



Universities UK  
International

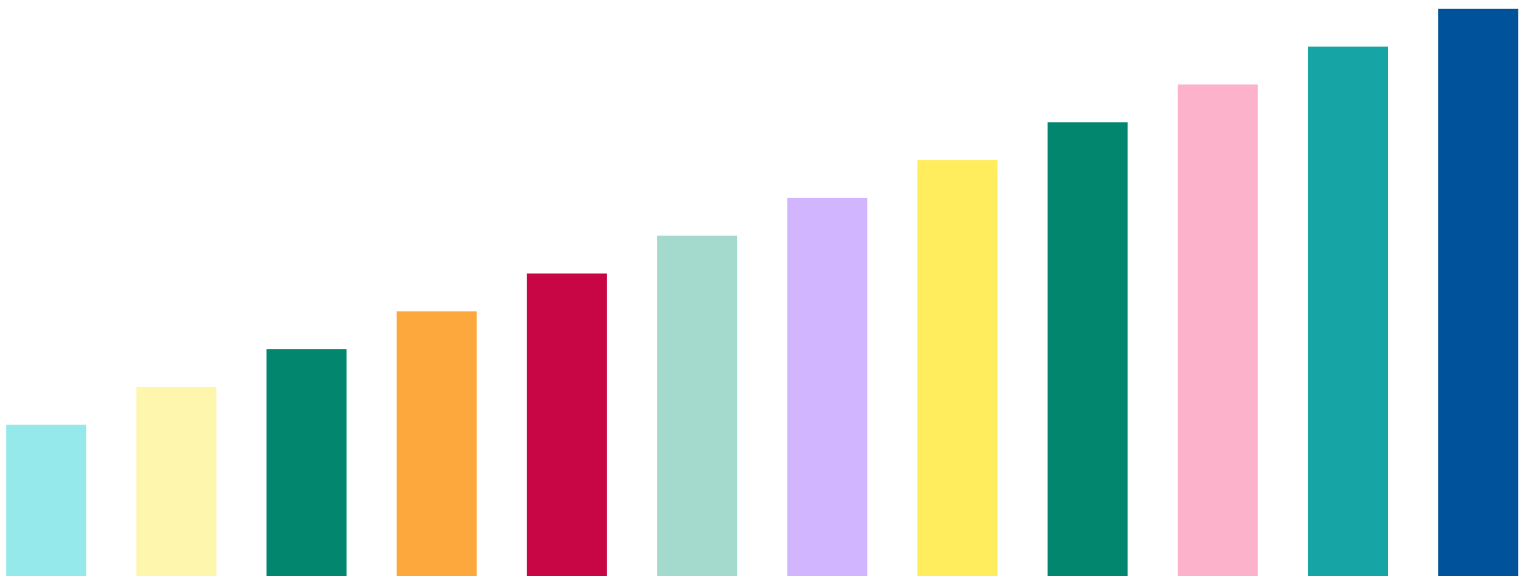
# Powering the engine

The non-financial contribution  
of international postgraduate  
students to the UK

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# Executive summary

**International postgraduate research (PGR) students are a crucial part of the success of the UK's research and development ecosystem. They provide skills that make PhD programmes a success, they contribute directly to the research base as collaborators and researchers, and they project the UK's soft power across the globe. They also directly support the UK's wider ambitions to be a global science superpower through their research outputs, exchanges, and skills.**

To date, this contribution has been frequently stated, but poorly understood. Most of the existing literature on international postgraduate research students has focused on the student experience, and the opportunities and challenges of studying at a postgraduate research level. Other research contributions have included a restating of the broader economic contributions of international students.

## **In summary, we found:**

- International students studying for a postgraduate research degree course make up 7% of the total UK international student population but account for 41% of the total postgraduate research student body in UK higher institutions.
- International PGR students can be found at 149 different providers across the UK but 50% of international PGR students are clustered at 15 research-intensive universities.
- In 2016/17, 47,395 international PGR students were studying in the UK. As of 2021/22 this number had declined to 46,350.
- International PGR students are studying a diverse range of subjects but study science, technology, engineering and mathematics, (STEM) subject areas by a ratio of 3:2. The largest subject group was engineering and technology, with 18% of international PGR students completing their research in a related field.
- The high concentration of international PGR students in programmes related to the UK's longstanding research and innovation priorities suggests these students are fulfilling wider policy objectives.
- The lack of any deliberate government strategies to attract, retain, and maximise the benefits of international PGR students is a missed opportunity to enhance the UK's research base, given the benefits these students bring.
- There is no evidence that international PGR students are displacing home PGR students.

- As part of exchange programmes, dual PhDs, direct research outputs and through the relationships they build between the UK and their home countries, international PGR students perform a vital function in projecting the UK's research strength across the globe.
- There is widespread consensus within the sector that international PGR students are delivering positive outcomes for universities as teachers, researchers, collaborators, and advocates for the UK higher education system.
- The lack of data held on the impacts of international PGR students by funders, universities, and other agencies, is a significant barrier to evidence-based policy making.
- There should be a significant rethink in university and government data collation, a review of visa policy relating to international PGR students, and reconsideration of whether incidental programme costs and university pricing strategies are effectively attracting and retaining international PGR students.

This report has set out and substantiated the areas in which we think the impact of international PGR students is the greatest. We strongly recommend that the sector considers a more systematic approach to capturing and consolidating the data that sits behind these contributions, thinking about both the impact students are having while they are studying in the UK and then the incentives which maximise that impact. Fixing this data gap is vital if there is to be a more informed debate about how to grow and develop the non-economic contributions international PGR students can make. Not doing so risks taking for granted – and even starting to diminish – the important role these students play across the UK's R&D ecosystem.



# Summary of Recommendations

## Problem

## Solution

### Lack of coordination

There is no stated policy or objective on how to get the most impact from this cohort or to maximise the contribution they can make to the UK government's wider science and research ambitions

1

The government should convene a time-limited expert group to consider how to maximise the impact of international PGR students and the contribution they can make to the government's science ambitions. This work may be stand alone but its conclusions should form part of a wider refresh of the international education strategy.

### Data collection

Data collection by universities on the impacts of their international PGR students is mixed and inconsistent between institutions.

2

Universities should update their systems to collect international PGR student outputs, and publishers should investigate whether routinely categorising their outputs is practical or possible.

### Lack of follow up post-study

International PGR students play a role in projecting UK research strengths across the globe but there a lack of systematic information gathered about international PGR students in particular

3

Universities should establish international PGR alumni schemes as a means of better understanding the insights of this group, and to more routinely collate case studies.

### Low understanding of graduate outcomes

The collation of international PGR graduate outcomes is vital in articulating how the UK should nurture their talents, how employers can benefit from their skills, and how funders should best encourage their ongoing contribution to the UK research and innovation base.

4

UUKi should work with the sector to ensure international PGR student outcomes are captured on a more comprehensive basis. This should, in the first instance, focus on ways to increase response rate of existing surveys, such as the Jisc / HESA's Graduate Outcomes survey.

### Visa restrictions during study limit impact

Current visa policy limits the contribution of international PGR students as research collaborators. The intention of the work restrictions on the study visa is not to discourage PGR students doing work that is adjacent to their programme. Paid research roles both enhances the research ecosystem overall through the application of their skills to research projects and provides students with relevant employment experience.

5

Government should review the practicalities of an exemption to working time limits where an international PGR student is employed by their own university in a role which is adjacent to their programme.

### Effectiveness of post study visa options

The UK is in a global race for talent and the government should ensure visa and other costs to study are not putting the UK at a competitive disadvantage.

6

Government should continually review whether the post study visa landscape is internationally competitive and effectively retaining international PGR students.

7

Government should collate more detailed visa data including which qualifications students obtaining Graduate Route visas have achieved.

### Competitiveness of the UK as a study destination

There is a global race for international PGR talent, and these students are high talent and highly globally mobile. UK universities need to remain competitive against their international counterparts.

8

Government should urgently review whether the cumulation of incidental costs to study, including visa fees and the Immigration Health Surcharge are inhibiting the attraction of the UK as a study destination for international PGR students.

9

Universities should consider whether their own pricing strategies are aligned to their wider objectives of attracting and retaining international PGR students as collaborators and researchers.

# Introduction

Universities UK International (UUKi) commissioned Counterculture Partnership LLP and Public First to enhance the evidence base on the contribution and impact of international PGR talent to the UK's Research and Development performance. In doing so, the aim is to help to:

- Articulate the contribution of international PGR students to UK R&D.
- Stimulate debate of the role and contribution of international PGR talent to the UK.
- Inform university, funder, and government policy with regards to international PGR students.

For the purposes of this report, we are defining international PGR students as students studying in the UK from overseas seeking to obtain a PhD or a masters primarily through research.

In undertaking this project it has become apparent that there has been very little work done to date to categorise and articulate the contribution of international PGR students. In interviewing universities, collating publicly available information, undertaking a literature review, and attempting a bibliometric analysis, this report highlights the multitude of ways in which international PGR students are central to the UK's research and innovation ambitions.

