



This is an excerpt from the publication  
“Wissenschaft weltoffen 2020”

Since 2001, the DAAD has been analysing data on the internationalisation of studies, research and higher education from Germany as well as from particularly relevant countries and regions such as the USA, the United Kingdom or Asia.

These include figures on international students in Germany, data on mobility behaviour, an overview of students' countries of origin and host countries as well as developments in the field of doctorates. A special data analysis sheds light on the status quo and trends at universities and research institutes during the Covid-19 pandemic.

The study integrates international data from OECD and UNESCO as well as national data from the Federal Statistical Office in Germany. In combination with other indicators, it provides a valid basis for long-term analyses.

#### Published by

DAAD  
Deutscher Akademischer Austauschdienst  
German Academic Exchange Service  
Kennedyallee 50, D-53175 Bonn  
Study and Research

DZHW  
Deutsches Zentrum für Hochschul- und  
Wissenschaftsforschung GmbH  
German Centre for Higher Education Research and  
Science Studies  
Lange Laube 12, D-30159 Hannover  
Educational Careers and Graduate Employment

#### Publisher

wbv Media GmbH & Co. KG  
Postfach 10 06 33, D-33506 Bielefeld  
wbv.de

#### Authors

Rachel Estévez Prado (DAAD)  
Katharina Fourier (DAAD)  
Dr. Ulrich Heublein (DZHW)  
Dr. Julia Hillmann (DAAD)  
Christopher Hutzsch (DZHW)  
Alexander Kupfer (DAAD)  
Dr. Jan Kercher (DAAD)  
Dr. Christian Schäfer (DAAD)

#### Data preparation

Configuration and evaluation of the Wissenschaft  
weltoffen web information system: Martin Fuchs,  
Dr. Ulrich Heublein, Christopher Hutzsch (DZHW)

The content management, the editorial team and the  
publisher have compiled the information in this  
publication with the utmost care. However, they cannot  
exclude the possibility that, in exceptional cases, some  
of the information was based on erroneous data or may  
have changed after going to press. Therefore, they  
assume no liability of any kind for the completeness and  
accuracy of the information.

#### Overall production

wbv Publikation  
A division of wbv Media GmbH & Co. KG,  
Bielefeld 2020

#### Layout

zaydesign, Christiane Zay, Potsdam

This publication is available for free download at  
**wbv-open-access.de**

This publication is published under the following  
Creative Commons copyright license:  
<http://creativecommons.org/licenses/by-sa/4.0/>



All trade, company and brand names used in this work  
may be protected by intellectual property rights, even if  
they are not identified as such. The use of such names  
in this work does not justify unauthorised reproduction  
thereof.

Printed in Germany

Number of copies: 700

ISBN: 978-3-7639-6574-8  
DOI: 10.3278/7004002sew  
Order number 7004002sew

#### Bibliographical information of the German National Library

The German National Library catalogues this publication  
in the German National Bibliography; detailed  
bibliographical data are available online at  
[https://www.dnb.de/EN/Home/home\\_node.html](https://www.dnb.de/EN/Home/home_node.html).

#### SPONSORED BY THE



Federal Ministry  
of Education  
and Research



Federal Foreign Office

The project on which this brochure is based and the publi-  
cation thereof were funded by the Federal Ministry of Edu-  
cation and Research and the Federal Foreign Office.

This publication was printed in sustainable ink on 100%  
recycled paper using a carbon-neutral process (certified  
with the German “Blue Angel” environmental label).



International doctoral candidates are of great importance to German universities. Their research contributes to new scientific discoveries and to the increased international networking of universities and the internationalisation of teaching.

In 2019, around 27,100 international doctoral candidates were enrolled at German universities, corresponding to a quarter of all doctoral candidates (25%). Compared to the previous year, the number of international doctoral candidates has increased by around 1,000 (3%) and has increased by as much as 52% within 10 years. The number of international doctoral candidates has grown faster than that of German doctoral candidates. In 2009, one in five doctoral candidates came from abroad; in 2019, it was one in four. However, it should be noted that the statistics underestimate the number of German doctoral candidates, as a significant percentage are not enrolled at universities. By contrast, the overwhelming majority of international doctoral candidates are probably enrolled for residence law purposes and are therefore included in the statistics. However, this statistical imprecision does not alter the finding that the number of international doctoral candidates in Germany has risen significantly. On the one hand, this reflects universities' increased efforts to attract doctoral candidates from other countries and, on the other, Germany's international attractiveness as a place to carry out research.

