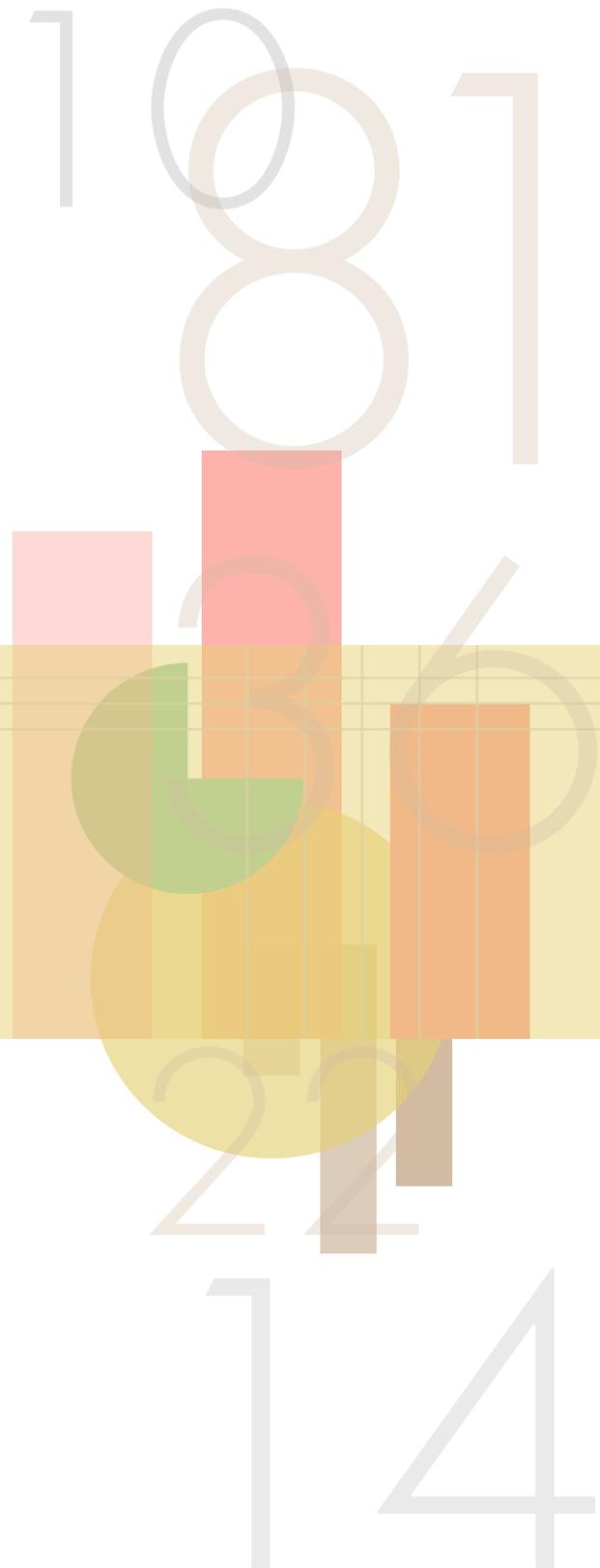


Staf Analytics.

Doctoral Students in Stockholm

– An Overview



Main Content

1/3 of Sweden's doctoral students are in Stockholm

43% from abroad

Doctoral students from more than 100 countries

International doctoral students have increased in proportion

Staf Analytics, October 2019

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There are almost 5,500 doctoral students enrolled at a university or university college in Stockholm. Among them, 43% came to Stockholm for their postgraduate education from another country, compared to 36% in the rest of Sweden. In the last ten years, the proportion of international doctoral students has increased significantly, as much as 14 percentage points. The Stockholm Academy is a very attractive place for researchers, which explains the high degree of internationalization in postgraduate education in Stockholm. Sweden also boasts favorable conditions for doctoral students compared to many other countries. This report presents an overview of postgraduate education in Stockholm: its size, gender distribution, degree of internationalization, and subject distribution.

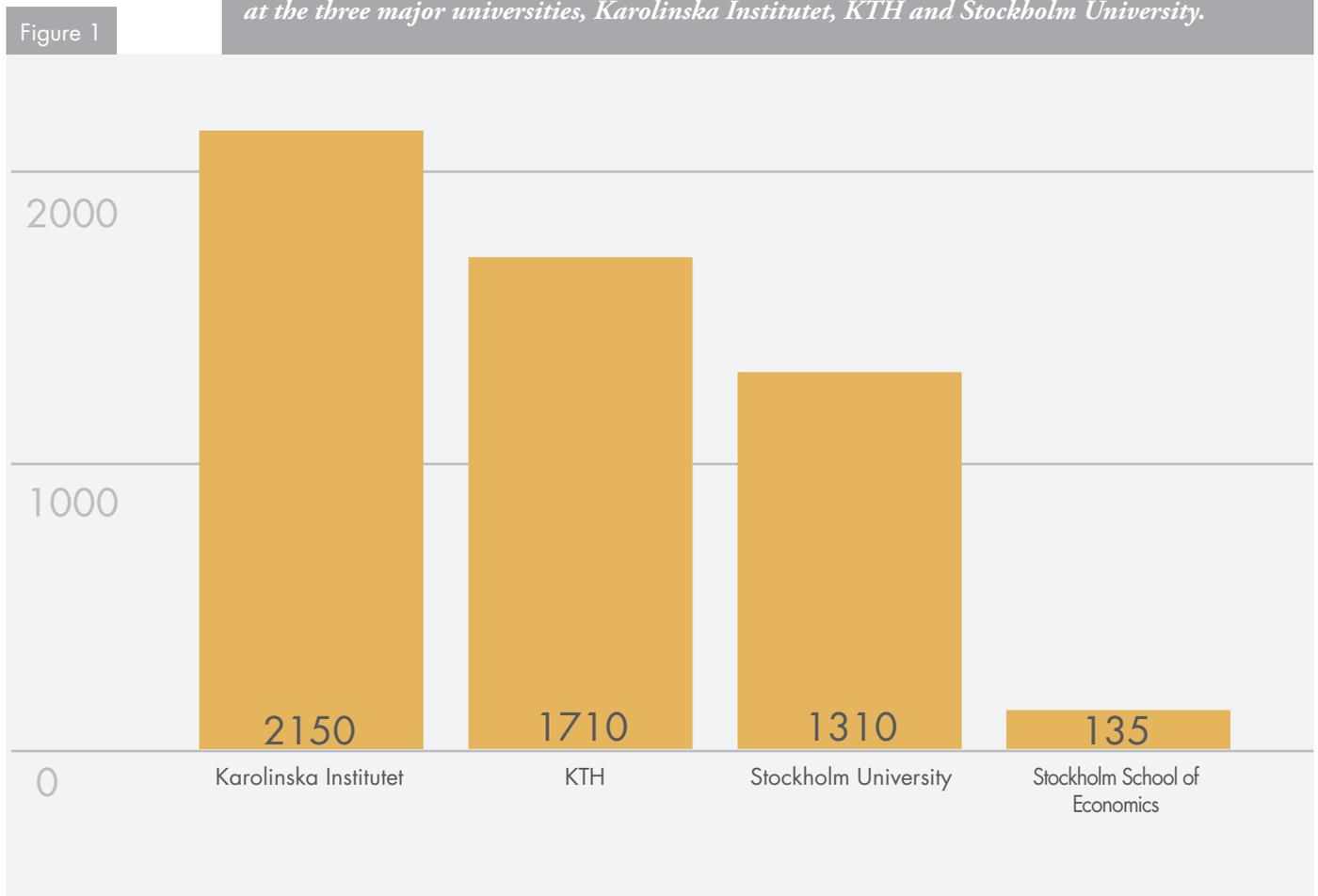
A Third of Doctoral Students in Sweden

In the autumn semester, 2018, there were 5,440 doctoral students enrolled at a university or university college in Stockholm, which amounted to 32% of all doctoral students in Sweden.¹ Nine of the eighteen universities and university colleges in Stockholm offer postgraduate education. The medical university Karolinska Institutet (KI) hosted the largest contingent of doctoral students, no fewer than 2,150. There were 1,710 doctoral students enrolled at KTH – Royal Institute of Technology (KTH) and 1,310 at Stockholm University (SU). Those three major institutions account for 95% of all postgraduate education in Stockholm: 40% for KI, 31% for KTH and 24% for SU.

Six other institutions offered postgraduate education in 2018 but in very different proportions. The Stockholm School of Economics had 135 doctoral students. Another five university colleges have only very recently introduced postgraduate programs, which are moreover limited to spe-

cific areas of research. This also means that these institutions have a small number of doctoral students and that their postgraduate education is still partly under construction. Södertörn University welcomed doctoral students in 2010 for the first time and had 70 doctoral students in autumn 2018. At The Swedish School of Sport and Health Sciences, which now hosts 20 doctoral students, postgraduate education started in 2011. Ersta Sköndal Bräcke University College started its postgraduate education in 2015 and three years later had 25 active doctoral students. Both Stockholm University of the Arts and University College Stockholm enrolled their first doctoral students in 2017 and, one year later, they had twenty and ten doctoral students respectively. In the last two years, two more institutions, Sophiahemmet University and the Swedish Defence University have also received the accreditation to grant doctoral degrees, which will be noticeable in next year's statistics.

Number of doctoral students at the universities in Stockholm. The majority, 95%, are located at the three major universities, Karolinska Institutet, KTH and Stockholm University.