This research is the start of what should be a sector-wide effort to improve understanding of the impact of international PGR students. There is a significant lack of literature, both grey literature and academic, on the impact of international PGR students. In part, this is because of the individualised nature of a PGR student experience, which is more complex and multi-varied than that for undergraduate or PGT routes.

In particular, the existing literature has rarely focussed on the impact of PGR students. While there is some research into the experience of international PGR students, and there is some literature on the experiences of international students, with a few exceptions there is little research into how international PGR students are contributing to the UK's research and innovation ecosystem.

This is a significant gap as the technical capability of international PGR students is vital to large scale research projects. International PGR students are projecting the UK's global research strengths through the partnerships they foster. And the UK's wider policy ambitions in the economy, labour market, or on the global stage, would not be possible without the contribution of international PGR students to the UK's research and innovation ecosystem<sup>1</sup>.

UUKi's 2022 report for UK postgraduate degrees stated that:

*[...] sustainable growth in international PGR student numbers is crucial to maintain and enhance the UK's R&D capability and develop the UK's future talent pipeline to support the government's objectives of raising R&D investment to 2.4% of GDP by 2027 and making the UK a global hub for innovation by 2035. International PGR recruitment critically supports the seven technology families of UK strength and opportunity and ultimately the government's ambition in making the UK a science superpower<sup>2</sup>.*

The report demonstrates the importance of international PGR students to the UK's R&D capabilities, however the UK has failed to grow its international PGR student population. In 2016/17, 47,395 international PGR students were studying in the UK. As of 2022/23 this number has increased to 49,830<sup>3</sup> – an increase of 5%. Over the same period the number of all international undergraduate students has grown by 19%, from 253,680 in 2016/17 to 303,080 in 2021/22<sup>4</sup>.

In the two years since UUKi's report was published the challenge of maintaining the UK's advantages in international PGR recruitment have only become more acute. A period of policy turbulence, government commitments to reducing immigration, and ongoing political and media discourse on the value of international students is leaving the UK at a competitive disadvantage. This is before considering a wider foreign policy landscape which increasingly sees the value in onshoring knowledge assets.

Overall, it is clear from our research and assessment that international PGR students "power the engine" of the UK's science and research capabilities, providing new insights and technical capacity. However, we have not yet done enough to measure their impact and unless measures are taken to join up policy initiatives, address challenges in the visa regime, collect better data, and otherwise make explicit how valued their contribution is, the UK risks losing their talents to other nations.

This report begins with an overview of the size and shape of the international PGR student cohort. It then discusses their academic impact, and the productivity benefits they bring to the research ecosystem. We then look at how PGR students bring critical skills that power the UK's research programmes such as their complementary work with domestic PGR students as teachers, shapers of pedagogy, and contributors to life on campus. Finally, we examine their contribution to the UK's place in the world and its soft power, before concluding with recommendations for growing the impact of this cohort even further.

We are thankful for the universities that supported this work, UKRI for their feedback and financial support for this report, and to participants at UUKi's International Higher Education Forum 2024 whose questions further sharpened our thinking.

<sup>1</sup> [https://www.ukcisa.org.uk/resources\\_download.aspx?resourceid=189&documentid=338](https://www.ukcisa.org.uk/resources_download.aspx?resourceid=189&documentid=338)

<sup>2</sup> [https://www.universitiesuk.ac.uk/sites/default/files/field/downloads/2022-06/Global%20demand%20for%20UK%20postgraduate%20research%20degrees\\_0.pdf](https://www.universitiesuk.ac.uk/sites/default/files/field/downloads/2022-06/Global%20demand%20for%20UK%20postgraduate%20research%20degrees_0.pdf)

<sup>3</sup> <https://www.hesa.ac.uk/data-and-analysis/students/where-from>

<sup>4</sup> Ibid.

# Methodology

## We undertook this research in five parts:

- 1** We undertook a comprehensive review of existing literature, which aimed to better understand the different types of impact that could be ascribed to international PGR students.
- 2** We brought together representatives from eight UK higher education institutions across a range of leadership and policy roles for a roundtable and workshop to help add more detail and context to these impact types, and to explore new ways in which impact might be better understood.
- 3** We undertook an assessment of the characteristics of the current International PGR cohort, including how their size and shape compares to other student groups; which countries they come from; the types of institutions they study at; and the subject groups within which they undertake their research.
- 4** We attempted to better qualify and quantify the research and academic contributions of international PGR students. This included analysing Research Excellence Framework (REF) data, estimating research outputs, and interrogating university websites.
- 5** Finally, we synthesised in qualitative terms the breadth and depth of contributions that international PGR students make in the UK.

**There are limitations within the research owing to a lack of systematically collected data on the impacts of international PGR students. Where that is the case, we have sought to use publicly available data from sources like REF, sampling techniques to estimate academic output, and universities' own material on international PGR students.**

# The size and shape of the international PGR student cohort

Using Higher Education Statistics Agency (HESA) data, we can build a picture of who makes up the international PGR student cohort. As well as exploring overall numbers and trends, we focused our analysis here on three main areas: country; institution; and subject.

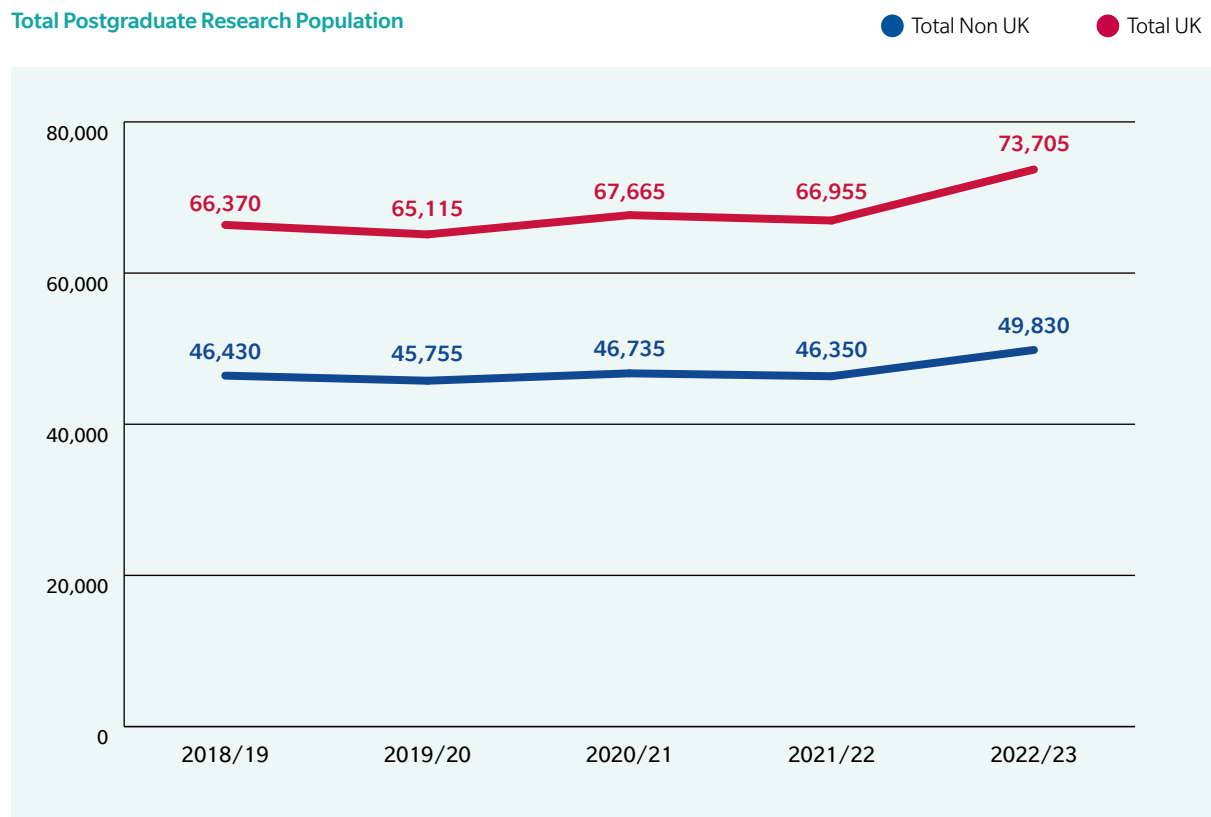
International PGR students are most likely to come from the EU, or from China; they are most likely studying in a science or business and management discipline; and they are most likely studying at one of 15 universities with high levels of research output, in London, the South East, and in Scotland.

Across the whole cohort however is a significant diversity of intake, subject area, and institution, each contributing through their research training to their discipline, departments and faculties.

## Country

In 2022/23 there were 49,830 international PGR students studying at UK higher education institutions, the majority (95%) of whom were on a doctoral research programme. International PGR students make up 40% of the total postgraduate research student body in UK higher education institutions but make up only 7% of the total UK international student population (down from 10% in 2017/18). Most international PGR students study full time, a small minority (10%) study part-time<sup>5</sup>.