“ 42% of international doctoral candidates completed their master's degrees in Germany.

The annual number of international junior researchers beginning a doctorate has also increased by 32% over the last ten years. However, this increase occurred almost exclusively in the period from 2008 to 2010, with this number remaining between 5,400 and 5,800 doctoral candidates ever since. A situation of this kind, with rising numbers of doctoral candidates and unchanged numbers of new entrants, suggests that international doctoral candidates are spending longer on their doctoral research.<sup>1</sup> In the 2018 academic year, 5,715 international doctoral candidates started a doctorate, 42% of whom had previously obtained a degree at a German university entitling them to pursue a doctorate, usually a master's degree. 58% completed this degree abroad and their doctoral application was their first application to a university in Germany. This share is above average among doctoral candidates from Western Europe and Latin America, and in the natural sciences, but below average among doctoral candidates from the regions of origin Eastern Europe, North Africa and Middle East, and in the subject groups of art and art history, engineering and the humanities.

According to OECD data for 2017, Germany is one of the countries with the most international doctoral candidates worldwide. Although the OECD does not have data for the USA, it is possible to obtain the number of international doctoral candidates in the USA from the American Student and Exchange Visitor Information System (SEVIS). According to this, around 150,000 international

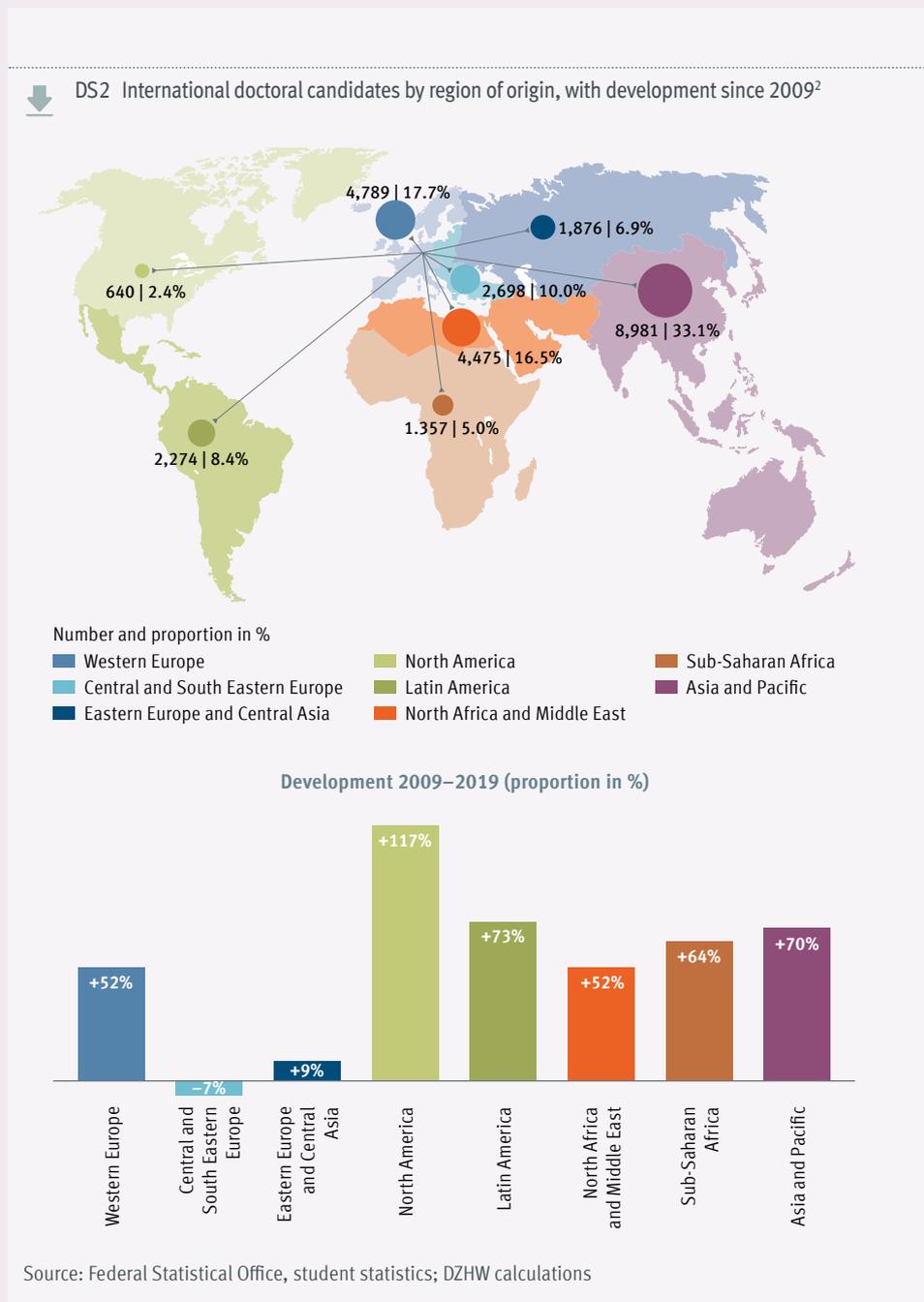
DS1 International doctoral candidates at German universities since 2009