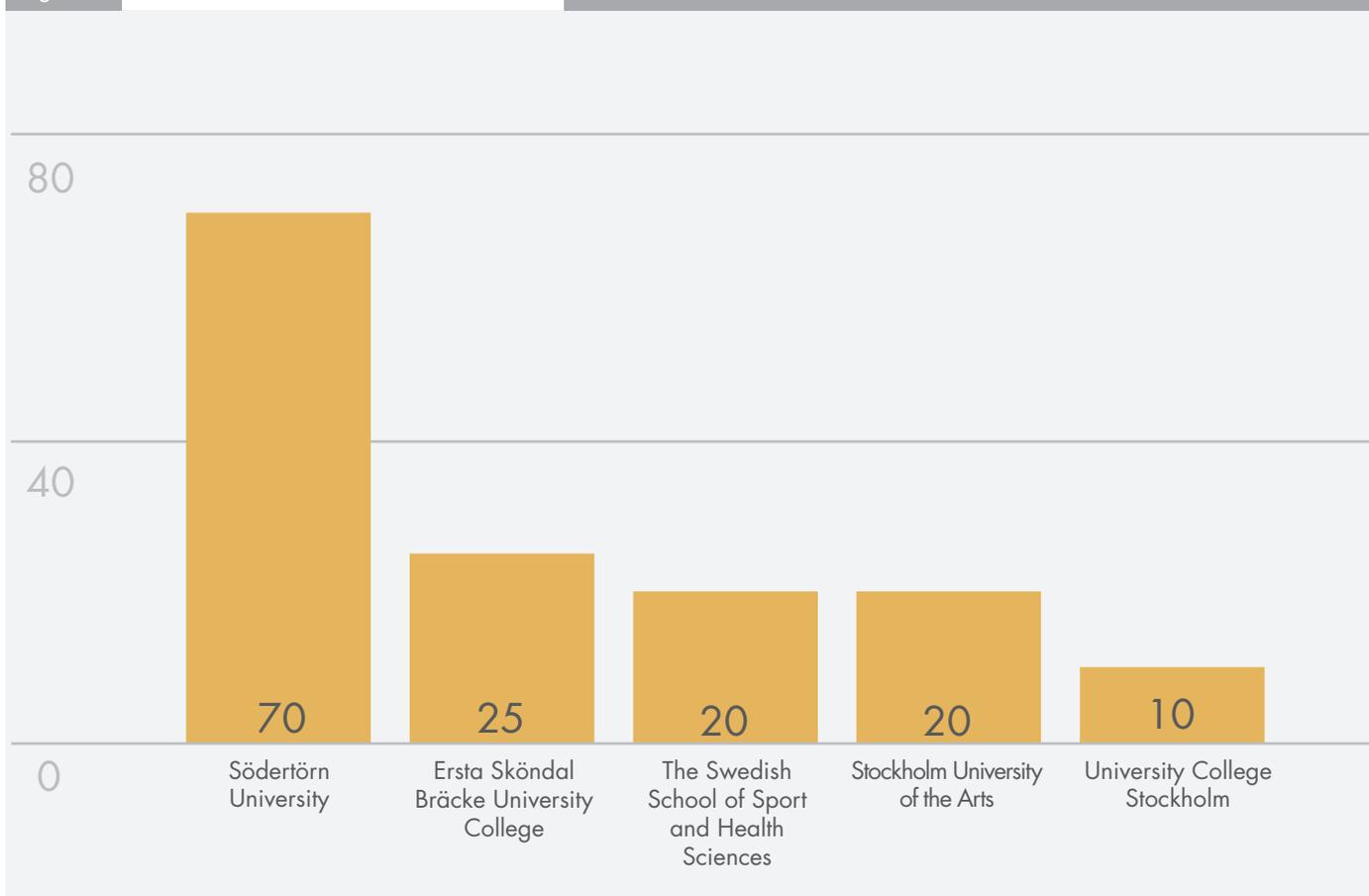


5440

DOCTORAL
STUDENTS
IN STOCKHOLM

At the five universities below, there are recently-established postgraduate programs that are limited to certain special areas. Two other universities, the Swedish Defence University and the Sophiahemmet University, have recently received the accreditation to grant doctoral degrees, and have accepted their first doctoral students in 2019.

Figure 2



Over 40% from Abroad

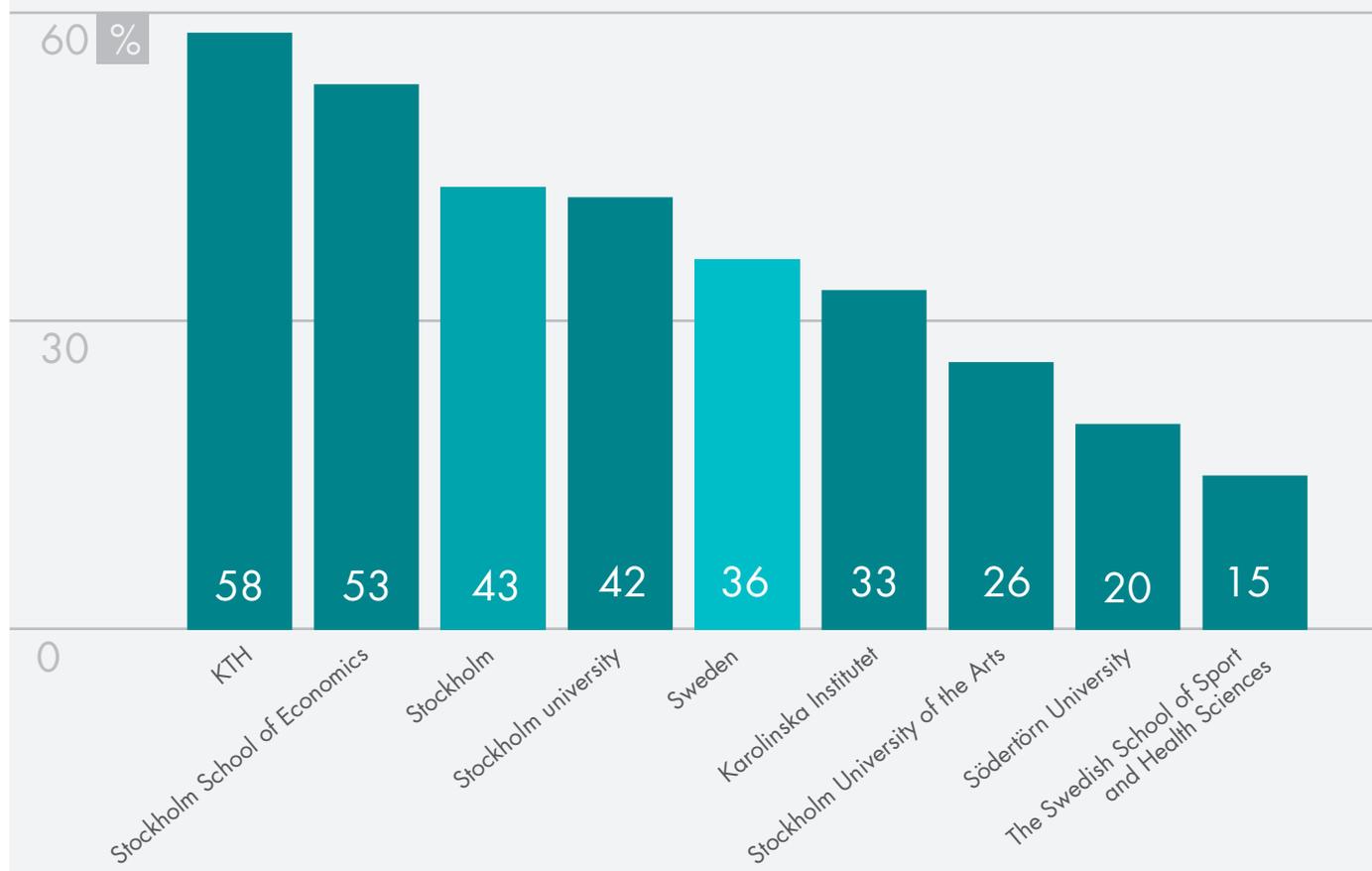
43% of the 5,440 doctoral students currently in Stockholm came from another country to pursue their postgraduate education at one of Stockholm's universities or university colleges, compared to 36% in the rest of Sweden.² Doctoral programs in Stockholm are quite competitive because the capital city is attractive and is home to several renowned universities. The largest proportion of international doctoral students, almost 1,000, were enrolled at KTH, which means that 58% of KTH's doctoral students came from another country. 42% of Stockholm University's doctoral students were international and that number reached 33% at Karolinska Institutet. Of the other institutions offering postgraduate education, the Stockholm School of Economics stands out with 53% of the doctoral candidate population coming from abroad.

43%

INTERNATIONAL
DOCTORAL
STUDENTS

Percentage of international doctoral students in autumn semester 2018 at the universities in Stockholm. In Sweden in total, the proportion of international doctoral students is 36%, while in Stockholm it is higher: 43%. At KTH and at the Stockholm School of Economics more than half of all doctoral students have come to Sweden from another country to participate in postgraduate education.