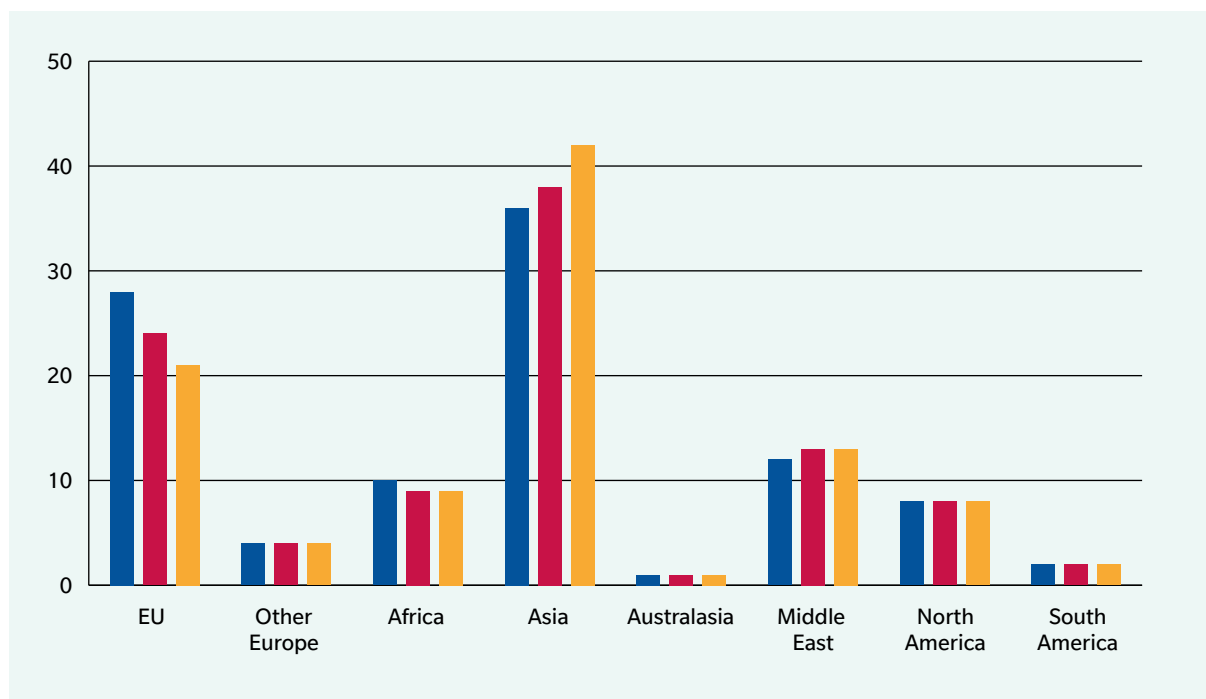
## Total Postgraduate Research Population



<sup>5</sup> Sourced from: <https://www.hesa.ac.uk/news/19-01-2023/sb265-higher-education-student-statistics>  
HE student enrolments by level of study 2017/18 to 2021/22

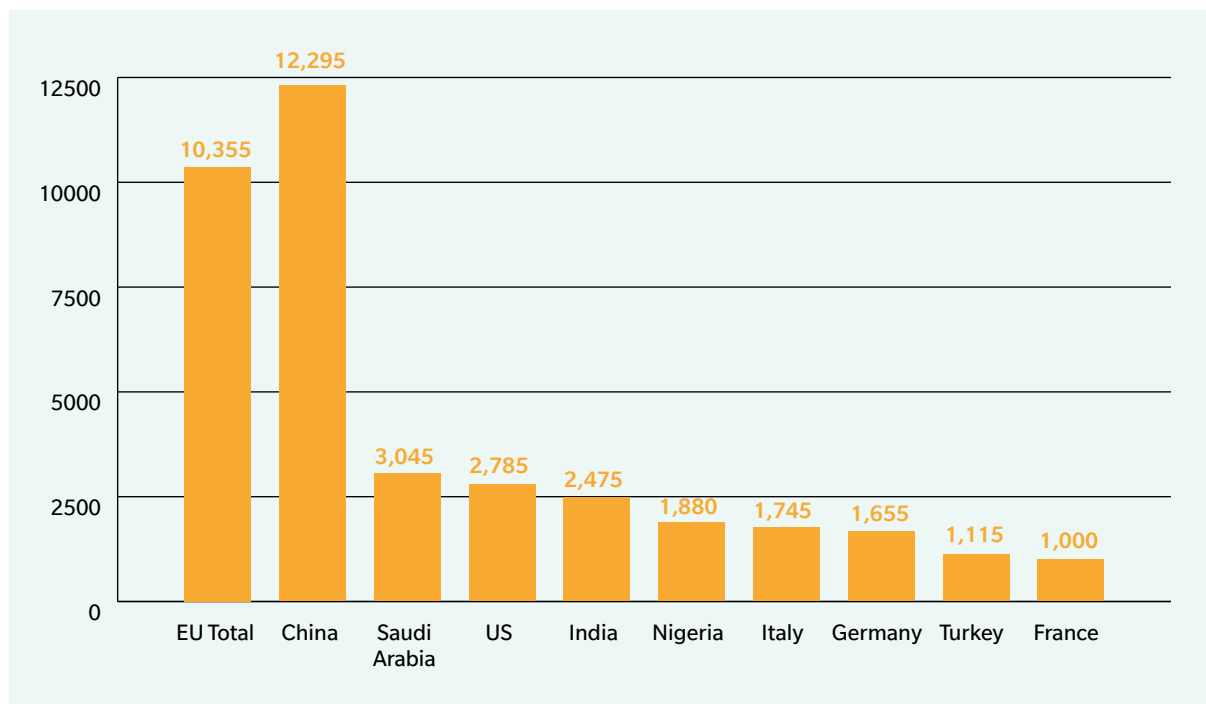
### International PGR students by origin region 2019-2022

● 2019/20 ● 2020/21 ● 2021/22



International PGR students primarily come from countries in Asia, particularly China, and from the EU. The past three years of available HESA data show that the share of students from Asia has increased, and from the EU decreased, with other regions remaining relatively static.

### International PGR by origin country



In 2022/23 one quarter (25%) of international PGR students came from China, which was by far the largest single country international cohort. A fifth come from the European Union, the next largest single country markets were Saudi Arabia, USA and India.



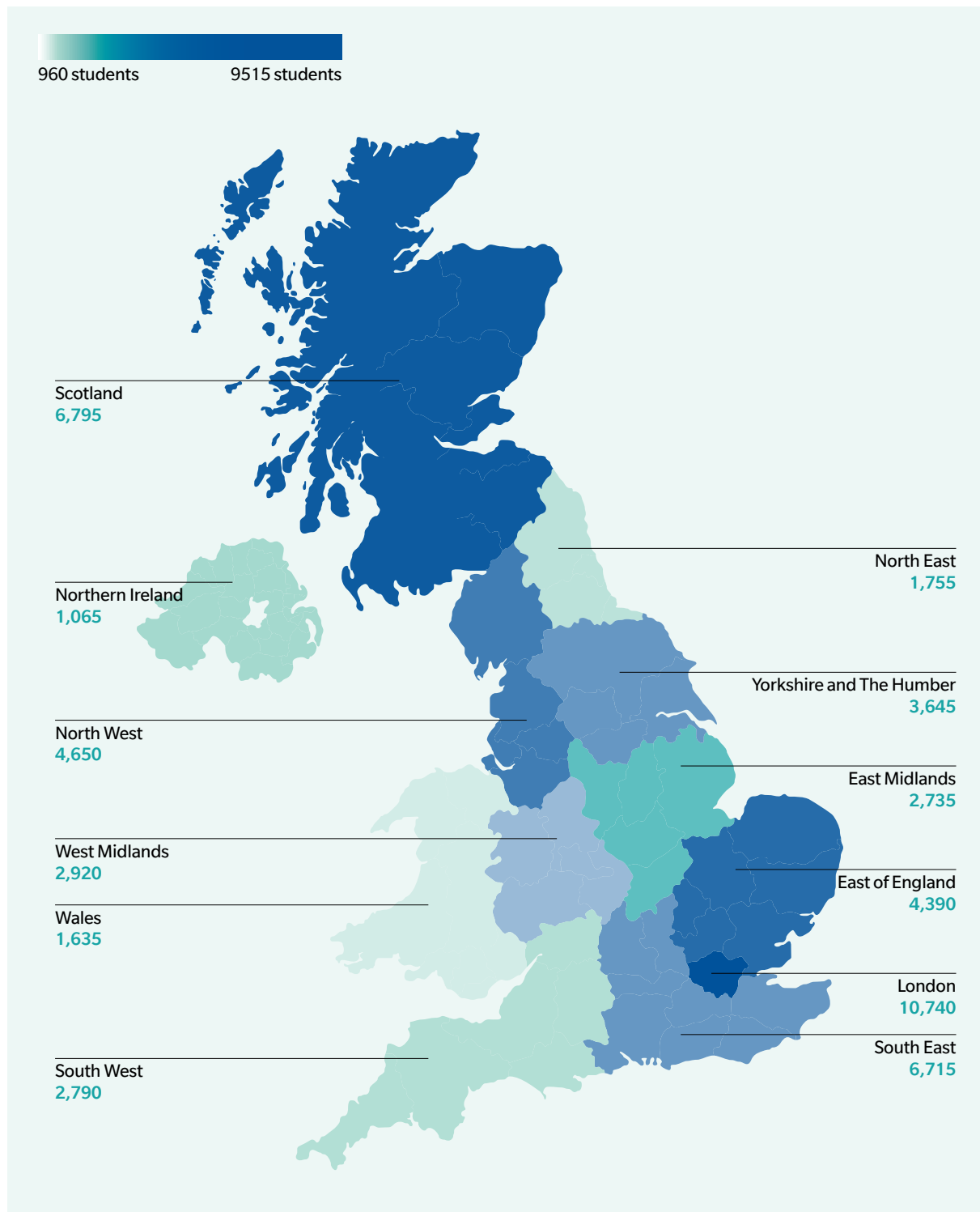
## Institution

International PGR students can be found in a total of 150 higher education institutions across the UK. They are unsurprisingly clustered in research-intensive universities. 50% of the 2022/23 international PGR student cohort are studying at just 14 research-intensive universities. Across these 14 institutions, the average cohort size for international PGR students is 1,786 (and 2,769 across the top four providers).

