

A blurred, 3D rendering of the letters 'DFG' in white, set against a blue background with light rays emanating from the left.

# Funding of Research in Mathematics

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Deutsche Forschungsgemeinschaft (DFG, German Research Foundation)

# Germany – political framework

## Implications of our federal structure

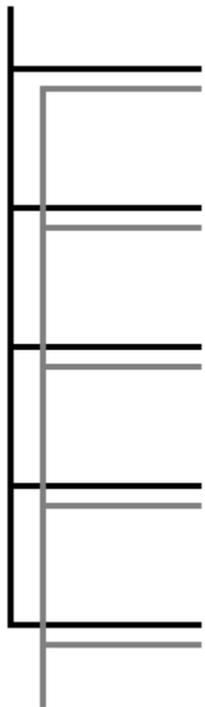
- ▶ Definition: `Germany is a country consisting of 16 countries/states‘
  - „Bund“: central government and its agencies
    - by Germany’s constitution no responsibility for education, i.e. for universities
    - limited responsibility for research
    - relatively stable financial resources
  - 16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



[http://commons.wikimedia.org/wiki/File:Germany\\_location\\_map.svg](http://commons.wikimedia.org/wiki/File:Germany_location_map.svg), 2014-11-17

# Broad spectrum of research funding through „Bund“ & „Länder“ co-funded agencies/research organizations in Germany

„Bund“ → direct funding through BMBF projects



→ Helmholtz (large infrastructures)

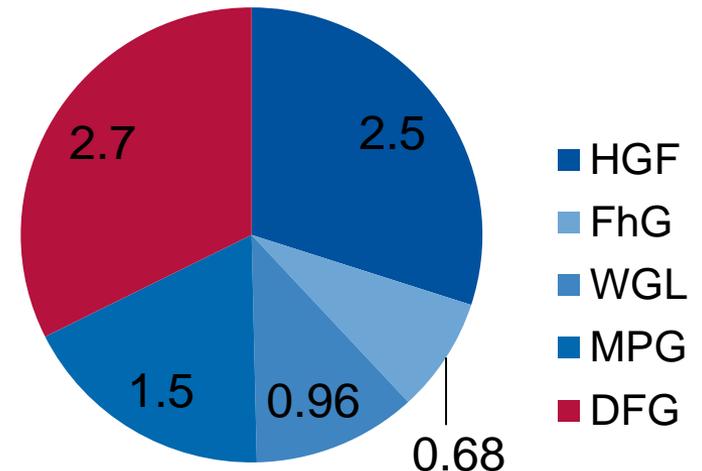
→ Fraunhofer (very applied)

→ Leibniz (relatively diverse)

→ Max Planck (fundamental research)

→ DFG (fundamental research at univ.'s)

## Base Funding 2013 of German Research Organizations



(in billion euros, according to annual reports)

„Länder“ → direct (permanent) funding for universities

International mobility and people funded through DAAD and Alexander von Humboldt Foundation

# Examples (non-DFG, not exhaustive)

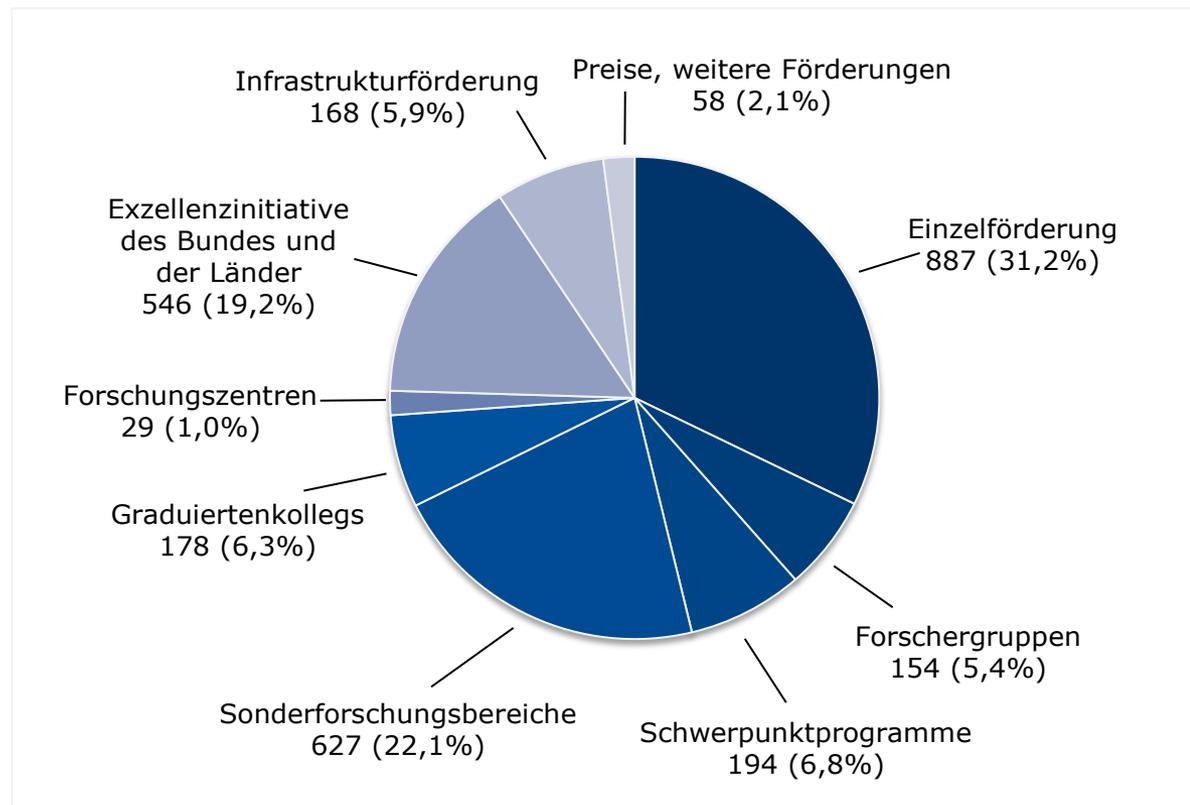
## Mathematical centres under different funding schemes