Figure 3

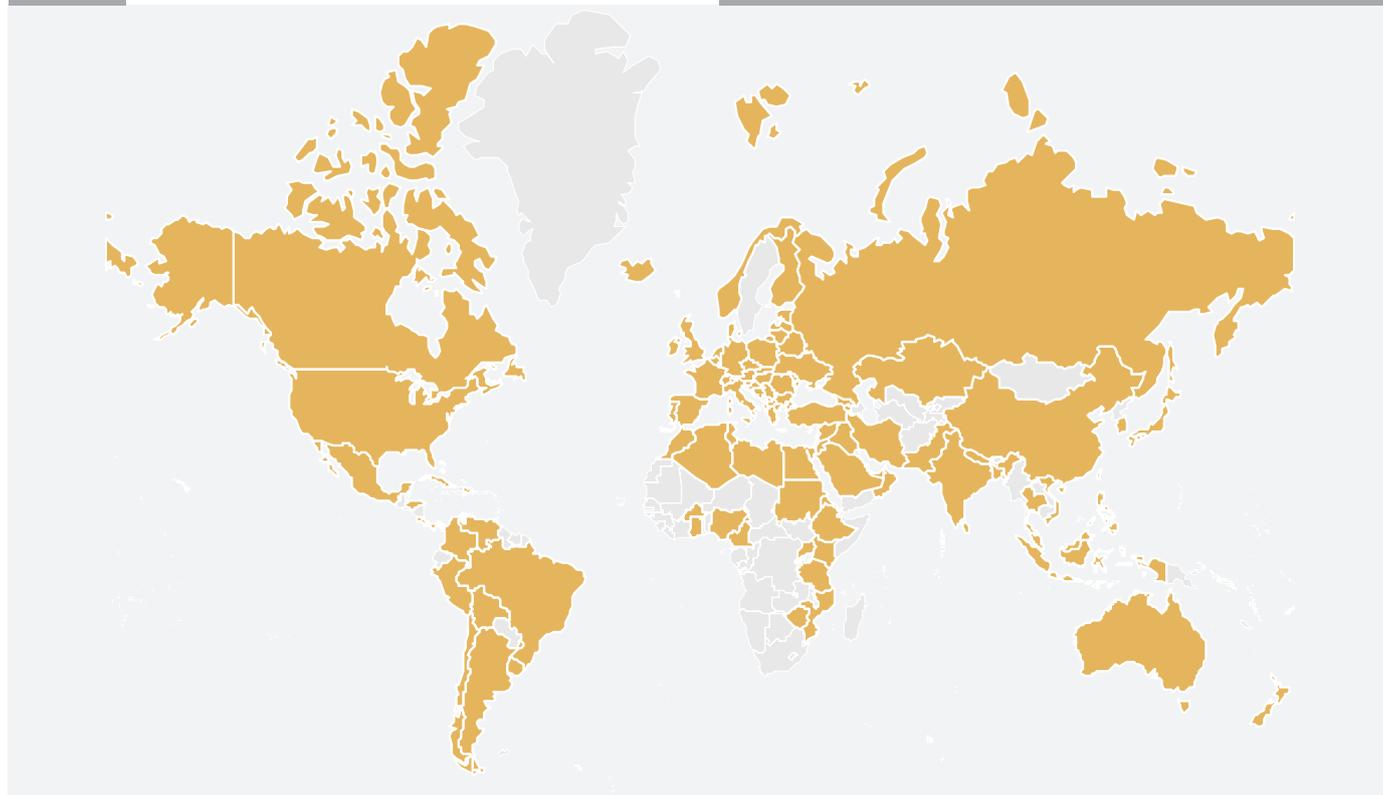


Doctoral Students From All Over the World

In autumn 2018, there were doctoral students from more than 100 countries in Stockholm.³ The largest group of international doctoral students came from China, totaling 475 people.⁴ In terms of size, the second largest group of doctoral students came from Germany, 185 people. It is not a surprise since German students have long made up one of the largest international groups both at the undergraduate and graduate levels. Next, many candidates come from Italy to Stockholm for their undergraduate and graduate studies and make up the third largest international group, with 165 doctoral students. Doctoral students from Iran make up the fourth largest group (125) and doctoral students from India the fifth one (115). In Stockholm, there is an even distribution of doctoral students from a number of different countries, and no nationality dominates, as is the case at some foreign universities.

In Stockholm there are doctoral students from more than 100 countries. China, Germany and Italy, are the countries from which most international doctoral students come.

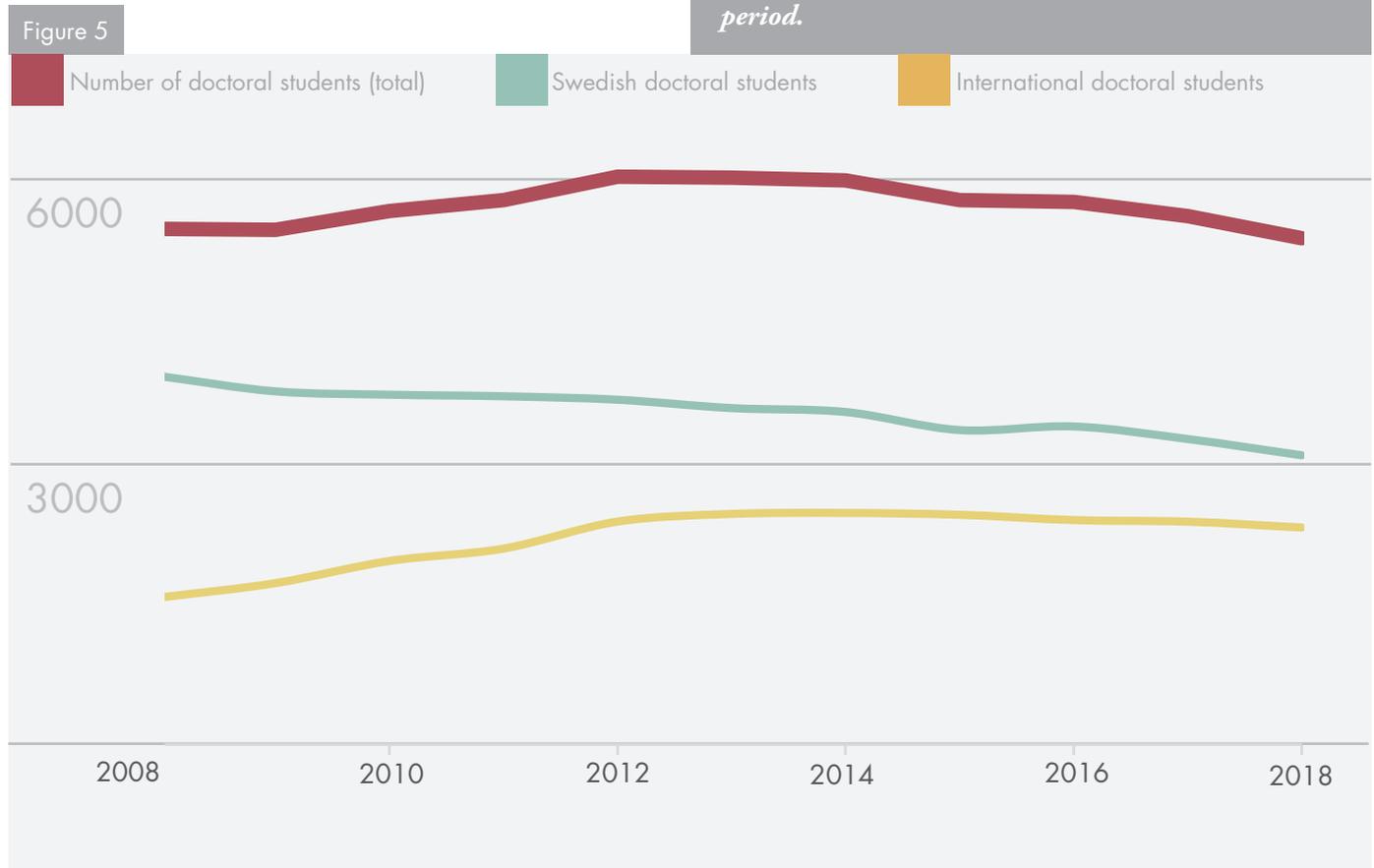
Figure 4



International Doctoral Students Increases

If we look at the evolution of the total doctoral candidate population from a ten-year perspective, we see a sharp increase in the proportion of international doctoral students. The total number of doctoral students is largely the same, but the degree of internationalization has increased significantly from autumn 2008 to autumn 2018. In 2008, international doctoral students made up 29% of the doctoral candidate population in Stockholm, compared to 43% in 2018, an increase of 14 percentage points. Since the total number of doctoral students remains largely unchanged, it means that the number of Swedish doctoral students have continuously decreased over the same period. One explanation for this may be the boom that has prevailed for many occupational groups, which has meant that the universities have found it difficult to attract Swedish students to doctoral studies. The number of international doctoral students rose sharply until 2014 before slightly decreasing each year.

Change in a ten-year perspective. The red line shows the total number of doctoral students in Stockholm. The yellow line shows how the international doctoral students rose in number up to 2014 and how they subsequently declined. The light green line shows the number of Swedish doctoral students during the period.



