

## A guest article by Dr. Isabelle Schiffer-Fiedler and Marie Lena Muschik



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International doctoral students make a significant contribution to Germany's academic excellence and innovative capacity. Moreover, their successful integration into the labour market also offers a long-term opportunity for meeting Germany's growing demand for skilled workers. To develop their full potential, it is imperative that the general conditions for international doctoral students be improved on an ongoing basis, while consolidating Germany's position as a hotspot for research.

The share of international doctoral students at universities in Germany is an important indicator of the success of these endeavours. According to official student statistics, the percentage of international (enrolled) doctoral students (measured by obtaining university entrance certificates outside Germany, see also the info box on the data) has risen steadily in Germany in the last few years (see Fig. DS1). Only at the onset of the pandemic was a slight decline observed (from WS 2019/20 to 2020/21). Since then, the numbers have recovered and the positive growth trend continues. Most recently, the share of international doctoral students enrolled at universities in Germany in the 2023/24 winter semester was a record high of 28%, some six percentage points higher than ten years ago.

This growth trend is corroborated by the data of the National Academics Panel Study (Nacaps) (see Fig. DS2). While 18% of those who embarked on their doctoral studies in 2017/18 were international doctoral students, this number had risen to 25% in the most recent doctoral cohort of 2021/22. For reference: according to student statistics, the respective figure for the 2021/22 winter semester was 27%. In other words, the findings of the Nacaps survey largely correspond to the percentage reported in the student statistics.

Nacaps data provide a reliable and multifaceted basis for analysing international doctoral students in Germany that complements data from official statistics (see the info box on the data). Similar to student statistics, Nacaps data define international doctoral students according to the country in which they received their (first) university entrance certificate. The data also include the country of their last educational qualification. The data reveal that approximately 30% of international doctoral students had graduated from a university in Germany, qualifying them for admission to a doctoral programme. Almost a third were thus

## Data

The development in the number of international doctoral students in Germany is illustrated by official student statistics (*Statistik der Studierenden*), which distinguish between domestic doctoral students holding a German university entrance certificate and international doctoral students. International doctoral students are defined as doctoral candidates who obtained their (first) university entrance certificate abroad. One shortcoming of student statistics is that they only include doctoral students who are enrolled at a university. The introduction of doctoral statistics following the amended German Higher Education Statistics Act in 2016 bridged this gap. These statistics reflect all persons in doctoral programmes, regardless of whether they are enrolled. However, they currently only classify candidates based on citizenship, without differentiating between domestic and international doctoral students. Therefore, data from the DZHW's National Academics Panel Study (Nacaps) – a survey of all persons admitted to doctoral programmes, regardless of whether they were enrolled – were also taken into consideration, thereby identifying international doctoral students via the country of their (first) university entrance certificate, similar to student statistics (Briedis et al., 2024). Topics covered by Nacaps data include the mobility aspirations, career paths and personal background of international doctoral candidates (Briedis et al., 2022). The analyses presented here are based on the most recent cohort of doctoral students, who were first surveyed in 2023.<sup>1</sup>

integrated in the German higher education system before starting their doctorate. However, the majority only come to Germany to pursue a doctorate after completing their studies.

According to Nacaps data, international doctoral students are particularly well-represented in certain subject groups (see Fig. DS3), such as mathematics and natural sciences (32%) plus agricultural, forestry and food sciences and veterinary medicine (31%). Above-average shares are also found in engineering (29%) and the humanities (28%). The lowest percentages of international doctoral students are reported in medicine and health sciences (18%) and in law, economics and social sciences (15%).