- ▶ Leibniz Association (WGL):
  - Mathematisches Forschungsinstitut Oberwolfach
  - Weierstraß Institute Berlin (hosting also the permanent office of IMU)
- ▶ Max Planck Society (MPG):
  - Max Planck Institute for Mathematics, Bonn
  - Max Planck Institute for Mathematics in the 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 Ministry for 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, **≈ 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 established funding agencies 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
  - for Africa: Dr. Beate Wilhelm and Dr. Markus Wilms, + staff

# 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

<b>1</b>	<b>Mathematics against Malaria – a holistic approach</b>	Gideon Ngwa, Wilfred Ndifon, Bernhard Renard	Time period: 20-23 February 2017 Location: <b>AIMS Cameroon</b>
<b>2</b>	<b>Evolutionary Processes on Networks</b>	Jacek Banasiak, Mapundi Banda, Wolfgang König, Peter Stollmann, Conrad B. Tabi	Time period: 19-24 March 2018 (before NEF) Location: <b>AIMS Rwanda</b>
<b>3</b>	<b>Shape optimization, homogenization and control</b>	Volker Schulz, Diaraf Seck	Time period: 13-16 March 2017 Location: <b>AIMS Senegal</b>
<b>4</b>	<b>Incomplete market methods applied to weather and agricultural risks</b>	Ludger Overbeck, Patrick Weke	Time period: 20-24 February 2017 Location: <b>AIMS Tanzania</b>
<b>5</b>	<b>Global Differential Geometry</b>	Hamidou Dathe, Bernhard Hanke, Aissa Wade, Katrin Wendland	Time period: 14 to 25 May 2018 Location: <b>AIMS Senegal</b> Scope: a) Spring school during the first week, on recent developments in the area 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' without 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 for new clusters: decisions in September 2018

# DFG's institutional funding programmes overview

- ▶ four types of funding:
  - `classical' project funding
  - early career funding
  - infrastructure funding
  - supporting international cooperation
- ▶ in most cases, no thematic requirements, proposals accepted at any time
- ▶ in any review procedure, at least one disciplinary review board is involved
- ▶ `expensive' programmes (collaborative projects, infrastructure funding) have their own interdisciplinary decision boards

# DFG's institutional funding programmes

## characteristics of individual research projects

- ▶ submitted by a single applicant or a small group of applicants (up to 3 PIs)
- ▶ 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

## Three ways to involve international partners

DFG-proposals always need a lead applicant from Germany as PI and international proposals always compete with national ones.

1. **pre-project funding** for the initiation of a collaboration (up to 12 months)
  - PI from Germany submits a proposal describing the basic ideas for cooperation based on a description of the expertise of all partners and potential for joint work
  - mutual visits and/or workshops as funding items; **aim to develop a joint project**
2. research proposals for individual projects (up to 36 months + possible prologation) may involve foreign partners receiving funding on their side
  - funding sources may vary
  - in some cases: joint calls with partner agencies
3. In case there is no partner agency, DFG may even provide funding for

**African partner**

Mathematics Funding at DFG - Frank Kiefer

# TWAS-DFG Cooperation Visits

TWAS is the academy of sciences for the developing world, located at the International Centre for Theoretical Physics ICTP in Trieste, Italy.