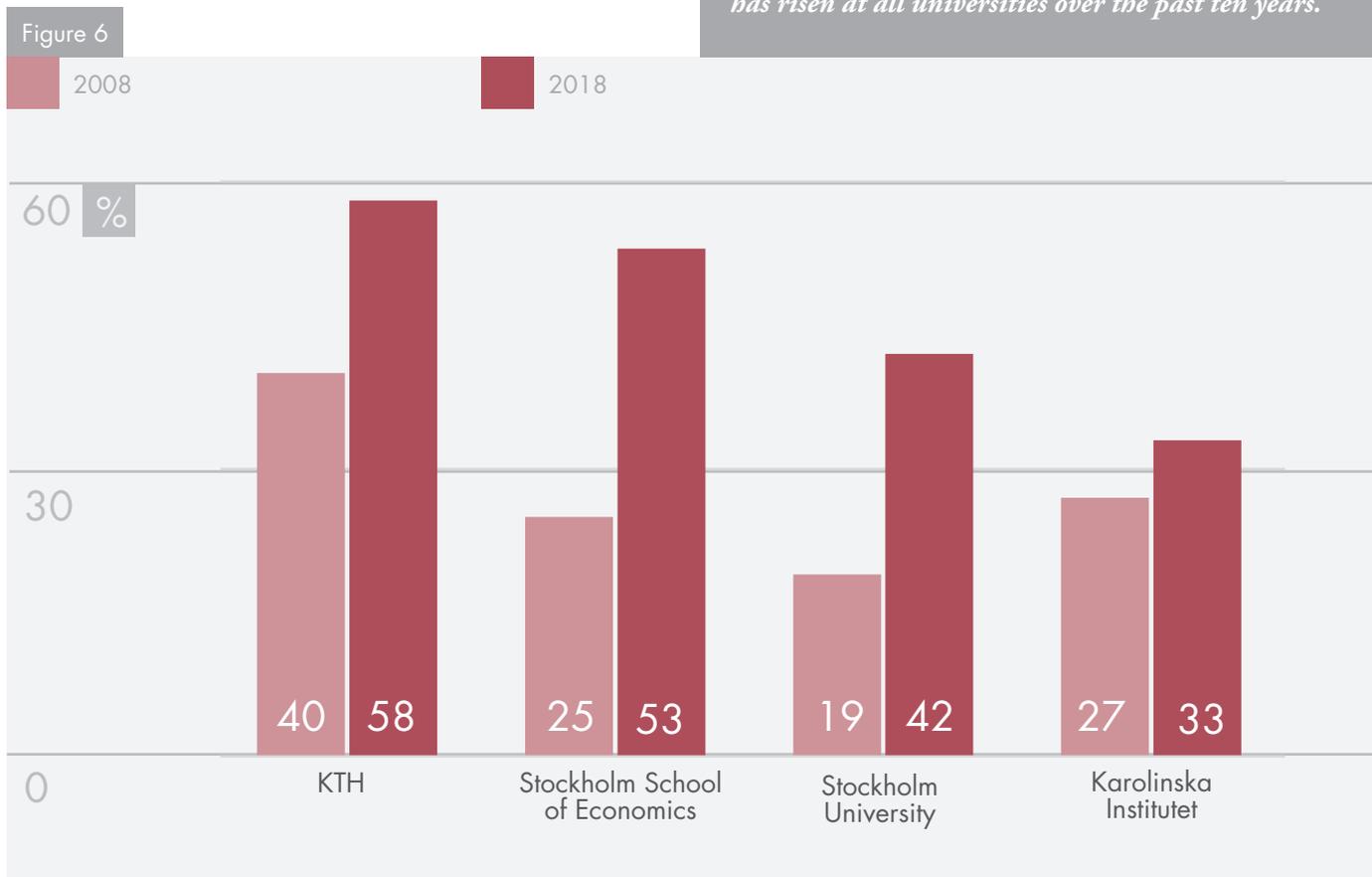
Numbers Doubled at Some Universities

In terms of individual universities, Stockholm School of Economics (SSE) has seen the largest increase in the proportion of international doctoral students, which has more than doubled, going from 25% to 53% during the period 2008 to 2018. Moreover, Stockholm School of Economics now has an internationalization strategy, with the aim to reach 50% of international enrollment at all levels of studies. The school argues it will promote the quality of education. At Stockholm University, there are postgraduate programs in the Natural Sciences, Social Sciences, and in Arts and Humanities. The proportion of international doctoral students at Stockholm University has increased from 19% to 42% during the same ten-year period. At KTH, the proportion has increased from 40% to 58%. The medical university Karolinska Institutet has also seen an increase, but not as strong, with an increase from 27% to 33%.

... but significantly fewer in the Arts and Humanities and Social Sciences. Since then, the number of international doctoral students has not only increased in all subjects but actually doubled in the Arts and Humanities, Social Sciences, as well as in the Natural Sciences. This means that even in the domains of less interest to international doctoral students, their proportion has increased sharply: from 8% to 21%, in the Arts and Humanities and from 15% to 31% in Social Sciences. Therefore, the total proportion of international doctoral students at a given university closely reflects the research areas available there. At Stockholm University, for example, there is a high proportion of international doctoral students in the Natural Sciences, but their number is significantly lower in the Humanities and Social Sciences.

Ten years ago, there were already many international doctoral students in Technology, Natural Sciences, and Medi-

The proportion of international doctoral students has risen at all universities over the past ten years.



40% of Doctoral Students in Medicine

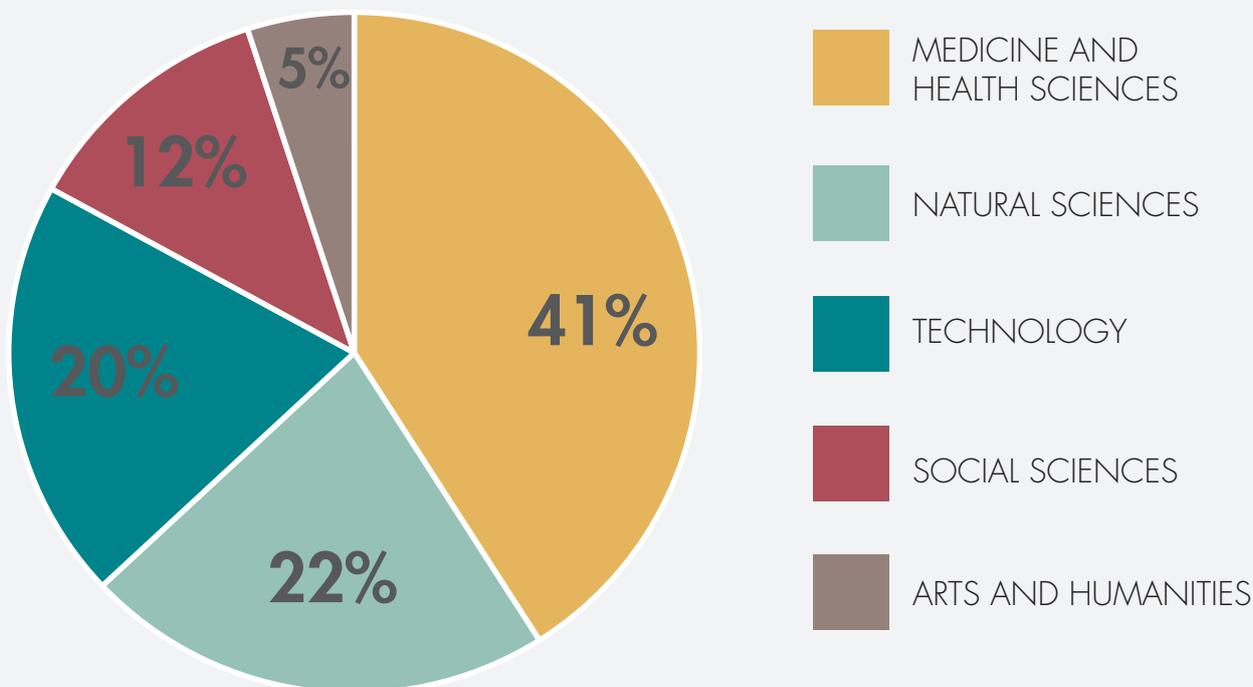
Stockholm hosts 40% of the country's doctoral students in Medicine and Health Sciences. The subject is the largest research area in Sweden and attracts one third of all doctoral students in the country. In Stockholm, the second largest research area is Natural Sciences, with 22% of doctoral students, followed by Technology, with 20%. At 12% (or 660 people), Social Sciences are somewhat smaller. The smallest subject area is Arts and Humanities, at 5%, i.e. 285 active doctoral students in Stockholm in autumn 2018. There is no postgraduate education in Agricultural Science and Veterinary Medicine in Stockholm.

The proportion of international doctoral students in Stockholm is slightly higher in all subject areas compared to