DS1 International doctoral students at universities in Germany since the 2013/14 winter semester



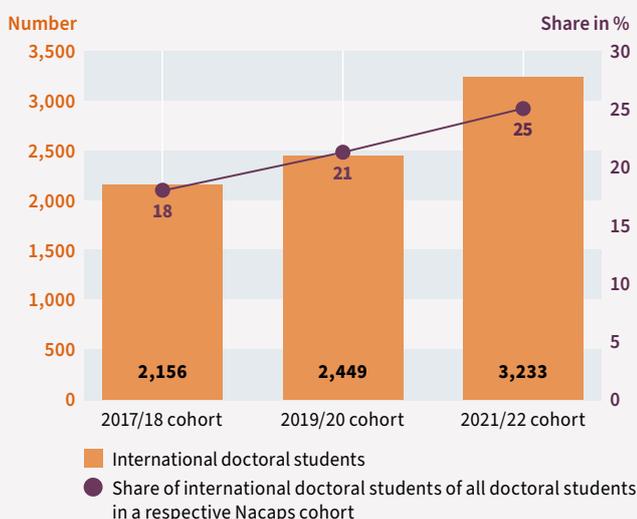
Source: Federal Statistical Office, "Statistik der Studierenden"; DZHW calculations

The growing numbers and shares of international doctoral students (see Figs. DS1 and DS2) highlight Germany's increasing attractiveness as a location of science and research. Nonetheless, how many intend to remain in academia after completing their doctorate – and who means to leave Germany? According to Nacaps data, almost 40% of international doctoral students are planning to leave Germany temporarily or permanently while pursuing their future career. It should

be noted that these plans are not always by choice: residence permits may be provisional or only granted for specific purposes, thereby obliging international doctoral candidates to leave the country after completing their doctorate.

Nacaps data also distinguish between plans for temporary and permanent visits abroad. 24% of international doctoral students intend to take up a permanent position abroad in the future (see Fig. DS4) – an indication that they mean to leave Germany in the long term. First and foremost, they are looking for long-term employment related to research in other countries. Plans to undertake temporary visits abroad, chiefly for research or teaching assignments, are much less likely (13%). Just 14% of international doctoral students have no plans to relocate abroad, while almost half (49%) are still undecided.<sup>2</sup>