The remaining 50% of students are split across 136 different providers across the UK. At these, the average cohort size for international PGR students is 183.

Institution	Number of international PGR students	% share
The University of Oxford	3,115	6.3%
University College London	2,935	5.9%
The University of Cambridge	2,545	5.1%
Imperial College of Science, Technology and Medicine	2,480	5.0%
The University of Manchester	2,260	4.5%
The University of Edinburgh	2,175	4.4%
King's College London	1,435	2.9%
The University of Glasgow	1,415	2.8%
The University of Birmingham	1,375	2.8%
The University of Sheffield	1,210	2.4%
University of Nottingham	1,135	2.3%
The University of Leeds	1,025	2.1%
The University of Southampton	955	1.9%
The University of Bristol	940	1.9%

## International PGR students region of study across the UK

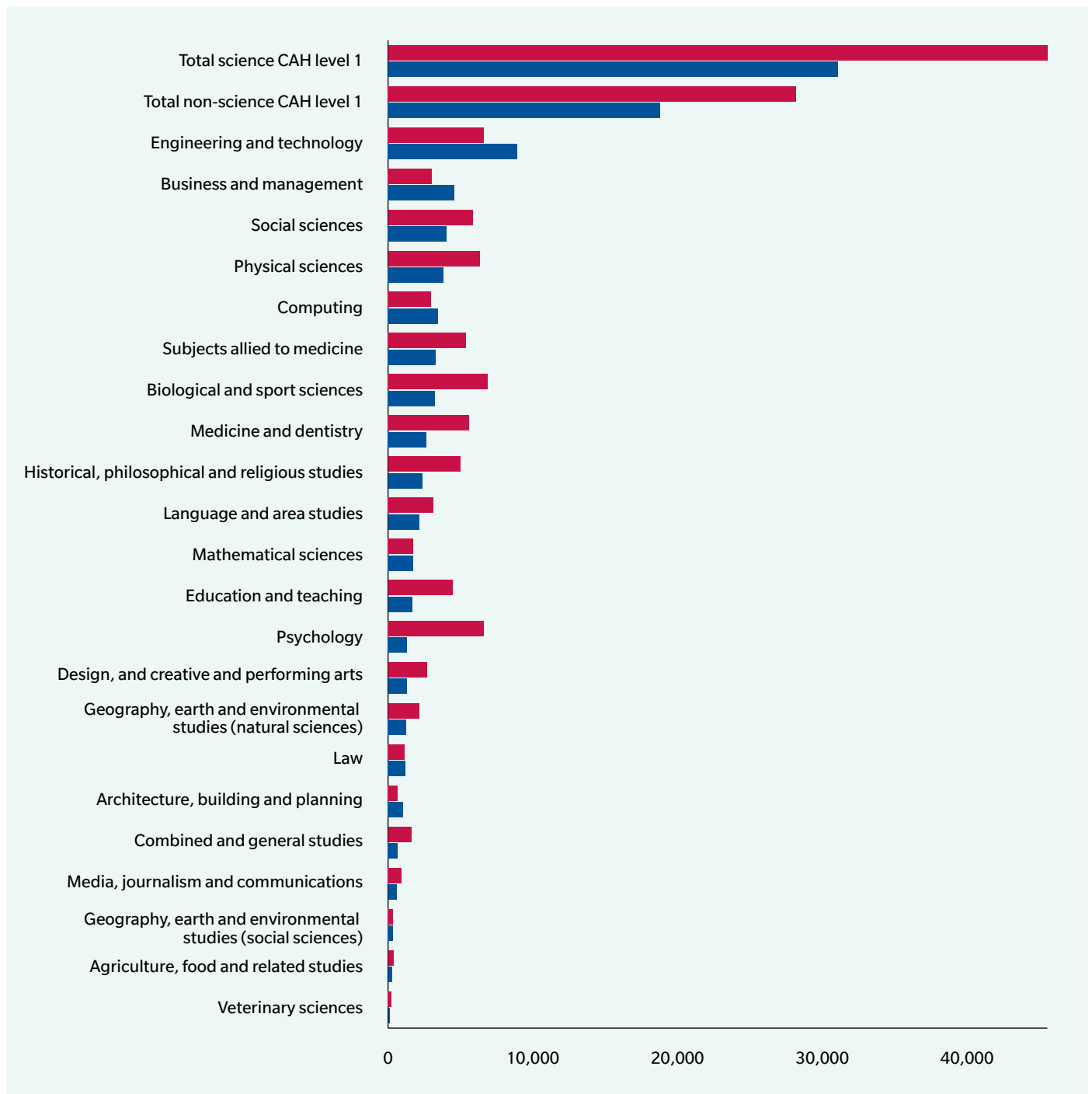


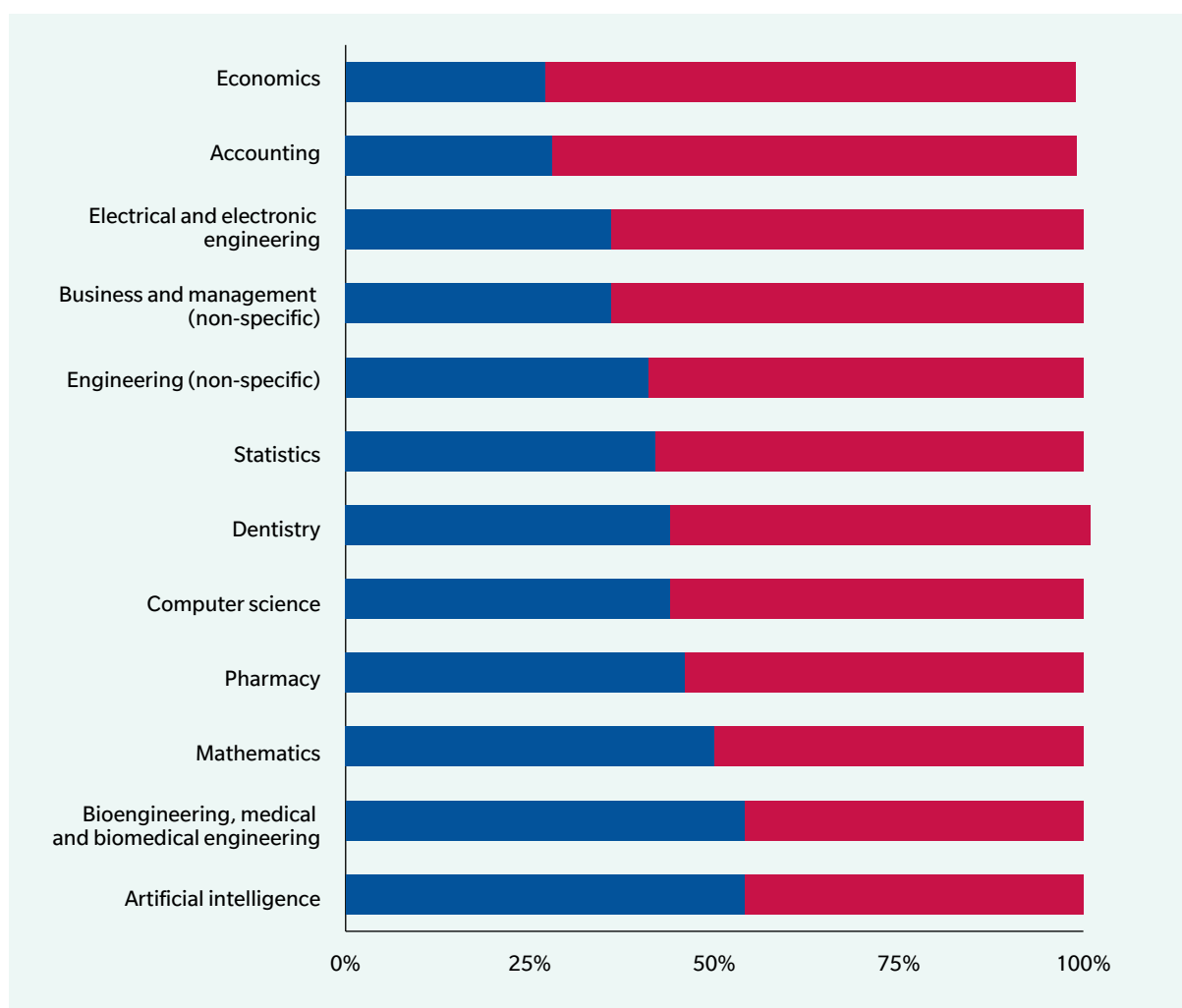
There is some clustering by region of study; 22% of international PGR students are at institutions based in London, and 35% are in London and the South East. A further 14% of the total cohort are studying in Scotland.