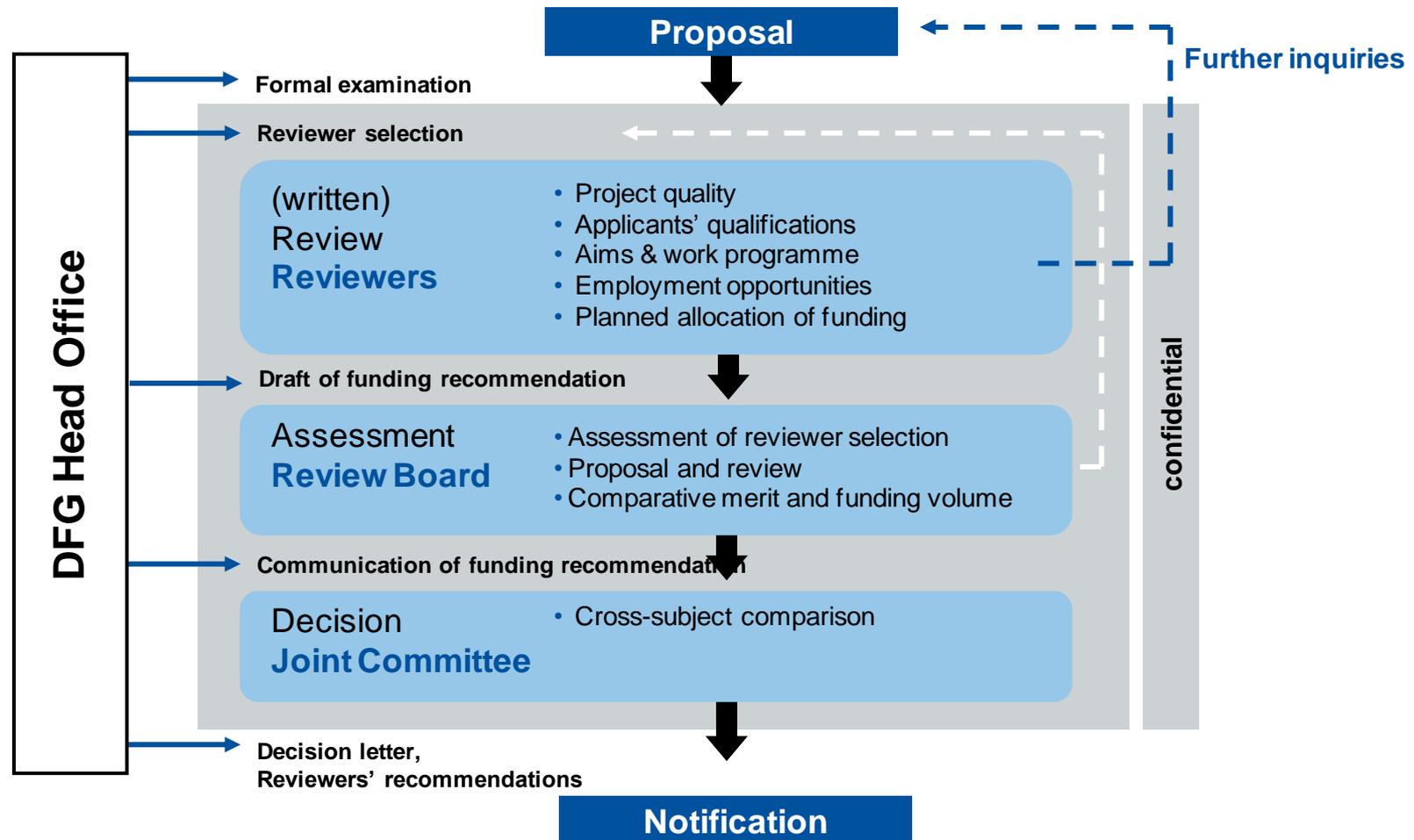
Founded in 1983 by the Pakistani physicist and nobel prize winner Abdus Salam (1926-1996)

- Cooperation visits (max 3 months) for young researchers (max. 5 years after PhD) from sub-Saharan African countries, including South Africa, holding a research position in a sub-Saharan country
- Deadline: 31 March each year, **next deadline 31.03.2018**
- Filled application form + CV + invitation letter by host in Germany + 2 reference letters

<http://twas.org/opportunity/twas-dfg-cooperation-visits-programme>

# 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 DFG funding (excluding overhead): 50 mio. euros annually
  - 30 mio. euros for Ph.D. students and 15 mio. euros for postdoc positions
  - rest: travel, guest funding, conference funding
- ❖ corresponds to roughly 700 Ph.D. students and 230 postdocs
  - to be compared to  $\approx 1.500-2.000$  mathematics Ph.D. students in total in Germany
- ❖ distribution of Ph.D. students over DFG's 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 from mathematics