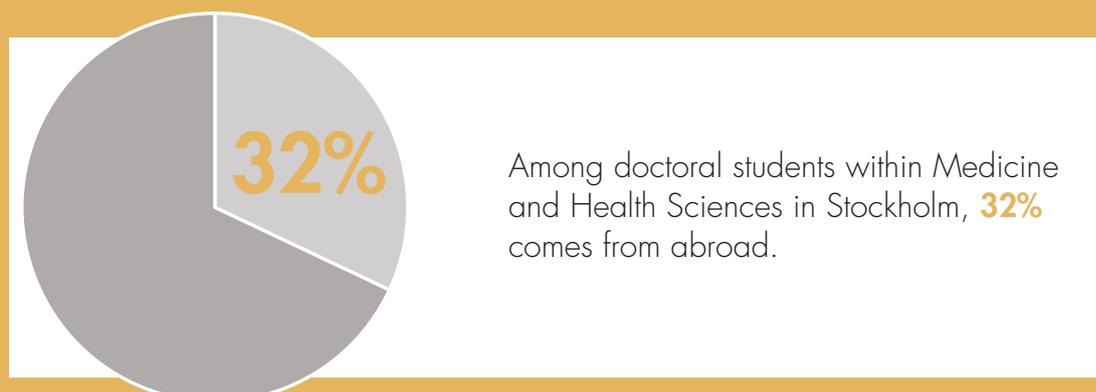
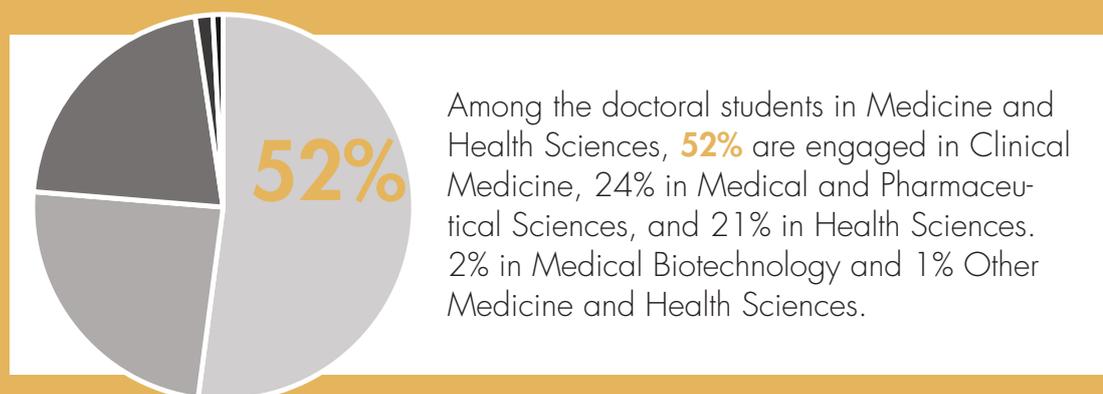
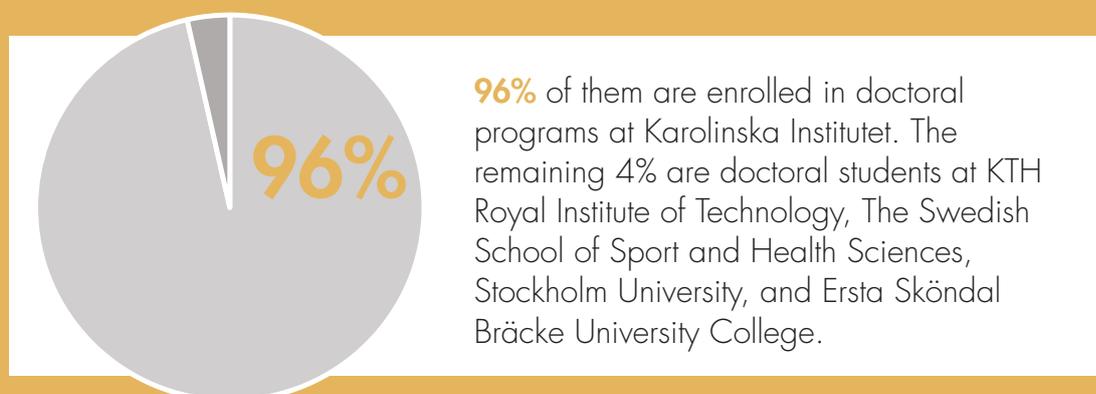
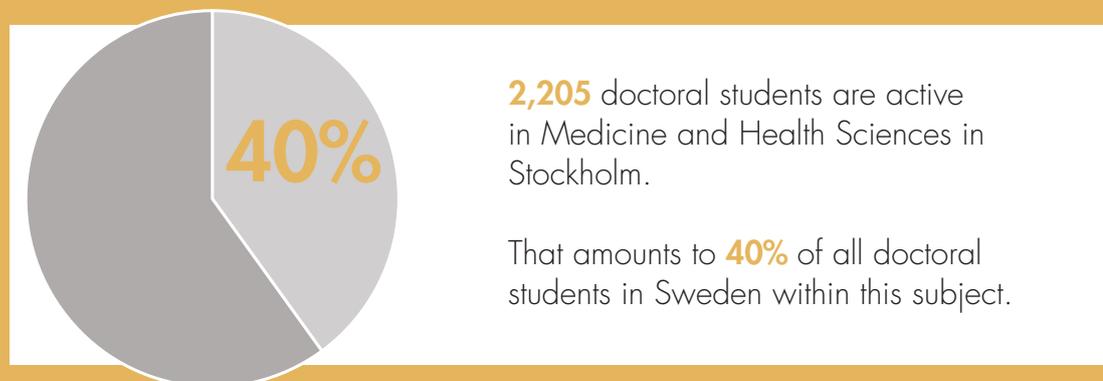
corresponding figures throughout Sweden. While 24% of all doctoral students in Medicine and Health in Sweden come from another country, their proportion in Stockholm is 32%. The difference between Stockholm and the whole country is about the same in Technology and Social Sciences, i.e. 7-8% higher than the national average. In the Natural Sciences and Arts and Humanities, on the other hand, we find roughly the same proportions in Stockholm as in the rest of the country.

The largest proportion of doctoral students at the universities in Stockholm are active in Medicine and Health Sciences, followed by Natural Sciences and Technology.

Figure 7



Subject in Focus: Medicine and Health Sciences



Equal and Unequal Gender Distribution

Gender distribution seems quite even when we look at the total number of doctoral students in Stockholm (47% women-53% men) but it varies greatly depending on subject areas. In the Arts and Humanities, the gender distribution is 62% women and 38% men while it is the reverse in Technology: 30% women and 70% men. This is largely the same distribution in the country as a whole.

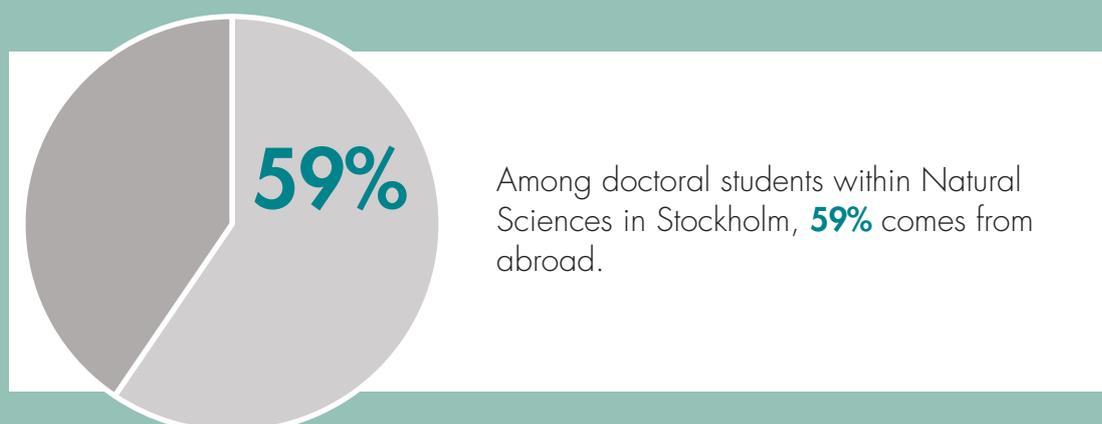
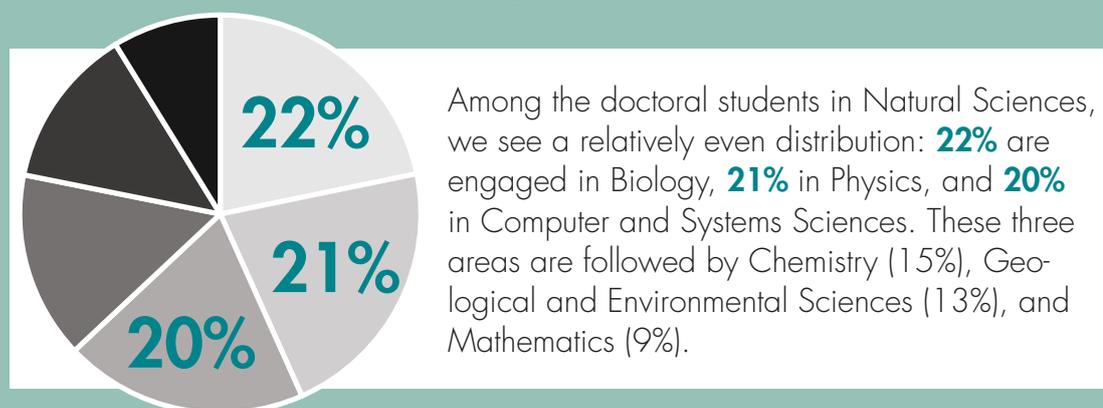
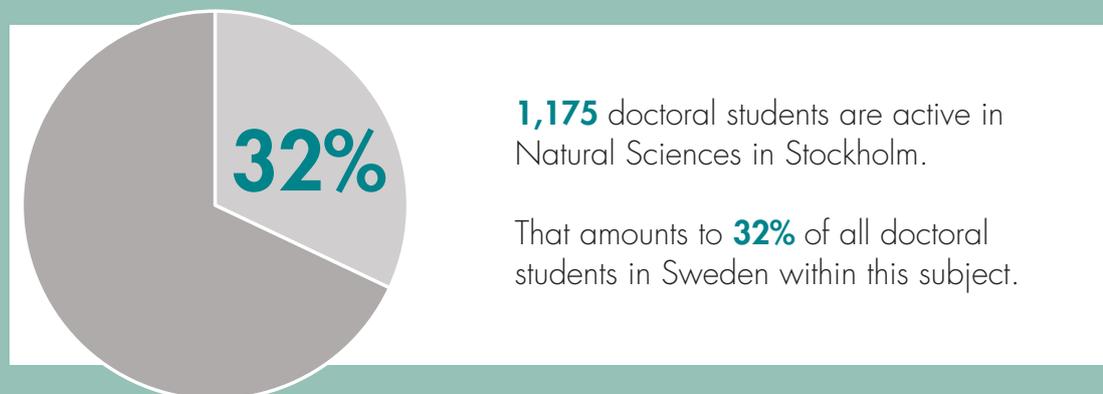
However, we must point out that gender distribution is different among international doctoral students: the proportion of women is lower, only 40%, while men make up 60% of international doctoral students. We see how it affects all

individual subject areas. In Medicine and Health Sciences, a female-dominated research area, female dominance would be even greater if we did not take into account international doctoral students. In the male-dominated subject of Technology, we see the same tendency but, instead of an equalizing effect, the inclusion of international doctoral students means that the subject becomes even more male-dominated. In both Technology and Natural Sciences, the total number of male international doctoral students exceeds the total number of women overall, both Swedish and international.

Overall, the distribution between female and male doctoral students is even, but with large differences among different subject areas. Below: percentage distribution with figures showing numbers by sex and origin.