Source: Federal Statistical Office, student statistics; DZHW calculations

junior researchers were aiming to gain a doctorate in the USA in 2017 (cf. also p. 20/21). Second place is occupied by the United Kingdom with 47,200 international doctoral candidates, followed by France (26,500) and Germany (26,200)<sup>2</sup>. Australia (18,100) and Canada (17,700) are also notable for their high numbers of international doctoral candidates. A different ranking emerges when working on the basis of international candidates as a share of all doctoral candidates. Luxembourg then takes first place with international doctoral candidates making up 85%, while Switzerland (55%), New Zealand (49%), the Netherlands (43%), the United Kingdom (42%) and France (40%) also have high figures. In this analysis, Germany occupies a mid-table place with international doctoral candidates making up 24% in 2017. Relatively small percentages are recorded by Brazil (2%), Mexico, Russia (7% each), Turkey (8%) and South Korea (10%). These figures are based on different growth dynamics. While the number of international doctoral candidates rose by 13% in Germany and 5% in the United Kingdom between 2013 and 2017, it remained almost unchanged in Australia and fell by 5% in France. Countries such as Spain (+236%), Turkey (+111%), Hungary (+98%) and Portugal (+83%) recorded very strong growth.

Students from the Asia and Pacific region represent by far the largest group of international doctoral candidates in Germany. Their share alone amounts to 33%. Other important regions of origin include Western Europe (18%), North Africa and Middle East (17%), Central and South Eastern Europe (10%), Latin America (8%) and Eastern Europe and Central Asia (7%). The lowest proportions of doctoral candidates are from Sub-Saharan Africa (5%) and North America (2%). This largely corresponds to the regional distribution of all international students intending to gain a degree at German universities. Particularly lively growth can be seen among doc-



toral candidates from North America, whose number has grown by 117% since 2009. By contrast, a slight decline has been recorded for Central and South Eastern Europe (-7%) and only a slight increase for Eastern Europe and Central Asia (+9%).

In the ranking of the most important countries of origin for international doctoral candidates, China takes first place with around 4,700. 17% of all international doctoral candidates in Germany come from China. Other major countries of origin are India (7%), Iran (6%) and Italy (5%). Russia, Turkey and Egypt (3% each) also occupy top positions. With regard to major countries of origin, there has been a strong increase in the number of doctoral candidates in Germany over the last ten years, especially from Iran (+180%), Italy (+161%) and China (+133%).

\* Footnotes

- 1 At present, it is not possible to comment on how long doctoral candidates stay in Germany or how long their doctorates take to complete.
- 2 Specific citizenship information is missing for 17 international doctoral candidates.