## ❖ represented by two major societies (DMV, GAMM)

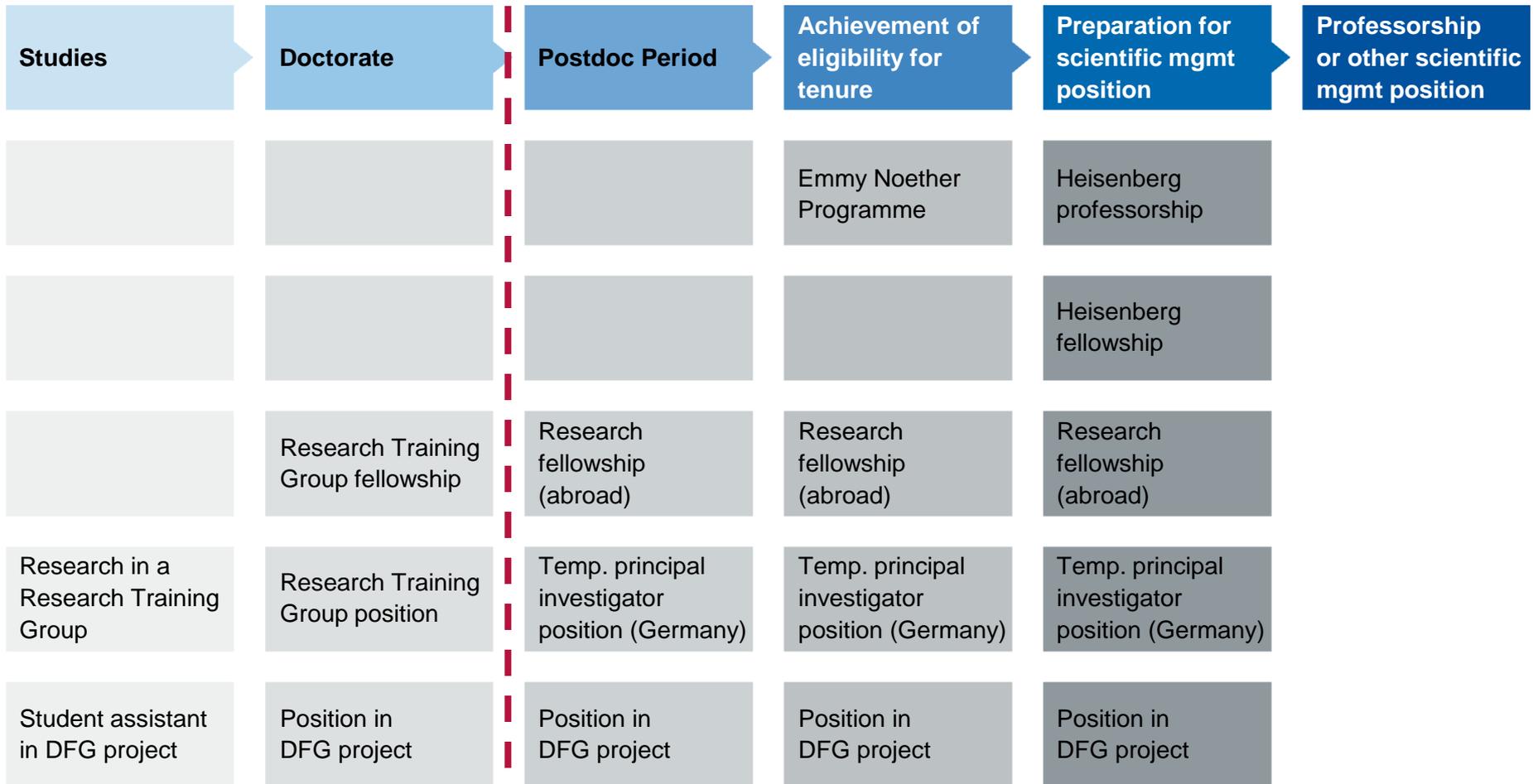
# Many thanks!

## Further information

- ▶ myself: [frank.kiefer@dfg.de](mailto:frank.kiefer@dfg.de)
- ▶ DFG: <http://www.dfg.de>
- ▶ funding statistics: <http://www.dfg.de/foerderatlas>
- ▶ funded projects: <http://www.dfg.de/gepris>

# DFG's funding programmes

## funding for research training / junior scientists



# DFG's policy on open access / open data

- ▶ Open access to journal publications
  - all projects may receive funding in order to publish scientific results under open access licences (as opposed to classical journals which are free for authors)
  - DFG organizes subscription of journals under ‚national licences‘ in order to bundle the purchase power of Germany's scientific system for negotiations with publishers
  - through the ‚German National Library for Science and Technology‘ (TIB Hanover), DFG supports arxiv.org
- ▶ DFG aims to extend this policy to access to relevant databases
- ▶ DFG has no open data policy, but ‚Guidelines on the Handling of Research Data‘
  - no fixed requirements, but dependent on discipline, available data infrastructures
  - funding is available for such infrastructures