rather broad priority areas
- was held in March 2016 in Dakar (alongside with Next Einstein Forum)

Results: Five topical follow up workshops in 2017-2018

possibly leading to collaboration projects -> some comments later

1	Mathematics against Malaria – a holistic approach	Gideon Ngwa, Wilfred Ndifon, Bernhard Renard	Time period: 20-23 February 2017 Location: AIMS Cameroon
2	Evolutionary Processes on Networks	Jacek Banasiak, Wolfgang König, Peter Stollmann, Conrad B. Tabi	Time period: Spring 2018 (NEF) Location: AIMS Rwanda (NEF)
3	Shape optimization, homogenization and control	Volker Schulz, Diaraf Seck	Time period: 13-16 March 2017 Location: AIMS Senegal
4	Incomplete market methods applied to weather and agricultural risks	Ludger Overbeck, Patrick Weke	Time period: 20-24 February 2017 Location: AIMS Tanzania
5	Global Differential Geometry	Hamidou Dathe, Bernhard Hanke, Aissa Wade, Katrin Wendland	Time period: 14 to 25 May 2018 Location: AIMS Senegal Scope: a) School during the first week b) Workshop during the second week

DFG's different budgets

Institutional funding and additionally assigned tasks

- ▶ DFG finances research projects from its 'institutional funding'
 - DFG's permanent task (since 1951)
 - based on a well-established programme structure
- ▶ DFG finances 'clusters of excellences' and 'graduate schools' through additional funds under Germany's 'excellence initiative'
 - additional funding for scientific research, 2006-2017
 - about to be replaced by an 'excellence strategy' w/o fixed duration
- ▶ DFG has a budget for strategic activities
- ▶ DFG manages certain extra funds, e. g. for large research equipment at universities

Examples

Mathematical centres at universities within the 'excellence initiative'

► Hausdorff Center for Mathematics Bonn

- unites mathematical research in Bonn (including Max Planck institute)
- provides as structural components: Hausdorff Research Institute for Mathematics; Bonn International Graduate School in Mathematics

► Berlin Mathematical School

- joint graduate school established by all three universities in Berlin and respective mathematics departments in cooperation with other mathematical institutions in Berlin

► Heidelberg Graduate School of Mathematical and Computational Methods for the Sciences

- joint graduate school established by different departments of Heidelberg university

► new application process: decisions in September 2018

DFG's institutional funding programmes

overview

- ▶ three types of funding:
 - 'classical' project funding
 - early career funding
 - infrastructure funding
- ▶ in most cases, no thematic requirements and proposals accepted at any time
- ▶ in any review procedure, at least one disciplinary review board is involved
- ▶ 'expensive' programmes have (collaborative projects, infrastructure funding) have their own interdisciplinary board which decides

DFG's institutional funding programmes

characteristics of individual research projects

- ▶ submitted by a single applicant or a small group of applicants (up to 3)
- ▶ describes a concrete (seemingly reachable) aim within its field
- ▶ delivers a (up to 3 year) work plan, which spells out the need for support
- ▶ items which are usually supported:
 - Ph. D. positions
 - postdoc positions
 - an allowance for guest invitations and travel
 - workshops
- ▶ typically one position with some other funding
- ▶ zero or two (rarely more) positions are common forms of proposals, too

DFG's institutional funding programmes

how to involve international partners – initiation of cooperation

- ▶ need a German lead applicant
- ▶ pre-project funding for the initiation of a collaboration
 - German needs to submit a proposal
 - proposal has to describe the basic ideas for cooperation based on a description on expertise of all partners and potential for joint work
 - mutual visits and/or workshops as funding items
 - aim to produce a joint project
- ▶ in general, relatively quick decision
(for modest financial requests, e. g., 5,000 euros)