Depending on the country of origin, the share of doctoral candidates among all students and doctoral candidates from a given country varies. A particularly high proportion of doctoral candidates is found among students from Ethiopia (31%), Chile (25%), Iraq (23%), Kenya (21%) and Iran (21%). In contrast, comparatively low percentages of doctoral candidates are found among students from Tunisia, Cameroon, Luxembourg (2% each), Bulgaria and Syria (3% each).

In the 2019 academic year, most international doctoral candidates were enrolled in the subject group mathematics and natural sciences. Over a third of all international doctoral candidates belong to this subject group (36%), with the majority enrolled in biology (11%), chemistry (8%) and physics, astronomy (8%). Engineering (21%) follows some way behind, where the most popular fields of study are computer science (5%), mechanical/process engineering (5%) and electrical engineering (4%). Other important subject groups for international doctoral candidates are the humanities (16%), law, economics and social sciences (12%) and medicine (10%).

“ China is by far the most important country of origin for international doctoral candidates, accounting for 17% of the total.

The strongest increase in the number of international doctoral candidates is recorded in the subject groups of medicine and health sciences and engineering. Since 2009, the number of international doctoral candidates in these fields has increased by 172% and 126% respectively. Hardly any change has taken place in the humanities, however, where the number has only risen by 6%.

The various subject groups and study areas at German universities are not equally attractive to international doctoral candidates. Compared to German doctoral candidates, a smaller share of international doctoral candidates are enrolled in the subject group of law, economics and social sciences (21% vs. 12%) but with larger percentages in mathematics and natural sciences (36% vs. 29%) and engineering (21% vs. 17%). Subject-related interests of this kind are also reflected in the respective shares of international doctoral candidates among all doctoral candidates.

This proportion is above average in agricultural, forestry and food sciences (30%), mathematics and natural sciences and engineering (29% each), but below average in law, economics and social sciences (17%). In terms of fields of study, however,

DS3 International doctoral candidates by key countries of origin 2019, with development since 2009

Country of origin	Proportion in %	Number	Development 2009–2019 in %
China	17	4,695	133
India	7	1,829	77
Iran	6	1,731	180
Italy	5	1,425	161
Russia	3	919	17
Turkey	3	797	43
Egypt	3	693	21
Brazil	2	619	71
Pakistan	2	596	40
Spain	2	562	110
Greece	2	553	41
Austria	2	538	95
USA	2	494	134
South Korea	2	494	-26
Syria	2	455	-23
Poland	2	432	-42
Ukraine	2	416	1
Vietnam	1	401	85
Mexico	1	392	82
France	1	387	20

Source: Federal Statistical Office, student statistics; DZHW calculations

DS4 Countries of origin where doctoral candidates make up the highest proportions of all international students 2019

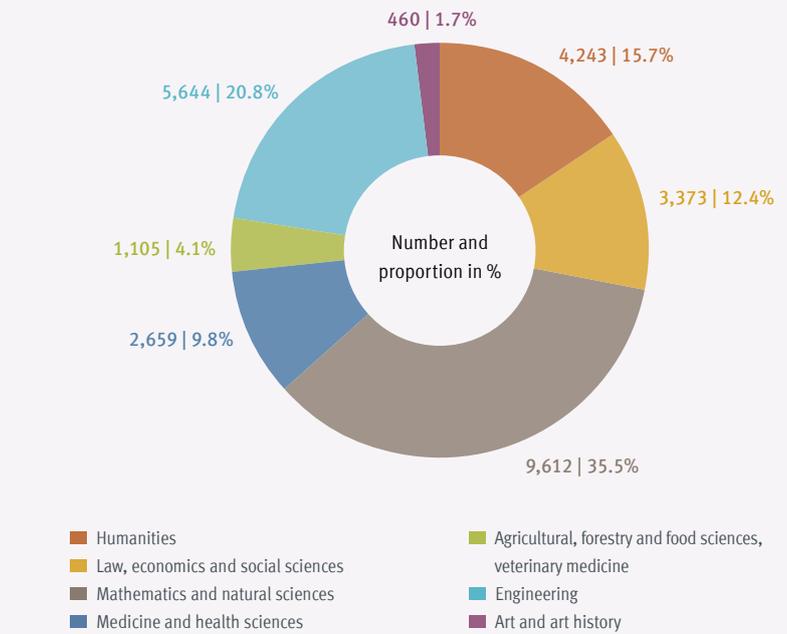
Country of origin	Number	Proportions of all international students in %
Ethiopia	152	31
Chile	262	25
Iraq	157	23
Kenya	140	21
Iran	1,731	21
Serbia	192	18
Thailand	163	17
Ghana	205	17
Portugal	186	17
Brazil	619	16
Italy	1,425	15
Greece	553	15
Netherlands	249	15
Egypt	693	15
Canada	146	14
Croatia	142	13
Mexico	392	12
China	4,695	12
Colombia	383	11
Taiwan	286	11
<b>Total</b>	<b>27,107</b>	<b>9</b>