## Subject

International PGR students study a diverse range of subjects, favouring sciences over non-science subjects by a ratio of 3:2 (the same ratio as their domestic PGR counterparts). The largest subject group is engineering and technology (18%), followed by business and management (9%).

% breakdown per subject group (CAH1): UK vs. International PGR 2022/23





At a more detailed subject level, we can see that the subject areas with the highest numbers of international PGR students are computer science; electrical and electronic engineering; chemistry; medicine; engineering; management studies; and physics, all of which in 2022/23 had cohorts above 1,500 students.

International PGR students also make up a large proportion of the cohort across key strategic subject areas for the UK’s global science superpower and economic growth ambitions, including for strategically significant technologies areas such as artificial

intelligence and engineering biology. International PGR students make up:

- 72% of those studying economics
- 58% of those on civil engineering courses
- 56% of computer scientists
- 56% of those on mechanical engineering courses
- 50% of PGR level mathematicians
- 46% of those studying artificial intelligence courses.

# International PGR students' contributions to the productivity of the UK research ecosystem

The UK's ambition to grow the size of its R&D footprint is dependent on a highly skilled PhD labour force. It is an evidence gap that visa data is not collated by type of qualification. This would give us a better idea of the post study destinations of this cohort. Equally, there is no systematic employment survey of international PGR students.

Our research uncovered several examples of how international PGR students are using their expertise to make a significant contribution to tackling UK policy problems, both through their research and through other activities that happen alongside their studies.

International PGR's contributions to the UK can lead to enhanced relationships with research institutions in other countries, which on both a personal and organisational level, forges international research links (UUK 2022<sup>6</sup>). The case studies below demonstrate how the research of international PGR students is shaping policy making in the UK and enhancing the productivity of the public sector.

International PGR students fulfil an immediate need within universities as teachers, teaching assistants, tutors, and the associated roles. During workshops participants told us that while this role is not unique to international students we should not underestimate the role they perform, along with domestic PGRs, of supporting wider academic needs on campus.

We have not seen any evidence that international students are crowding out domestic student PhD applicants. UKRI has a policy to limit the total number of students appointed each year through individual doctoral programmes to 30% of the total awards<sup>7</sup>. There is a consistent ratio between home and international PGR student numbers (see above). Even in the face of changing undergraduate student ratios, this suggests costs and the wider funding environment has maintained an equilibrium between the enrolment of these students. To find evidence of a displacement effect there would also need to be a coterminous pool of domestic applicants that are hoping to fill places currently occupied by international PGR students. It seems unlikely that programmes with lower international PGR recruitment like accounting or economics would fill over 50% of their cohort with additional home PGR students. As workshop participants reflected, providers would simply have smaller cohorts of students.

It is also the case that the contribution of international PGR students to the UK's research and innovation base does not stop when they complete their studies. In one example in the final 2018 Migration Advisory Committee report, Cancer Research UK articulated the academic contribution of international PhD students to their work.

*"We invest in international PhD researchers in the UK and there should be opportunities for them to continue to work and develop expertise in the UK to ensure we continue to have a thriving research environment. We believe it would be detrimental to the UK research environment if we lost this talent. [...] it is essential for CRUK that we can retain our talented international students following their studies. Retaining our international students ensures a training pipeline and a highly skilled UK research community<sup>8</sup>."*

<sup>6</sup> [https://www.universitiesuk.ac.uk/sites/default/files/field/downloads/2022-06/Global%20demand%20for%20UK%20postgraduate%20research%20degrees\\_0.pdf](https://www.universitiesuk.ac.uk/sites/default/files/field/downloads/2022-06/Global%20demand%20for%20UK%20postgraduate%20research%20degrees_0.pdf)

<sup>7</sup> [https://www.ukri.org/what-we-do/developing-people-and-skills/esrc/funding-for-postgraduate-training-and-development/eligibility-for-studentship-funding/#~:text=UKRI%20will%20normally%20limit%20the,UK%20national%20\(meeting%20residency%20requirements\)](https://www.ukri.org/what-we-do/developing-people-and-skills/esrc/funding-for-postgraduate-training-and-development/eligibility-for-studentship-funding/#~:text=UKRI%20will%20normally%20limit%20the,UK%20national%20(meeting%20residency%20requirements))

<sup>8</sup> <https://www.gov.uk/government/publications/migration-advisory-committee-mac-report-international-students>

## Cranfield University

### Understanding the reality of post-Covid travel behaviour

Mengyuan Lu, from Beijing, China, is PhD researcher at Cranfield's Centre for Air Transport Management. Her research focuses on improving connecting opportunities between high-speed rail and air transport. She was one of a few candidates selected to undertake a three-month internship with the Department for Transport (DfT) during 2023. At the DfT, she was tasked with researching the long-term effects of the Covid-19 pandemic on travel behaviour in the UK in order to inform the transport models DfT uses for policy making. Her deep understanding of the research process, the scope of the problem, along with her professionalism and

ability to discuss the progress with a panel of experts was highlighted in her final review by the Head of the Demand Analysis Team. The DfT highlighted how Mengyuan's efforts contributed to provide ***"an evidence-based report that links robust evidence to actions we need to be taking in the future [...] This allows for longer term impacts to be considered in a more robust way in transport modelling."***

Her findings will now help DfT use their models to reflect a new reality post-Covid and thus improve the development of transport infrastructure networks and services in the UK.

## University of Cambridge

### Improving local government understanding of AI<sup>9</sup>

Then postgraduate research student, and now Assistant Professor, Ramit Debnath led a project which explored how local authorities in England can use AI ethically to improve their public value. It ran alongside his PhD studies as a Gates scholar at the University of Cambridge.

The places and cities project aims to investigate how local authorities in England are using AI to make decisions about issues such as place-making, land use and mobility, and sustainable water supply systems to create public value. The project was given seed funding by the University's ai@cam fund and will now develop resources for local authorities to make ethical and informed choices

and explore how to best use AI as part of digitalisation initiatives.

This project is a part of a cluster of programmes that will use ***"AI ethically to improve the public value"*** of local authorities. In 2024 Ramit won a £300,000 grant to ***"[...] investigate how local authorities in England are using AI to make decisions about issues such as placemaking, land use and mobility, and sustainable water supply systems to create public value. The project will develop resources for local authorities to make ethical and informed choices and the use of AI as part of digitalisation initiatives"***<sup>10</sup>.

<sup>9</sup> [Scholar on winning team for inaugural AI prize - Gates Cambridge](#)

<sup>10</sup> <https://www.arct.cam.ac.uk/news/assistant-professor-dr-ramit-debnath-wins-300k-grant-universitys-flagship-ai-mission-called>

# The publication outputs of international PGR students

*“International postgraduate research (PGR) students directly contribute to university research, often publishing papers that count towards the university’s research impact. These students help refresh the UK’s research base, facilitating the exchange of ideas and expertise. Their international links also promote our universities’ global research collaborations and strengthen partnerships. It is no coincidence that our universities, which attract a high proportion of international PhD students and academics, are the driving force behind the UK’s world-leading research performance”<sup>11</sup>.*

## Russell Group Evidence to 2018 Migration Advisory Committee commission on international students

PGR students, and particularly those on doctoral research programmes, are most often “researchers in training”. Most, if not all, are working towards an individual thesis or submission, which will usually be a piece of novel research in their chosen field. Much of this work has a wider impact on the overall research ecosystem.

UKRI defines research impact as the “demonstrable contribution that excellent research makes to society and the economy”<sup>12</sup>. Some of these impacts, as demonstrated through the case studies in this report, produce very tangible ways in which research can lead to new technologies, processes, and products. It also includes the harder to measure influences on policy, ideas, and the work of governments.

A research output is the generation of a piece of work which makes a researcher’s idea real. This can vary from individual research publications or papers in academic journals (usually as a part of, or a follow up, to the main doctoral thesis); a contribution to an academic paper as part of a research team or lab team; an invention or a piece of IP; or a multitude of other research outputs.

It is worth stating that while the publication outputs of international PGR students are a useful measure of the volume of work taking place it tells us nothing about quality. Therefore, caution should be exercised in assigning a value to volume in isolation of wider analysis. The work of international PGR students as collaborators, advocates, teachers, and so on, cannot be measured through the narrow lens of how much work they produce.

Volume should also not be conflated with impact. We heard directly about students right at the start of their research career who have relatively few or no research publications. Their contributions are not less significant because of their inexperience in academia. The whole research ecosystem relies on their new energy, ideas, and challenge.