DS2 International doctoral students in Nacaps cohorts

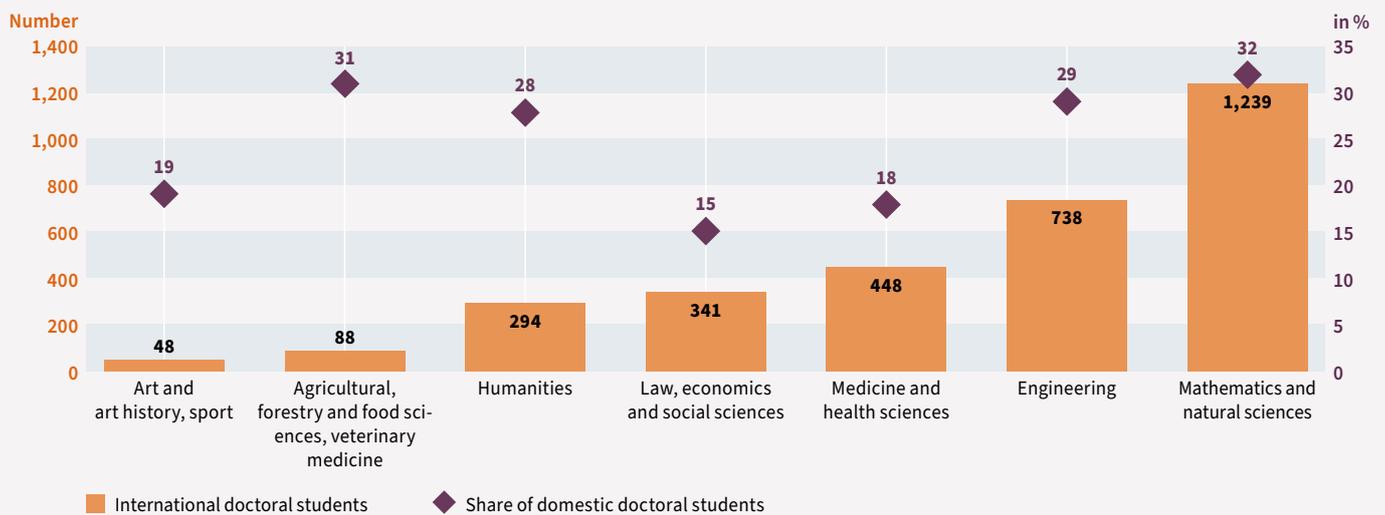


Sources: Nacaps 2018, 2020 and 2022, first waves only; DZHW calculations

\* Footnotes

- 1 The population of this cohort consists of doctoral students who embarked on their doctoral studies at one of the 66 participating universities in 2021 and 2022. Respondents who were not part of the population were excluded from the analyses.
- 2 The high proportion of doctoral students who are undecided may be attributed to the fact that respondents are at the beginning of their doctoral phase at the time of the survey (in the third year at the latest). It may be assumed that this indecision will decline as their studies progress.
- 3 Scale of responses from 1 (not important at all) to 5 (extremely important), categories 4 and 5 combined.
- 4 For further information on the research project, related publications and data sets, please see the project website [https://www.dzhw.eu/en/forschung/projekt?pr\\_id=706](https://www.dzhw.eu/en/forschung/projekt?pr_id=706).
- 5 Deviations from 100% are due to rounding.

DS3 International doctoral students of Nacaps cohort 2021/22 by subject group



Source: Nacaps 2022, first wave; DZHW calculations; N = 12,850

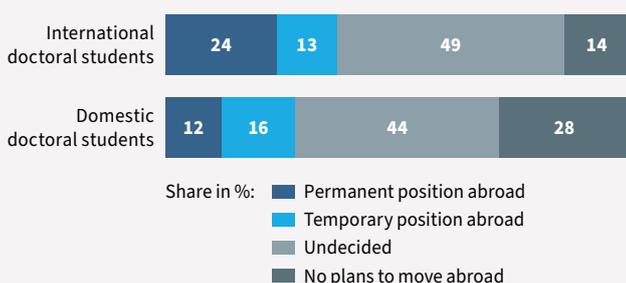
Overall, domestic doctoral students (that is, doctoral candidates holding a German university entrance certificate) are less willing to relocate: just 12% plan to move abroad in the long term, while 28% are not considering mobility at all, whether temporary or permanent. In this group, too, the share of those still undecided is the largest category at 44%.

Broken down by subject groups, international doctoral students' plans to move abroad vary only slightly. Remarkably, international doctoral students in the field of medicine are less likely to intend to relocate overseas than other subject groups (35%). This pattern corresponds to findings on the overall international mobility of doctoral students, according to which medical students are the least mobile of all subject groups (Heublein et al., 2024).

International doctoral students' preference for research positions also reflects the fact that many indicate a desire to stay in academia after completing their doctorate (see Fig. DS5). The proportion of those intending to remain in the scientific sector is significantly higher than doctoral students without an international educational background (63% vs 25%). A remarkable 37% of domestic doctoral students are undecided, as opposed to just 26% of international doctoral students. 12% of international doctoral students want to leave academia (for now, at least). At 38% of domestic doctoral students, this proportion is significantly higher.

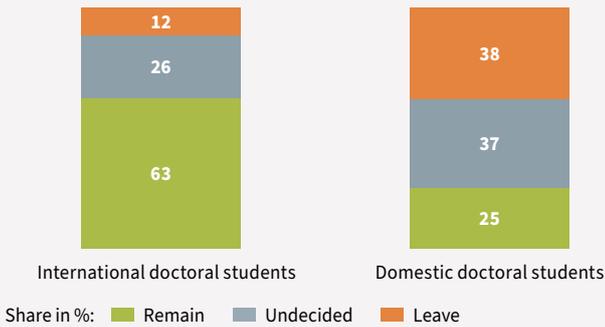
A finer-grained analysis within individual subject groups also demonstrates that the majority of international doctoral students intend to remain in academia (see Fig. DS6). The figure shows that the differences do not correlate with particularly high proportions of international doctoral students in subject groups with a high quota of those intending to stay. Sizeable variations among doctoral students can also be observed across the individual subject groups. In the humanities, for example, the subject group with the highest quota of those intending to stay overall, the share of domestic doctoral candidates wishing to remain in academia is 42%, compared to 71% for international doctoral students in the same subject group. The same applies at the other end of the spectrum: the lowest proportions of those intending to remain in academia are found among both international and domestic doctoral students in medicine and health sciences. However, there is also a striking disparity within medicine and health sciences: just 17% of domestic doctoral students aspire to an academic career as opposed to 53% of international doctoral students.