Source of calculations: Federal Statistical Office, student statistics; DZHW calculations

the highest degree of internationalisation is found among doctoral candidates in regional sciences (71%), surveying (50%), non-European languages and cultural studies (49%), and architecture and interior design (48%). Very low percentages are found in industrial engineering with an engineering focus (4%), social sciences (9%), dentistry (11%) and education (12%).

Depending on the region and country of origin, differing preferences for certain subjects become apparent. Doctoral candidates from Western Europe, for example, enrol particularly frequently in mathematical and scientific subjects (41%). This can be attributed in particular to doctoral candidates from Italy and Spain: half of all doctoral candidates from these countries (48% in each case) achieve a doctorate in this subject group. The same preference is also found among doctoral candidates from the Asia and Pacific region (39%). 54% of all doctoral candidates from India alone have enrolled in mathematics and natural sciences. Doctoral candidates from North Africa and Middle East are striking for their strong preference for engineering

DS5 International doctoral candidates by subject group 2019



Source: Federal Statistical Office, student statistics; DZHW calculations

DS6 International doctoral candidates as a proportion of all doctoral candidates by subject group and field of study 2019

Subject group	Proportion of all doctoral candidates in %
Agricultural, forestry and food sciences, veterinary medicine	30.1
Mathematics and natural sciences	29.0
Engineering	28.7
Humanities	27.0
Medicine and health sciences	21.0
Art and art history	17.7
Law, economics and social sciences	16.6
<b>Total</b>	<b>25.0</b>
Field of study	
Regional science	70.8
Spatial planning	51.7
Non-European languages and cultural studies	48.7
Architecture, interior design	47.6
Agricultural sciences, food and beverage technology	45.6
Slavonic, Baltic and Finno-Ugric studies	44.7
Forestry, wood management	44.1
Mining, metallurgy	40.5
Materials science and engineering technology	39.1
Civil engineering	37.7
General and comparative literature and linguistics	37.6
Earth science	36.9
Islamic studies	34.6
Biology	33.7
Philosophy	32.9

Source: Federal Statistical Office, student statistics; DZHW calculations

subjects (36%). A comparatively high share of doctoral candidates from Sub-Saharan Africa take doctorates in agricultural, forestry and food sciences (16%), with particularly high percentages among doctoral candidates from Ethiopia (26%) and Ghana (20%). Doctoral candidates from North America, on the other hand, come to Germany to study for a doctorate in a humanities subject (28%) relatively frequently.