Subject in Focus: Natural Sciences



Good Reputation Attracts

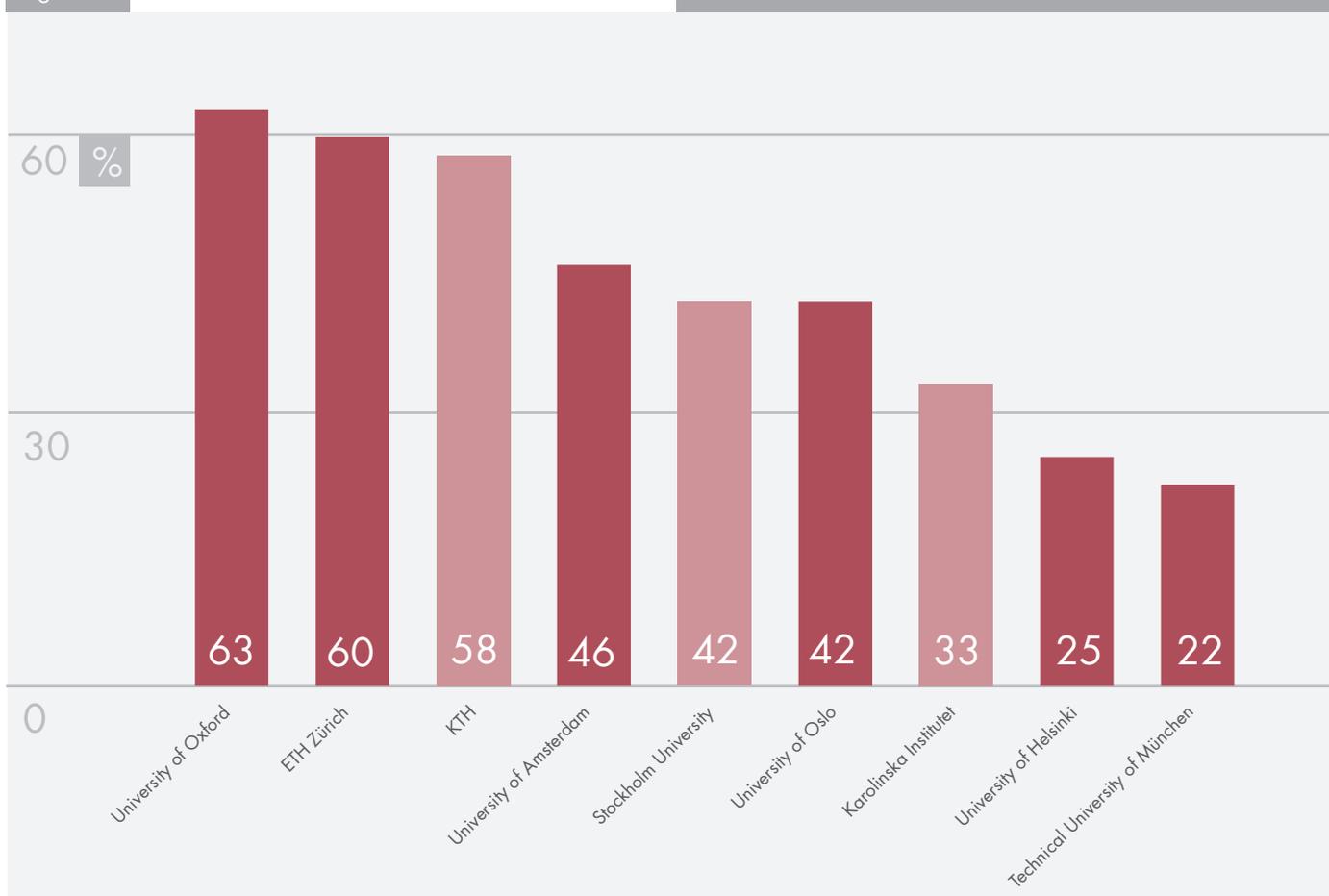
How does the proportion of international doctoral students in Stockholm compare to their presence at other prominent universities? Is a proportion of 43% international doctoral students large or small? It is always difficult to make comparisons at an international level because divisions and designations look different in different systems, but we will nevertheless try to sketch an answer. If we start by looking at the University of Oxford, one of the world's highest-ranked universities, 63% of their "post-graduate research" students are recruited from other countries. The vast majority of candidates in this group graduate with a doctoral degree so we can compare them with our doctoral students. At ETH Zurich, which all major university rankings tend to place in the top-20, the proportion of international doctoral students is 60%.

As they are both university cities, Stockholm and Amsterdam lend themselves to comparison. If we look at the Uni-

versity of Amsterdam, one of the two major universities in the Dutch capital, we see that 46% of their doctoral students are international. So quite close, but slightly higher than in Stockholm. As a few further references, we take two universities in Nordic capital cities: the University of Helsinki, with 25% of international doctoral students and the University of Oslo, with 42% of international doctoral students. At the Technical University of Munich, which is also a highly-ranked university (usually among the 50 to 60 best universities), the figure is around 22% of international doctoral students. However, when we compare universities as we just did, it seems that the better the university's reputation, the higher its proportion of international doctoral students. A renowned university can recruit the best in the world.

Figure 9

A comparison of the proportion of international doctoral students among some universities in Europe.

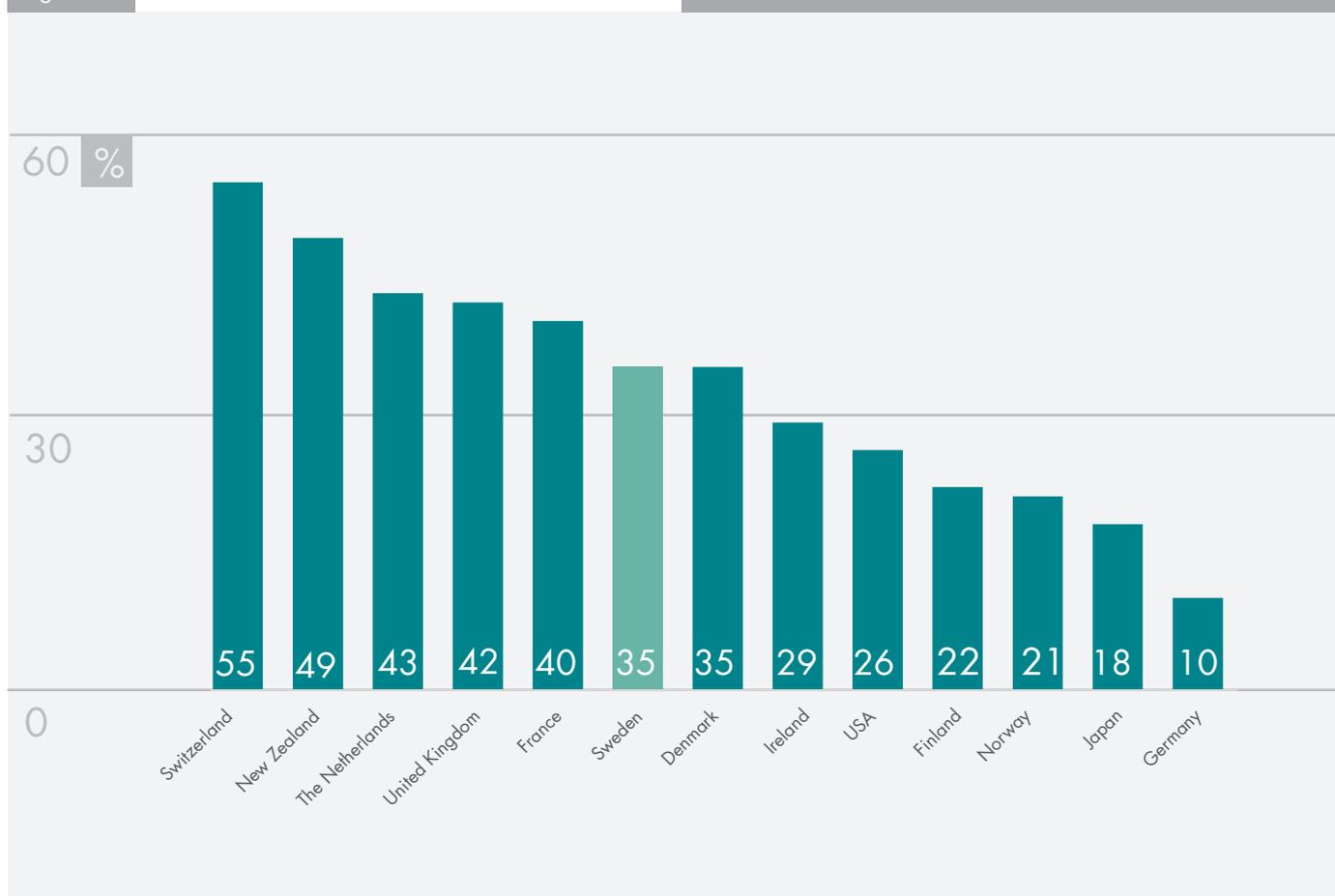


The proportion of international doctoral students at a given university can be explained by many different reasons. The degree of internationalization is often increased in places geographically close to other countries, such as the Netherlands and Switzerland. The use of English both at the university and in the host country is also important, while the university's subject profile can play a major role. There may also be national strategies behind the figures. The OECD report *Education at a Glance 2019* compares the proportion of international doctoral students in the OECD Member States.⁵ The figures in the report come from 2017. The list is topped by Luxembourg with 85% international doctoral students, followed by Switzerland with 55%. Both of these countries are small and geographically located centrally in Europe, surrounded by

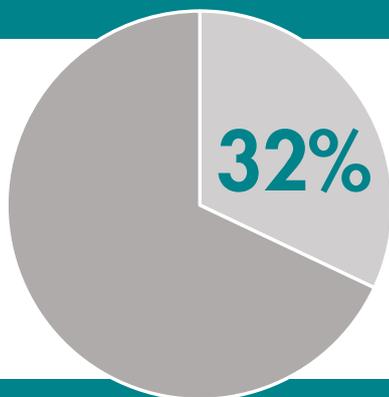
several other states. Sweden and Denmark are at the same level, with 35% international doctoral students, which is significantly higher than both Norway and Finland. In Germany, the proportion of international doctoral students is only 10%, despite many prominent universities.