DS4 Doctoral students' plans to move abroad in the Nacaps cohort 2021/22



Source: Nacaps 2022, first wave; DZHW calculations; N = 12,807

DS5 Intention of international and domestic doctoral students of Nacaps cohort 2021/22 to remain in academia<sup>5</sup>



Source: Nacaps 2022, first wave; DZHW calculations; N = 12,875

Apart from their intention to remain in academia, other indicators also suggest the preference of international doctoral students for the scientific sector. 64% of international doctoral students regard a career in academia as a major professional goal.<sup>3</sup> Moreover, 30% of international doctoral students are aiming at a professorship. For reference: a career in academia constitutes a major professional goal for 26% of domestic doctoral students, while a mere 11% aspire to a professorship.

In summary, not only are there large numbers of international doctoral students at universities in Germany, they also have a much greater

research focus than domestic doctoral students. This is true for most subject groups; therefore, these individuals may be viewed as resources of enormous scientific potential for Germany as a research location. At the same time, their long-term commitment remains uncertain: a substantial proportion would consider a permanent position outside Germany, while many are still undecided in this regard. These unresolved prospects raise a few questions: what factors influence students' decision to stay or leave? What makes Germany attractive as a research location and where do the challenges lie? The research project "International Academics at German Universities: From Postdoc to Professorship (InWiDeHo)", carried out by the DZHW and the DAAD, provides initial answers to these questions. The project's key findings were presented in the previous issue of *Wissenschaft weltoffen* (Jaudzims & Oberschelp, 2024).<sup>4</sup> Accordingly, international academics and researchers particularly appreciate the scientific freedom, academic environment and support services, but also cite obstacles such as the non-transparent appointment procedure, language barriers and administrative challenges (Jaudzims & Oberschelp, 2024). To consolidate the insights gained and identify areas for improvement at an early stage, the DZHW will undertake further comprehensive analyses of the situation of international doctoral students during the doctoral phase.

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DS6 Intention of international and domestic doctoral students of Nacaps cohort 2021/22 to remain in academia by subject group<sup>5</sup>

Subject groups	Doctoral student group	Share in %		
Humanities	International	71	5	24
	Domestic	42	17	41
Art and art history, sport	International	73	7	20
	Domestic	35	22	43
Agricultural, forestry and food sciences, veterinary medicine	International	72	14	15
	Domestic	29	34	38
Mathematics and natural sciences	International	66	11	23
	Domestic	30	33	38
Engineering	International	61	13	26
	Domestic	21	40	38
Law, economics and social sciences	International	58	10	31
	Domestic	24	38	38
Medicine and health sciences	International	53	18	29
	Domestic	17	48	35

Share in %: Remain Undecided Leave

Subject groups sorted by percentage of "remain" among all doctoral candidates in the subject group

Source: Nacaps 2022, first wave; DZHW calculations; N = 12,748

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*The spotlight explores the mobility and career plans of international doctoral students in Germany based on the latest Nacaps data. Large numbers of international doctoral students are enrolled at German universities and demonstrate a strong research focus: 63% intend to remain in academia after completing their doctorate, as opposed to just 25% of their domestic peers. Further analyses reveal that this discrepancy cannot be attributed to differences in the subjects of international versus domestic doctoral students. The preference of international doctoral students for the scientific sector is also reflected in their career goals: 30% are aiming for a professorship, compared to only about 11% of domestic doctoral students. At the same time, there is a marked uncertainty regarding their future in Germany. Although 14% of international doctoral students plan to remain in Germany, another 24% are considering leaving the country permanently, while approximately half are still undecided. The spotlight thus illustrates both the potential of international doctoral students for the German science landscape as well as the need to create favourable conditions to retain this potential in the long term.*

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