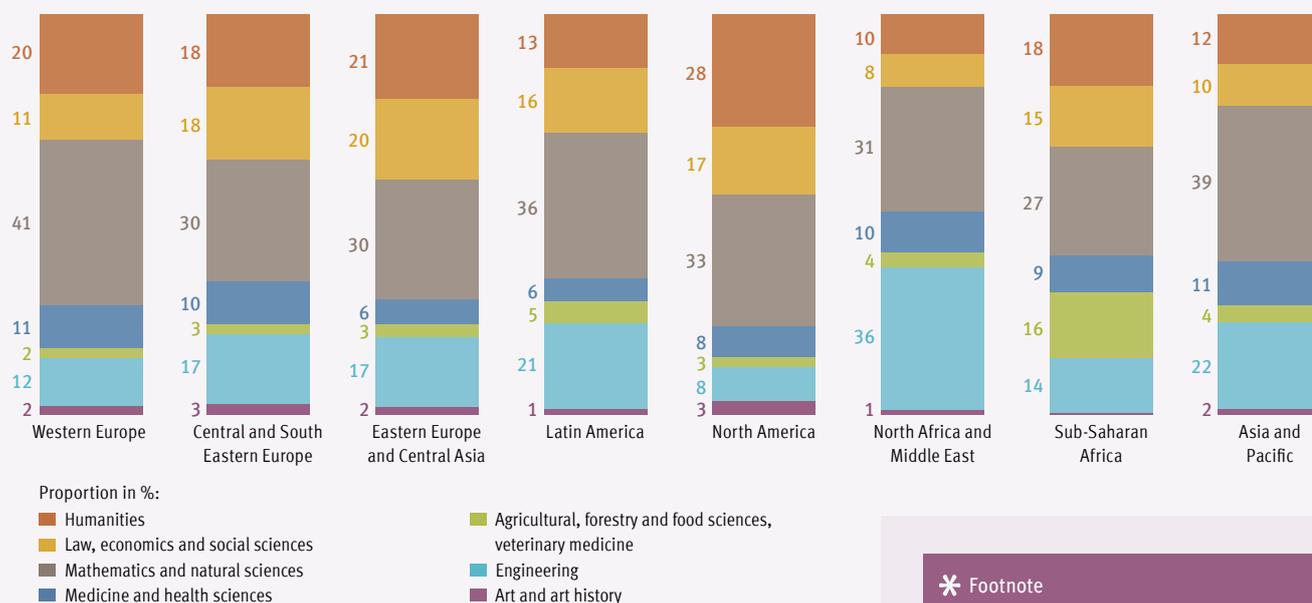
International doctoral candidates who prepare their dissertations in Germany not only prefer selected subject areas, but also certain universities. The reasons for this are likely to be related to the programmes offered by the various universities. The choice of university is certainly also influenced by the reputation of a university or a certain subject area, a university's location, and how international the university is. The universities with the most international doctoral candidates are the FU Berlin (1,346 doctoral candidates), the LMU Munich (1,178 candidates) and the HU Berlin (1,111 candidates). Other German universities with more than 1,000 international doctoral candidates are the universities of Göttingen (1,070 candidates), Hamburg (1,045 candidates) and Heidelberg (1,023 candidates). Around one fifth of all international doctoral candidates are enrolled at these six universities. As is the case with international students, metropolitan areas and internationally renowned traditional universities prove to be particularly attractive to doctoral candidates.

“ In the fields of regional science and spatial planning, more than half of doctoral candidates come from abroad.

However, if one looks at international doctoral candidates as a percentage of all doctoral candidates at a university, a different order emerges. The private Jacobs University Bremen then leads the field with a proportion of 59%. Jacobs University has set itself the goal of a majority international student body and therefore teaches exclusively in English. Other universities with a high proportion of international doctoral candidates are the Karlsruhe Institute of Technology (52%), the Bauhaus University Weimar (47%) and the University of Cottbus-Senftenberg (41%).

In the 2018 academic year, around 4,900 international junior researchers successfully completed a doctorate at a German university. This means that almost one in five graduates with a successful doctorate (18%) comes from abroad. Compared to the previous year, the number of successful international doctoral candidates has declined slightly by 3% for the first time, but has increased by a total of 37% since 2008. In line with the subject preferences of the international doctoral candidates, 43% of the doctoral degrees were awarded in a mathematics or natural sciences subject, with a large share being in biology (15%), chemistry (10%) and physics (9%). A further 20% of doctoral degrees are in engineering subjects, especially in mechanical/process engineering (5%), electrical engineering and computer science (4% each). The other doctorates are mainly in the subject groups of medicine and health sciences (12%), law, economics and social sciences (10%) and the humanities (10%).