The academic outputs of international PGR students are difficult to measure. There are limitations in data collection and international PGR students are not cited in REF as lone authors. The mobility of international PGR students presents a further issue as their research outputs post study may not be captured within the UK. There is a systemic challenge in that the academic outputs of international PGR students are not always collated and categorised by institutions, publishers, or funders.

Early in the research process, we ruled out a full bibliometric analysis. Our reasoning for this was twofold: firstly, because journals did not usually carry a metric for identifying whether an author was a postgraduate research student; and secondly, they did not always carry a metric for identifying the domicile country of the author. There is, as far as we understand, no way of “matching” whether someone was or had been an international PGR student with a database of research via bibliographic methods.

Instead, we selected a sample of 20 institutions which broadly reflected the overall makeup of the international PGR cohort. From these we asked whether institutions knew, or were able to estimate:

- **The percentage of each cohort which published their own research during or soon after their studies**
- **The percentage which contributed to broader research during their studies.**

We asked each institution in our sample to complete a short survey, including their estimates (or exact data, where this was held) for both the domestic and international PGR student cohorts, and any further supporting information that could be used to help us assess the impact via research output. For some, we then followed up with an individual conversation.

On the most part, this information was not held by institutions. Estimates of the percentage of each total PGR student cohort who published research, for example, ranged from 50% - 90%, with a significant degree of uncertainty. Most institutions did not keep a central record but were able to identify that a “high percentage” published during or shortly after their studies.

<sup>11</sup> <https://www.russellgroup.ac.uk/media/5679/rg-evidence-to-mac-commission-on-international-students-jan-2018.pdf>

<sup>12</sup> <https://www.ukri.org/councils/esrc/impact-toolkit-for-economic-and-social-sciences/defining-impact/>

The biggest barrier to this was that students often published after they had already formally graduated from their doctoral research programme, meaning that there was no systematic way for institutions to track this impact.

It is a significant gap that institutions seldom systematically collate data on the research outputs of their students. As part of a wider effort to promote the value of this cohort it is important that universities have a good understanding of who their international PGR cohort are and what they are doing.

The institutions that did collect data directly tended to give lower estimates as they mainly only tracked data while PGR students were still enrolled on a course and thus had a “student” data marker. One institution was able to track publications with a digital object identifier (DOI) and show that 13.5% had a student as a co-author (most often as a lead author). Another was able to track that international PGR students had published or co-published 2,548 outputs since 2019, from a cohort of 3,375 international PGR students in that time period (76.5%). Arriving at one estimate for the whole cohort is therefore, as we currently understand, not feasible.

## What do we know?

We know from HESA that half of all international PGR students are clustered at 15 research-intensive institutions and therefore likely to be in an academic and research environment in which a high level of publication output is supported and encouraged. This sample can be broadened to include an additional seven institutions, all of which are in the Russell Group and research-intensive, and with international PGR cohort sizes above 500.

The nature of doctoral research at these institutions in particular means it is reasonable to assume that the lower range of the estimates given from our sample 50% publication rate is not unlikely.

We can then further break down the cohort of PGR students at the 22 institutions by subject discipline (noting that it is not possible to split this by domicile at an individual provider level). With the exception of subject specific institutions, most had a larger STEM compared to non-STEM cohort, with two thirds of students in STEM disciplines.

If we model only the international PGR students in STEM disciplines at these research-intensive institutions, and we assume that at least 50% publish during or shortly after their time as a student, we can estimate a research output of around 10,000 publications from international PGR students alone per cohort.

<b>Total international PGR</b> (22 largest research-intensive providers)	<b>23,690</b>
<b>Of which STEM</b> (estimated)	<b>19,752</b>
<b>Of which 50% publish one research output</b> (estimated)	<b>9,876</b>

This number and contribution are substantial and most likely an under rather than an over-estimate of the total research output. UK-based researchers published 225,595 total outputs in 2020<sup>13</sup>; this modelling, which likely reflects the lower end of the actual research output of international PGR students, means our modified sample alone would account for around 4.38% of this total number.

Although publications are important, they are only part of a measure of research power and productivity. Much of the direct research impact of the international PGR cohort has a long tail, which is only realised after the period of postgraduate level study. This is hard to track, and even harder to objectively measure. What is clear however is that there are significant advances which can be made by training and retaining the next generation of research talent.

**The case study provided by Imperial College London demonstrates how the research outputs of students are pushing the frontiers of knowledge and how their impacts are supporting other researchers.**

## Imperial College London

### Developing the next generation of research talent

Anezka Klustová is a PhD candidate from Czechia in the Department of Physics at Imperial College London and currently holds an Imperial President’s PhD Scholarship. Her PhD research is in experimental physics and the study of the subatomic particles, called neutrinos. The study of neutrinos is key to understanding why the world exists, providing insights into how matter evolved from simple particles to everything around us.

Ms Klustová’s work focuses on accelerator-based experiments which are used to study how neutrinos interact with atoms. A key challenge of accelerator-based experiments is the large, systematic uncertainty of measurements, and her research looks to develop new analysis and detector technology to solve this problem. She has conducted several of the world’s first experiments of their kind in neutrino science and has led teams developing new technology for detectors to create measurements of individual particles, crucial to increasing the certainty of measurements.

Ms Klustová was the designated ‘detector expert’ when testing an internationally-developed detector prototype in the US, responsible for ensuring that the detector itself was functional. She has also led parts of the vital data preservation efforts of experimental findings so that data are available for future analyses.

<sup>13</sup> <https://assets.publishing.service.gov.uk/media/628cd2828fa8f55615524e8c/international-comparison-uk-research-base-2022-accompanying-note.pdf>



# Powering UK research programmes

**Universities simply could not run many of their PhD programmes without international PGR students' input. One participant in the workshops said that international PGR students "power the engine" of their academic efforts at this level, particularly in STEM subjects.**

The combination of stable numbers, the careful allocations of national funding for international PGR students, and the highly specialised nature of PGR study makes it highly unlikely that international PGR students are taking places to the disadvantage of home students. Given the concentration of international PGR students in programmes like economics, a reduction in international PGR students would only reduce the potential supply of future teachers and researchers. The impact of this would be to constrain capacity for all students. Of course, given the importance of PGR students to the wider research base this does not mean there should not be deliberate efforts to expand the domestic PGR pipeline.

One key piece of feedback from workshop participants is that often the highly specialised nature of PhD study means that there are relatively few students able to fulfil the technical needs of the programme. It is not like with undergraduate study where students undertake broad programmes that allow for specialisation later. At this level specialisation is inherent within the programme.

This means that in order to find students that have the background, expertise, and capacity to act as research collaborators universities need access to the widest field of students possible. Providers told us that these students also bring "new ways of thinking"<sup>14</sup> where their overseas academic training differs from that of a traditional UK programme. This exchange contributes to the evaluation, development, and iteration of ideas, which improves the whole of academia.

It is therefore important that we consider these students not as passive recipients of knowledge but as providing additional value in as an intrinsic part of their study programmes. There is little research on how their influence has changed pedagogies and research approaches over time. To develop talent pipelines it would be useful to understand the extent to which changing academic approaches within PhD disciplines meet the expectations of home and international students.

The data shows that international PGR students accounted for around 40% all postgraduate research students in 2022/23<sup>15</sup>.

Given these numbers it is reasonable to assume that programmes would be smaller without international PGR participation. In addition, our research suggests that international PGR students are providing new insights and technical capacity. The ability of international PGR students to contribute to the research of UK universities is, by proxy, a benefit for the UK's ecosystem overall. There would be no means of achieving the UK's global science ambitions without the contributions of these students.

It is difficult to prove a causality between strength of research and density of international PGR recruitment, but it is worth noting that international PGR students cluster in high performing research institutions. The number of international PGR students within specific disciplines inevitably means they play a significant role as researchers and collaborators, and the UK is incubating its future potential research workforce through both funding and teaching these students.

<sup>14</sup> Workshop participant

<sup>15</sup> <https://www.hesa.ac.uk/data-and-analysis/students/where-from>

# International PGR student contributions to the UK's soft power

*"[...]there is one incontrovertible benefit of hosting international students that has taken on a new urgency in recent years – that of soft power. The socio-political and environmental instability around the world with the stark realities of climate change, terrorism, human rights violations, and regime change, intensified by divisive politics and 'fake news', create a need like never before for great numbers of highly educated critical thinkers from all cultures and regions<sup>16</sup>."*

**Linda Cowen, Managing Director, Kaplan International Pathways, HEPI (Higher Education Policy Institute)**

International PGR students bring technical capacity, deploy specialist skills as researchers, and their programme clustering aligns with some of the UK's key sectoral strengths. Their contribution should not be viewed as any more or less valuable than their domestic counterparts but complementary within a research ecosystem which relies on a mix of skills, experiences, and talents.

Despite this contribution there has been little mention of international PGR students within government research strategies. The UK's R&D roadmap relies on leveraging international partnerships and expertise. Being a global science superpower relies on building new partnerships, companies, and collaborations, and a research security agenda predicated on the idea of ever closer international ties. These expressions of soft power, exerting influencing through cooperation rather than coercion, are expressed both institutionally and through the simple fact that international PGR students are highly mobile. It is a missed opportunity by government not to nurture these impacts more deliberately<sup>17</sup>.