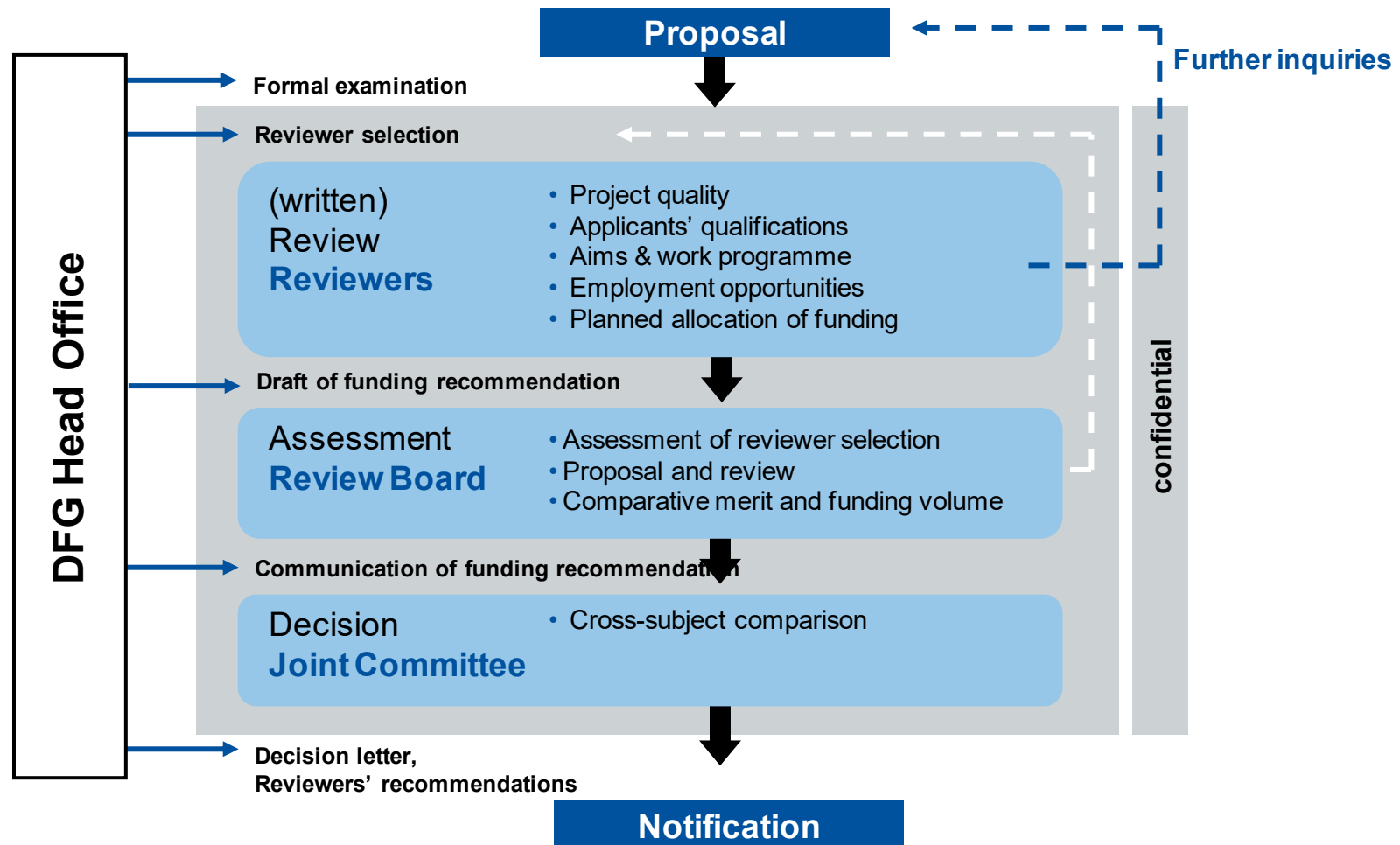
DFG's institutional funding programmes

how to involve international partners – research grants

- ▶ need a German lead applicant
- ▶ research proposals for grants for individual projects may involve foreign partners receiving funding on their side
 - foreign funding sources may vary
 - in some cases: joint calls with partner agencies
- ▶ if there is no partner agency, DFG may provide funding for foreign partner
- ▶ joint research proposals always compete with national ones

How does the decision-making process work?

Individual grants involve reviewers, a review board & the Joint Committee



Funding amounts for mathematics estimates (not official!)

- ▶ overall funding (excluding overhead): more than 50 mio. euros annually
 - 30 mio. euros for Ph.D. students and 15 mio. euros for postdoc positions
 - remainder: travel, guest funding, conference funding
- ▶ corresponds to roughly 700 Ph.D. students and 230 postdocs
 - to be compared to ≈ 1.500 -2.000 mathematics Ph.D. students in total in Germany
- ▶ distribution of Ph.D. students over funding programmes:
 - research training groups: 200 – 250
 - collaborative research centres: 150 – 200
 - priority programmes: 100 – 120
 - individual grants: 120 – 150
 - remainder on other programmes

Key numbers about the mathematical community in Germany (as of 2015)

► community in Germany

- approx. 1.250 professors (200 of them female; incl. junior professorships)
- approx. 3.800 persons on 'scientific assistant positions' (25% female)
 - includes postdocs and Ph. D. students holding positions
- approx. 2.800 Ph. D. students, 550 Ph. D. degrees p. a. (25% female)
- approx. 40.000 students in B. Sc./M. Sc. programmes in mathematics and related fields

► DFG's mathematics board: 8 members

► other (interdisciplinary) DFG boards: 8 members

► represented by two societies (DMV, GAMM)



Many thanks!

Further information

- ▶ myself: carsten.balleier@dfg.de
- ▶ DFG: <http://www.dfg.de>
- ▶ funding statistics: <http://www.dfg.de/foerderatlas>
- ▶ funded projects: <http://www.dfg.de/gepris>