DS7 International doctoral candidates by region of origin and subject group 2019<sup>1</sup>



\* Footnote

1 Deviations from 100% are due to rounding.

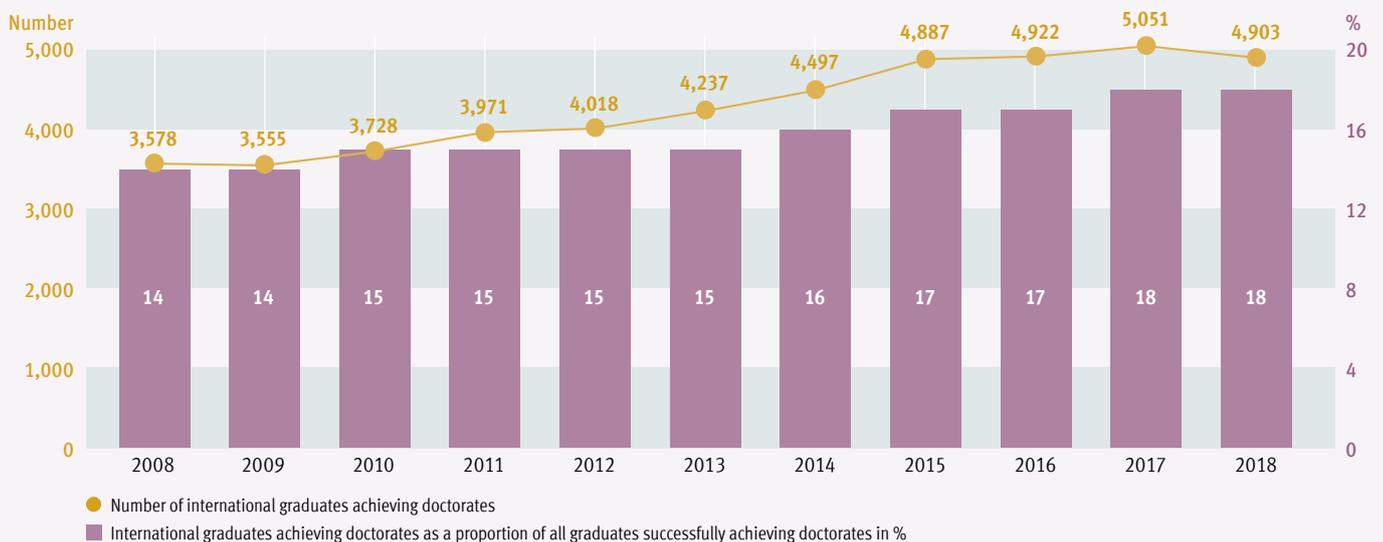
Source: Federal Statistical Office, student statistics; DZHW calculations

DS8 Universities with the highest numbers and proportions of doctoral candidates 2019

University	Number of international doctoral candidates	University	International doctoral candidates as a proportion of all doctoral candidates in %
FU Berlin	1,346	Jacobs University Bremen	59
U München	1,178	Karlsruhe Institute of Technology	52
HU Berlin	1,111	U Weimar	47
U Göttingen	1,070	TU Cottbus-Senftenberg	41
U Hamburg	1,045	U Heidelberg	38
U Heidelberg	1,023	Medizinische H Hannover	37
U Bonn	892	U Jena	36
TU Berlin	882	U Gießen	36
TU München	856	U Hohenheim	35
TH Aachen	841	U Bayreuth	35
TU Dresden	753	U Magdeburg	35
U Tübingen	664	FU Berlin	34
U Köln	624	U Freiburg	34
U Bochum	598	HU Berlin	34
U Münster	583	U Saarbrücken	33
U Potsdam	548	TU Berlin	33
U Frankfurt am Main	452	U Tübingen	33
U Freiburg	452	U Potsdam	33
U Duisburg-Essen	435	U München	32
U Leipzig	430	TU Freiberg	32

Source: Federal Statistical Office, student statistics

DS9 International graduates achieving doctorates since 2008



Source: Federal Statistical Office, graduation statistics; DZHW calculations