The proportion of international doctoral students in 2017 in a selection of OECD Member States.

Figure 10

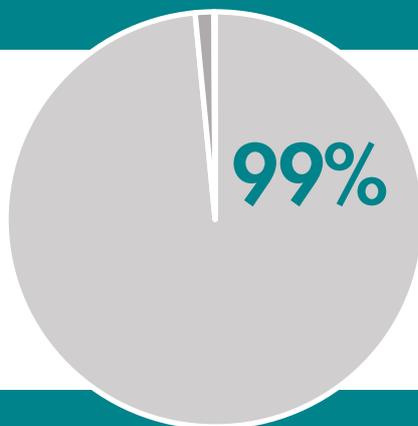


Subject in Focus: Technology

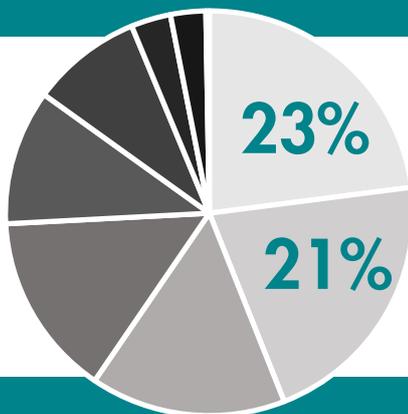


1,110 doctoral students are active in Technology in Stockholm.

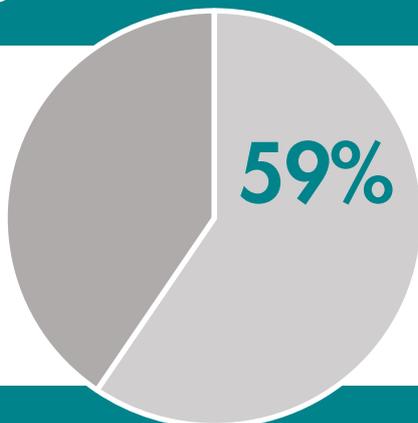
That amounts to **32%** of all doctoral students in Sweden within this subject.



99% of them are enrolled in doctoral programs at KTH, and the remaining per cent at Karolinska Institutet and Stockholm University.



Among the doctoral students in Technology, **23%** are engaged in Electrical Engineering and Electronics, **21%** in Mechanical Engineering, 15% in Materials Science, 15% in Built Environment, followed by Chemical Engineering (11%), Industrial Biotechnology (9%), Biomedical Engineering (3%) and Natural Resource Technology (3%).



Among doctoral students within Technology in Stockholm, **59%** comes from abroad.

How Many Stay in Sweden?

Given that the proportion of foreign doctoral students in Stockholm was as high as 43% as of autumn 2018, it is relevant to wonder what happens to them afterwards. A recent study conducted by the Swedish Higher Education Authority (UKÄ) looked at international doctoral students who graduated between 1998-2012 (a total of 7,100 people) and found that 38% had remained in Sweden three years after their doctoral degree.⁶ Results varied depending on subject areas and universities. Technology saw the highest proportion to have remained, 43%. As a result, 42% of international doctoral students who graduated from KTH remained in Sweden three years after their doctorate. That proportion was 39% at Stockholm University and 40% at KI. The study found that, generally, women were more likely to stay in Sweden than their male counterparts, and this also applied to international female doctoral students at KTH, Stockholm University, and KI. In fact, only 53% of international female doctoral students who graduated from KTH had left Sweden three years after their doctorate.

The number of international doctoral students has increased significantly since the period 1998-2012. During that 15-year period, there were a total of 7,100 international doctoral students who sat for a doctorate. The same figure over just

the past six years (2013-2018) was 5,900. It is likely that a similar study conducted on the more recent cohort would yield different results.

Since 2012, conditions for doctoral students after graduation have changed quite a bit. On July 1, 2014, legislation was amended to allow postgraduate candidates from countries outside the EU/EEA to obtain a permanent residence permit after four years in Sweden. Accompanying family members also gained the right to obtain work permits. Before that, doctoral students had to leave Sweden three months after graduation if they had not found a job. Further improvements are expected after January 1, 2020, when the Student and Researchers Directive is expected to come into force. Among other things, the Directive is supposed to further simplify the application process for residence permits for international doctoral students as well as to allow a doctoral candidate with a Swedish residence permit to stay in another EU country and conduct research there. These improved conditions should be reflected in the proportion of international doctoral students who stay in the country after completing their doctorate after 2014 and onwards.

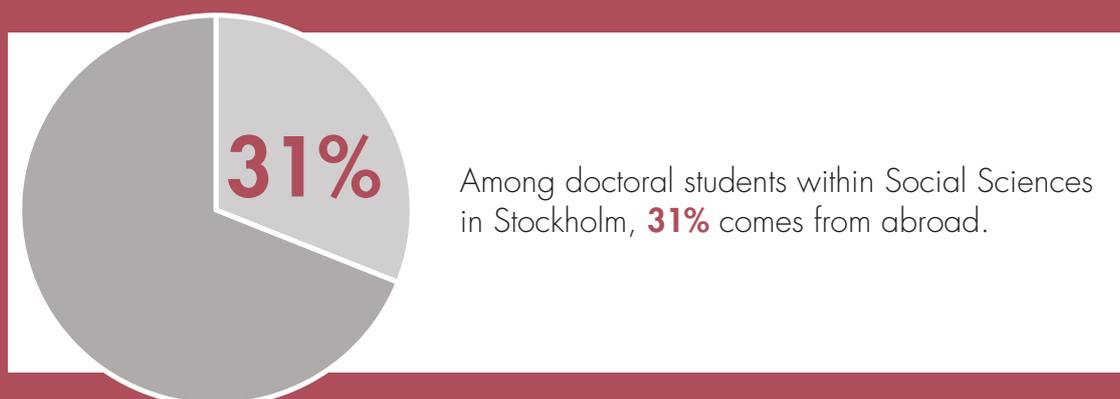
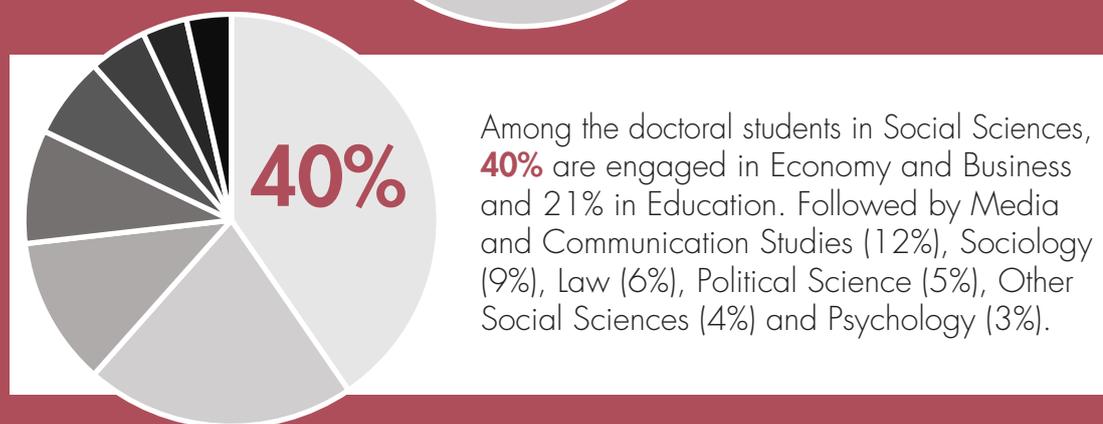
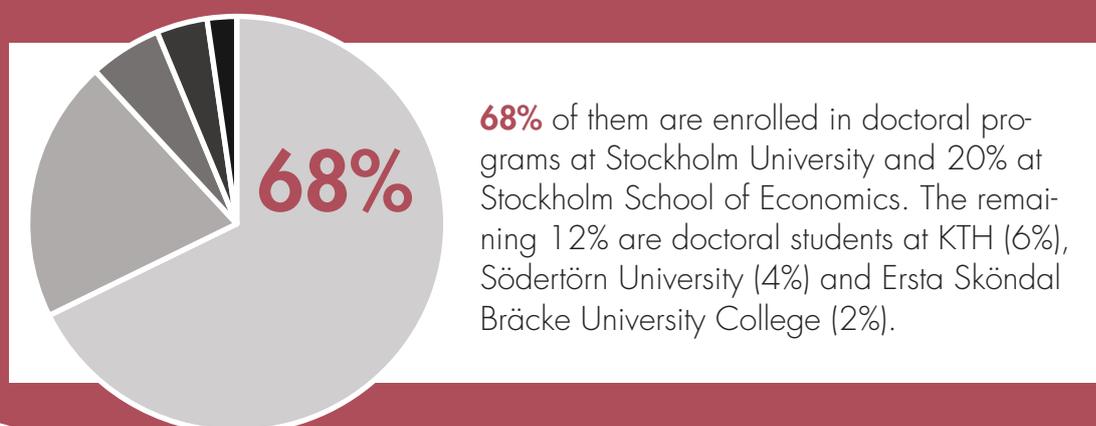
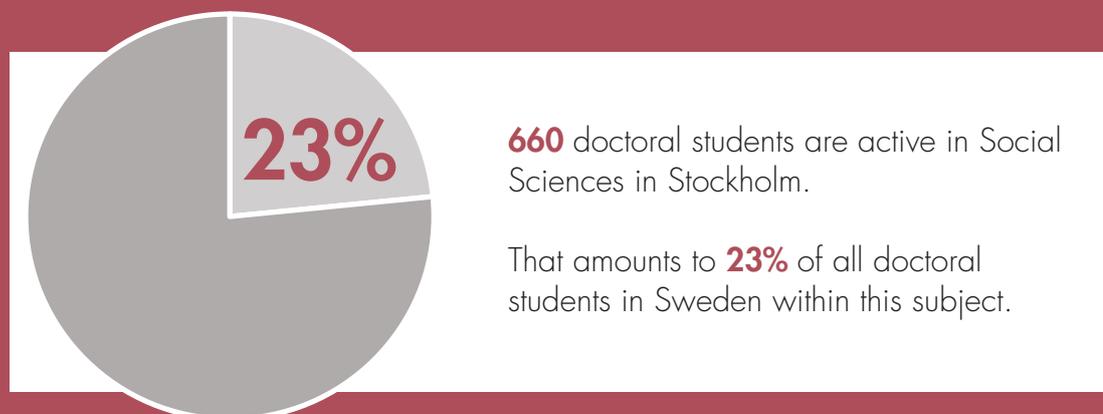
Majority Has Employee Status