Universities frame the work of their international PGR students as part of their wider global academic effort. It is not just that these students are important by virtue of being international students, they also facilitate broader international exchange.

For example, the **University of Exeter** uses PhD partnerships to advance its research on global sustainability:

*"Exeter has cultivated strategic international partnerships with the University of Queensland (QUEX Institute) focusing on global sustainability and wellbeing issues, the Chinese University of Hong Kong (CUHK-UoE Joint Centre for Environmental Sustainability and Resilience) with co-funded PhDs and postdoctoral opportunities, and Tsinghua University, including a joint Chair focused on area studies. We are members of the Venice International University consortium and fund partnerships with Duke University and the Universities of British Columbia and Geneva. We have bilateral MoUs with funding agencies and research institutes in Colombia (Colciencias and Humboldt Institute) and Brazil (FAPESP) to develop international programmes of research, teaching and academic mobility<sup>18</sup>."*

The UK's wider research and innovation ambitions would be significantly undermined without international PGR students. The UK as a global science superpower is dependent on international collaboration. We have seen significant evidence of international PGR students building new partnerships, working as part of consortia, and projecting the UK's power abroad.

For example, as part of its submission to the 2018 Migration Advisory Committee on international students, the University of Cambridge shared a case study of a student who completed his PhD in Public Health and Primary Care and became the first Gates Cambridge Scholar to be awarded the Bill Gates Senior Prize. This student went on to be the joint Principal Investigator on CAPABLE (Cambridge Programme to Assist Bangladesh in Lifestyle and Environmental risk reduction), which will enable the establishment of a 100,000-person cohort study across Bangladesh to study long-term health<sup>19</sup>.

In short, the UK's research and innovation ambitions rely on the UK being viewed as a reliable partner for collaborators. The ability for the UK to project its global research strength is supported by the work of international PGR students.

<sup>16</sup> <https://www.hepi.ac.uk/2021/09/15/the-soft-power-benefits-from-international-students-are-now-more-important-than-ever/#:~:text=Yet%2C%20there%20is%20one%20incontrovertible,years%20%E2%80%93%20that%20of%20soft%20power>

<sup>17</sup> <https://www.exeter.ac.uk/global/quex/>

<sup>18</sup> <https://www.exeter.ac.uk/global/quex/>

<sup>19</sup> <https://www.gov.uk/government/publications/migration-advisory-committee-mac-report-international-students>

REF case studies also point toward PGR students as key in fostering cultural relationships. There are several examples using REF evidence of universities considering their PGR offer as a form of partnership building:

- The **University of St Andrews** is a member of **Una Europa** which involves dual supervision of PhDs with international partners: “[a] unique European doctoral programme in Cultural Heritage, offered and created by eight Una Europa universities. Follow high-quality, innovative and customizable educational materials. Collaborate with numerous renowned Cultural Heritage academics and professionals. Participate in one of international cohorts of doctoral candidates and in one of Una Europa’s transnational research teams in Cultural Heritage. Develop your profile for working in a European and international environment in relation to Cultural Heritage<sup>20</sup>.”
- The **University of Ulster** explicitly recognised the importance of cultivating this cohort in their REF environment statement: “Ulster had a step change in 2017 with the establishment of a Doctoral College to oversee our postgraduate research degree provision, ensuring a rich, vibrant environment with a particular emphasis on cultivating innovative interdisciplinary research and internationalisation. We have PhD researchers from 35 countries across 5 continents<sup>21</sup>.”

While international PGR students continue to project the UK’s soft power abroad they also bring their international experiences to our campuses while promoting internationalisation of higher education more broadly<sup>22</sup>. For example, Tian and Wang have considered that intra-cultural teaching of UK students by international PGR students opens up new cultural “third-spaces” within the classroom<sup>23</sup>. Sin and Shartner have highlighted the centrality of international PGR students to forming informal care networks on campus<sup>24</sup>. And Arshad et al have highlighted the role of these students in mentoring and intercultural community building<sup>25</sup>.

<sup>20</sup> <https://www.una-europa.eu/study/una-her-doc>

<sup>21</sup> <https://results2021.ref.ac.uk/environment>

<sup>22</sup> <https://journals.studentengagement.org.uk/index.php/gtateach/article/view/1195>

<sup>23</sup> <https://journals.warwick.ac.uk/index.php/jppp/article/view/1479/1149>

<sup>24</sup> <https://ojed.org/index.php/jis/article/view/5544/2773>

<sup>25</sup> <https://www.tandfonline.com/doi/full/10.1080/14703297.2022.2141292>

# Barriers to excellence

## Constraints on the contribution of international PGR students to the UK's research and innovation base

The evidence to date suggests that international PGR students are making overwhelmingly positive contributions to the UK's research base. Aside from direct academic contributions they are bringing vital skills to programmes, working as collaborators in research, fulfilling government research policy objectives, and projecting the UK's research strengths around the globe while bringing global insight to the UK.

At the centre of our findings is a stark realisation that we know very little about the contribution of international PGR students to the UK's research and innovation base. When we do hear about international PGR students it is often in defence of their right to study and work in the UK or in discussions of research security and collaboration.

There is no doubt around the importance of these students. There is little evidence of significant negative externalities in their recruitment, but there has never been sufficient policy alignment, regulatory interventions, or incentives to understand their experiences. This knowledge gap is damaging because it prevents policy makers from tackling important questions on how best to incentivise their contributions, how the visa policies can strike the right balance between longevity of stay and immediate contribution, and what the correct incentives are to encourage these students in and out of the labour market.

### Attracting high talent individuals to the UK

Funding can be used to effectively attract, upskill, and retain highly talented researchers, both domestically and internationally.

Emily Chung is an ESRC funded PhD student in the Faculty of History at the University of Cambridge. Her research develops digital humanities tools to map the relationship between urbanization and social divisions in Victorian Manchester, exploring the origins of policy-driven spatial planning and inequality.

Having previously studied Architecture California Polytechnic State University in San Luis Obispo, she applied successfully for a 1+3 DTP programme in Economic and Social History.

During her first year of the programme, she was awarded the Ellen McArthur Prize for the best MPhil dissertation in economic history. She is now completing her PhD programme at the University.

Case Study





While both the International Education Strategy<sup>26</sup> and R&D Roadmap<sup>27</sup> mention the liberalisation of visa routes as a means of attracting and retaining these students this is likely insufficient on its own without a more rounded understanding of their work. Additional barriers to the success of international PGR students includes:

## Funding

Put simply there is a consistent demand for PGR places and a finite amount of funding. This means that providers and funders cannot fund every student that wishes to undertake a PGR programme.

**The case study above (page 20) provided by the University of Cambridge demonstrates how targeted funding can support the attraction of talented students to the UK.**

## Costs

International PGR students face a range of costs. There are costs to pay in the application for a visa and the Immigration Health Surcharge. From time to time some programmes will charge an “additional fee element” also known as bench fees. These are consumables used in the course of studies but don’t include visa costs. Providers will also often charge higher fees for international PGR students. Research by the Royal Society demonstrates that the UK has the highest up front visa costs of 17 comparable leading research nations<sup>28</sup>.

## Visas

Most visas allow international PGR students to work for up to 20 hours per week during term time. Some workshop participants had concerns that restrictions prevent students from undertaking some forms of placements as part of their studies. Currently, the Graduate Route visa allows students to work for two years after graduation, however this increases to three years for students with a PhD.

## Policy landscape

There has been significant coverage of how wider policy measures and political rhetoric add to the “hostile environment” toward international students<sup>29</sup>. During the workshops we heard from universities that believed this wider rhetoric coupled with previously mooted visa reforms is deterring some international PGR students from coming to the UK.

Our recommendations therefore consider how to maximise the contribution of international PGR students against this backdrop.

<sup>26</sup> [https://assets.publishing.service.gov.uk/media/5ccab348e5274a1ac5ce280c/International\\_Education\\_Strategy\\_Accessible.pdf](https://assets.publishing.service.gov.uk/media/5ccab348e5274a1ac5ce280c/International_Education_Strategy_Accessible.pdf)

<sup>27</sup> [https://assets.publishing.service.gov.uk/media/5efb9799e90e075c59a7b3f9/UK\\_Research\\_and\\_Development\\_Roadmap.pdf](https://assets.publishing.service.gov.uk/media/5efb9799e90e075c59a7b3f9/UK_Research_and_Development_Roadmap.pdf)

<sup>28</sup> [royalsociety.org/-/media/policy/publications/2024/summary-of-visa-costs-analysis-2024.pdf](https://royalsociety.org/-/media/policy/publications/2024/summary-of-visa-costs-analysis-2024.pdf)

<sup>29</sup> For example: <https://www.theguardian.com/commentisfree/2023/may/28/international-students-government-migrant-suella-braverman>

# Recommendations

The contribution of international PGR students to the UK's research and innovation base is significant. Simply, the UK research ecosystem could not function without their contribution as collaborators, researchers, and teachers. At the moment this group of students fall unhappily between policy regulation as students, the UK's global science ambitions, and interventions on research culture and support. Currently, international PGR students' centrality to the UK research and innovation landscape is not reflected in the wider policy debate.