In Sweden, most doctoral students have the status of employees during their postgraduate education. However, this employment may look a little different over time, be full-time or part-time, and be mixed with other forms of livelihood. Therefore, the figures are reported here for full-year persons and not individuals.⁷ The distribution between different types of occupation is as follows: 62% are employed as doctoral students, 8% are employed as medical doctors, 5% are employed outside the university but with a research connection, 4% are employed by their university in a different capacity, 4% are employed by a company, 5% have another source of revenue, while 12% are supported by scholarships. This distribution is quite similar at the various institutions as well as in the rest of the country. However, one university in Stockholm differs from the others: the Stockholm School of Economics, where 80% of doctoral students are funded through scholarships. Generally, the scholarship form is more common among international doctoral students. Of all doctoral students who are fully or partially funded through scholarships, 77% come from abroad. Scholarships can come from Swedish private or state sources, but they can also be scholarships that doctoral students bring from their home country or other international scholarships.

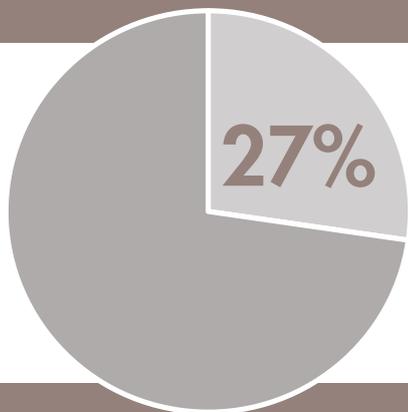
The fact that doctoral students are considered employees rather than students is a characteristic of the Swedish postgraduate education system that makes it particularly attractive. In many other countries, doctoral students must work in parallel to their doctoral studies in order to finance their education.

In Sweden there are also the so-called “Teacher’s Exemption”, which also applies to doctoral students’ work. The Teacher’s Exemption deals with copyright and is an exception to the rule that an employer owns the exclusive right to a work or invention created by an employee as part of their work. This became law in 1949. In many countries, universities own their employees or students’ copyrights and seek patents, if applicable.

Subject in Focus: Social Sciences

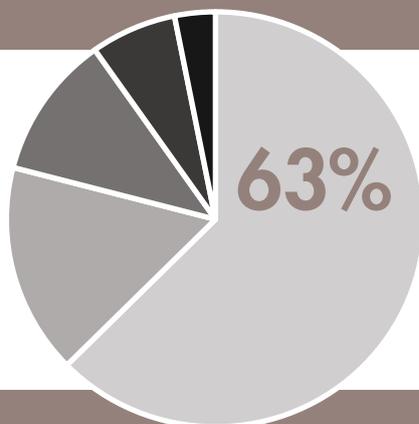


Subject in Focus: Art and Humanities

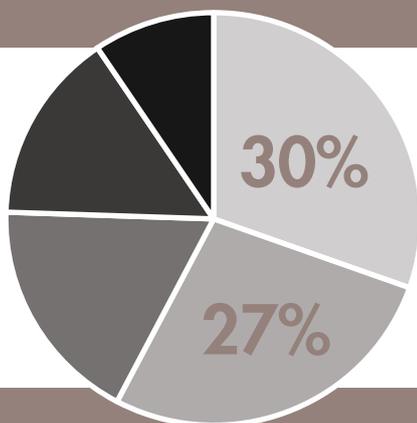


285 doctoral students are active in Art and Humanities in Stockholm.

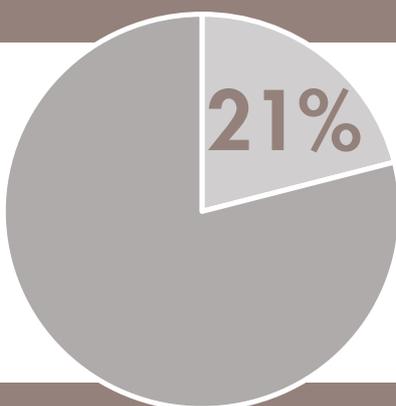
That amounts to **27%** of all doctoral students in Sweden within this subject.



63% of them are enrolled in doctoral programs at Stockholm University. The remaining 37% are docotoral students at KTH (16%), Södertörn University (11%), Stockholm University of the Arts (7%) and University College Stockholm (3%).



Among the doctoral students in Arts and Humanities, **30%** are engaged in Language and Litterature and **27%** in Arts. The remaining 43% are active in History and Archeology (18%), Philosophy, Etics and Religion (15%), and Other Humanities (10%).



Among doctoral students within Arts and Humanities in Stockholm, **21%** comes from abroad.

Concluding Discussion

43% of doctoral students in Stockholm are international. This proportion is higher than in the whole of Sweden. In an international comparison, it seems that the more renowned a university is, the higher its proportion of international doctoral students. This is also quite logical: It stands to reason that universities want to recruit the best candidates, regardless of their nationality.

Postgraduate education is also advantageous in Sweden. Doctoral programs have no tuition fees. The doctoral candidate is generally employed during all or part of their postgraduate education and, as a result, gets access to health and parental insurance. Postgraduate education is of good quality and the level of English proficiency is high. In an international perspective, the academic culture in Sweden is exempt from strict hierarchies and the doctoral student is regarded as an equal in the research group.

Research is and should be international. International doctoral students contribute greatly to a creative environment with perspectives from many different countries. International networks are already being built at the doctoral level, with benefits for both Swedish and international doctoral students for the rest of their careers.

A large number of international doctoral students can also pose challenges that universities have learned to recognize and tried to address. For example, there may be cultural differences in the expected degree of independence in work

or in the relationship with supervisors. Another challenge arises when international doctoral students bring their own funding to Sweden in the form of foreign scholarships, thus creating a situation in which individuals within the same doctoral group have different salary and legal employment conditions.

It would be positive if more international doctoral students stayed in Sweden after completing their degree. Keeping them is a challenge for the whole of society and it is a shame from both a socio-economic and academic perspective if too many people leave. But those who leave Sweden usually continue to be important alumni around the world who favor both Swedish research and the Swedish business community. The relationships that are created are largely part of Swedish public diplomacy.

Many of the doctoral students choose to pursue an academic career after completing their doctorate, but far from everyone. They make up a highly educated workforce available to the labor market.

But the question is whether employers in Sweden sufficiently exploit the opportunities to recruit them. Stockholm's knowledge-intensive labor market is increasingly global and has a great need to recruit internationally. Our universities host many creative and high-performing specialists and generalists in all subject areas, from all over the world.

Footnotes

All figures in this report have been rounded and reported at an individual level unless otherwise indicated.

1) Figures from May 2019, from the Swedish Higher Education Authority's (UKÄ) Statistical Database: The University in Figures. There is some backlog in the reporting of these figures, so the number of doctoral students may increase.

2) We use the same definition for international/foreign doctoral students as the Swedish Higher Education Authority: Individuals from other countries who are admitted to and are pursuing doctoral education in Sweden. They have either been granted a residence permit for studies less than two years before the doctoral studies began or are foreign-born and have immigrated less than two years before the beginning of their doctoral studies.

3) The statistics in this paragraph come from Statistics Sweden and report Active Foreign Doctoral students in Autumn 2013-2018 by country. The statistics are rounded. The nationality of a fairly large number of registered doctoral students appears as "unknown" (about 6% in Stockholm). When available, information about nationality is made available by Statistics Sweden, with information either from the Swedish Migration Agency, the Register of Total Population, or from the University Register.

4) Recently, the Swedish Government has devised a strategy on how Swedish authorities should behave on issues related to China. For Re-

search and Education it states: "It is important that Sweden has access to high-quality educational, research and innovation environments in China. [...] Chinese students, researchers and developers make valuable contributions to Swedish universities, university colleges and companies in Sweden. Cooperation with China in this area poses special challenges in ethics, academic freedom and intellectual property protection, as well as in links with the military sector in China with regard, inter alia, to the possibility that transferred technology can be used for military purposes." *Arbetet i frågor som rör Kina*, Regeringens skrivelse 2019/20:18.

5) OECD (2019), *Education at a Glance 2019: OECD Indicators*, OECD Publishing, Paris. Figure B6.3. Incoming student mobility in tertiary education, by level of study (2017).

6) *Många utländska doktorander lämnar Sverige efter examen*, Statistisk analys, Swedish Higher Education Authority, 2019.

7) In order to obtain a reasonable overview of types of occupation, the figures in this section are calculated on full-time equivalents during the full year 2018 and thus differ from the rest of the report, which mainly takes into account individuals during the autumn term 2018. Statistics come from Statistics Sweden.