This work initially emerged from UKRI's A New Deal for Postgraduate Research which committed UKRI to commissioning "research from Universities UK International to assess the contribution of international PGR students to the UK science and research base, which consists of a bibliometric analysis of the contribution of international PGR students to the UK science and research base in terms of scientific output, impact."

Our findings have gone beyond this initial brief to build a rich picture of the wider research impacts of international PGR students. Our recommendations align with the New Deal's pledge to "Make the UK the most attractive destination for talented people and teams from around the world," and focus on the practical things that can be done to meet this ambition.

## Coordinating effort

**1** The government should convene a time-limited expert group to consider how to maximise the impact of international PGR students within current government science ambitions.

Our research found that policies on funding restrictions on international PGR recruitment and political desire to reduce immigration is impacting confidence in recruiting these students, and there is no stated objective on how to get the most impact from this cohort.

A single strategy for international PGR students could potentially further the sense that they are separate from the wider research landscape. Instead, we would encourage government and the higher education sector, to convene a time-limited group to consider how to maximise the impact of international PGR students within current government science ambitions. This groups finding should be integrated into a refreshed international education strategy.

This should include a consideration of the support for these students, their funding and institutional support, data expectations, and shared ambitions for cataloguing and growing their impact.

## Data collection

**2** Universities should update their systems to collect international PGR student outputs and publishers should investigate whether routinely categorising their outputs is practical or possible.

The data collection by universities on the impacts of their international PGR students is mixed. Some universities are systematically recording the academic impacts of their international PGR students including their number of publications, their collaborators, and the nature of these publications.

Other institutions are not recording this impact at all. This is partially because impacts often occur once a student graduates, partially because regulators don't mandate it and partially because the REF does not allow for PGR students to be submitted. It is also because the number of international PGR students is much smaller than equivalent student cohorts and therefore attract less resource. Given that funders also do not centrally account for the academic impacts of internal PGR students it is therefore challenging to develop policy, defend their impact, or suggest appropriate funding interventions to deepen their impact.

In some institutions we saw libraries take a central role in adding data fields to their own repositories to add a specific field for "international students" when articles are published.

Universities should consider their data collation policies and whether a few tweaks to existing systems would allow them to understand the quantity of international PGR students' academic impact more effectively.

## Alumni schemes

**3** Universities should establish international PGR alumni schemes as a means of further benefitting from the insights of this group and routinely collating case studies.

One of the most persuasive forms of evidence for this report has been the stories provided by international PGR alumni on their experiences of study and life in the UK.

These stories are not systematically collected or compiled, and we suspect that there is a wealth of knowledge that is currently being lost by a group of students that have good labour market outcomes and project the benefits of a UK education to the world.

Our research found that international PGR students play a role in projecting UK research strengths across the globe and this is a significant contribution. However, evidence is patchy and in turn it is likely that their full impact as global ambassadors is going unrealised.

To this end we would encourage universities to consider how their alumni programmes can foster further engagement and recruitment of international PGR students. Part of this work should be to collect case studies to continually promote their value. These stories can then be shared with the likes of UUKi to promote policy interventions. This could also form part of the ongoing #WeAreInternational campaign.

## Graduate contributions

### **4** UUKi should work with the sector to ensure international PGR student outcomes are captured on a more comprehensive basis.

Methods that rely on data primarily collated within the UK are likely to yield mixed results as many international PGR students return to their home countries after study.

Our research shows that the contribution of international PGR students to the UK's research and innovation ecosystem is ongoing post-study but poorly understood. This presents a challenge in articulating how the UK should nurture their talents, how employers can benefit from their skills, and how funders should best encourage their ongoing contribution to the UK research and innovation base.

Unless we can effectively capture what this cohort is doing, it is more challenging to promote their value and advocate for policy measures that improve the recruitment, retention, and employment, of these students.

UUKi should work with the sector to ensure international PGR student outcomes are captured on a more comprehensive basis. This should, in the first instance, focus on ways to increase response rate of existing surveys, such as the Jisc / HESA's Graduate Outcomes survey, to help improve our collective understanding of international PGR students' graduate outcomes.

## Visa policies during study

### **5** The government should review the practicalities of an exemption to working time limits where an international PGR student is employed by their own university in a role adjacent to their study.

Generally, international PGRs are limited to working a maximum of 20 hours per week depending on the nature of the work. During workshops with a range of universities

it was mentioned that visa policies can be overly restrictive to employing students within the university in roles adjacent to their studies.

Our research found that current visa policy limits the contribution of international PGR students as research collaborators.

The intention of the work restrictions on the study visa is not to discourage international PGR students from developing professional skills but the impact is that it limits the time these students can spend doing work like lab assistants.

It would be worthwhile for policy makers to consider

**6** whether an exemption on working time where a PGR student is working for a university would be appropriate, and whether this would allow for these students to contribute even further to the academic outputs of their institutions.

### **7** Post study work visa policy

**The government should continually review whether the post-study visa landscape is internationally competitive and effectively retaining international PGR students.**

**Government should collate more detailed visa data including which qualifications students obtaining Graduate route visas have achieved.**

The current Graduate visa route allows international PhD students to stay in the UK for up to three years after their study<sup>29</sup> at which point they must switch to another visa such as a Skilled Worker visa where a student will be expected to earn either £38,700 per year for their role or the going rate, whichever is higher<sup>30</sup>.

There is a discount on required earnings where a role requires a PhD. For example, a chemical scientist need only earn around £30,960 per annum, depending on the nature of their role<sup>31</sup>.

Given the UK is in a global race for talent the government should continually review whether salary thresholds are a barrier to retaining international PGR students in the UK. Forming this evidence base also requires the government analysing which students are obtaining which visas.

<sup>30</sup> <https://www.gov.uk/graduate-visa>

<sup>31</sup> <https://www.gov.uk/skilled-worker-visa/your-job>

<sup>32</sup> <https://www.gov.uk/government/publications/skilled-worker-visa-jobs-that-qualify-for-a-phd-salary-discount/skilled-worker-visa-jobs-that-qualify-for-a-phd-salary-discount#:~:text=if%20your%20job%20is%20eligible,the%20Health%20and%20Care%20visa>

## Competition

- 8** Government should urgently review whether the collation of incidental costs to study, and mandated up front payments, including visa fees and the Immigration Health Surcharge are inhibiting the attraction of international PGR students.
- 9** Universities should consider whether their own pricing strategies are aligned to their wider objectives of attracting and retaining international PGR students as collaborators and researchers.

There is a global race for international PGR talent. These are students that are in high demand and often bring new skills, insights, and sometimes funding.

Workshop participants shared evidence that the increasing incidental costs to study are a barrier to attracting international PGR students. This is in line with concerns for other international students.

We also found that many universities either peg their international PGR fees to those of their undergraduate international cohorts or calculate them as a multiplier of home PGR fees. Universities should consider whether a more dynamic pricing model might attract more students and in doing so achieve wider research objectives or longer-term financial objectives through collaborations, IP and business creation, or the attraction of funding. Bench fees should also be reviewed as part of this exercise.



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# Contributors



## Universities UK International

### About

#### Universities UK International

Universities UK International (UUKi) represents UK higher education institutions (HEIs) globally and helps them flourish internationally. To do this we actively promote UK HEIs abroad, provide trusted information for and about them, and create new opportunities through our unique ability to act at sector level. We draw on UK university expertise to influence policy in the UK and overseas, delivering information, advice and guidance to facilitate mutually beneficial collaboration between UK HEIs and a broad range of international partners.

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## UK Research and Innovation

### About

#### UK Research and Innovation

Launched in April 2018, UK Research and Innovation (UKRI) is a non-departmental public body sponsored by the Department for Science, Innovation and Technology (DSIT). As the UK's largest public funder of research and innovation it is our responsibility to ensure the health of the system as a whole, now and in the future.

Our vision is for an outstanding research and innovation system in the UK that gives everyone the opportunity to contribute and to benefit, enriching lives locally, nationally and internationally. Our mission is to convene, catalyse and invest in close collaboration with others to build a thriving, inclusive research and innovation system that connects discovery to prosperity and public good.

Read about our long-term, high-level priorities for how we will deliver our vision for an outstanding research and innovation system in our first five-year [strategy: transforming tomorrow together](#).



### About

#### CounterCulture

CounterCulture is a specialist firm with deep expertise in higher education.

We provide rigorous policy analysis specialising in research, innovation, and broader education policy, coupled with a full suite of professional services in governance, legal, finance, and broader advisory work. There are few organisations working in education who can bring together an intimate knowledge of the higher education sector with the vision of a future to drive lasting organisational change.

Our education work is led by [James Coe](#). James is a renowned expert in higher education policy, he is the author of [The New University Local Solutions to a Global Crisis](#), the Associate Editor for Research and Innovation at [Wonkhe](#), and the former Head of Sustainability, Policy, and Civic Engagement at the University of Liverpool.



### About

#### Public First

Public First is a policy, research, opinion and strategy consultancy. We work with global companies, governments, start ups, institutions and foundations around the world to tackle major public policy and strategic challenges.



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