

UK research and
the European Union
People

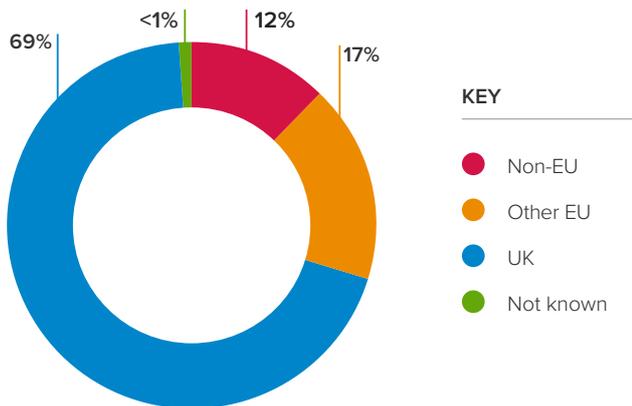
June 2018

UK researchers are from around the world

Research and innovation is increasingly global. The UK's reputation for excellence attracts people from around the world, and allows it to compete with other scientifically excellent nations for international talent.

FIGURE 1

Where do academic researchers working in the UK come from?



Source: Higher Education Statistics Agency. 2017 Staff numbers and characteristics. See <https://www.hesa.ac.uk/data-and-analysis/staff> (accessed 14 March 2018). Figures include academic staff with functions in research, in teaching or neither. Numbers are rounded.

It is difficult to gather clear and comprehensive data on the mobility of researchers working in industry but anecdotally we know that many companies value the opportunity to recruit staff from UK universities, which themselves offer a highly international pool of researchers³.

“We are a very much integrated company, and the smooth movement of people, goods and services is really important for us, across Europe and around the rest of the world⁴.”

Katherine Bennett
Senior Vice President, Airbus

Professional motivations are the main drivers for researchers choosing to move internationally¹.

Europe is home to world-class research, and researchers come from all over the world to collaborate with researchers that are based here and to use European scientific infrastructure. Elite scientists are drawn to research excellence⁵.

The number of academic staff from other EU countries in UK higher education institutions².



29% of academic staff in UK universities are non-UK nationals, with 17% coming from other EU countries and 12% from the rest of the world⁶.

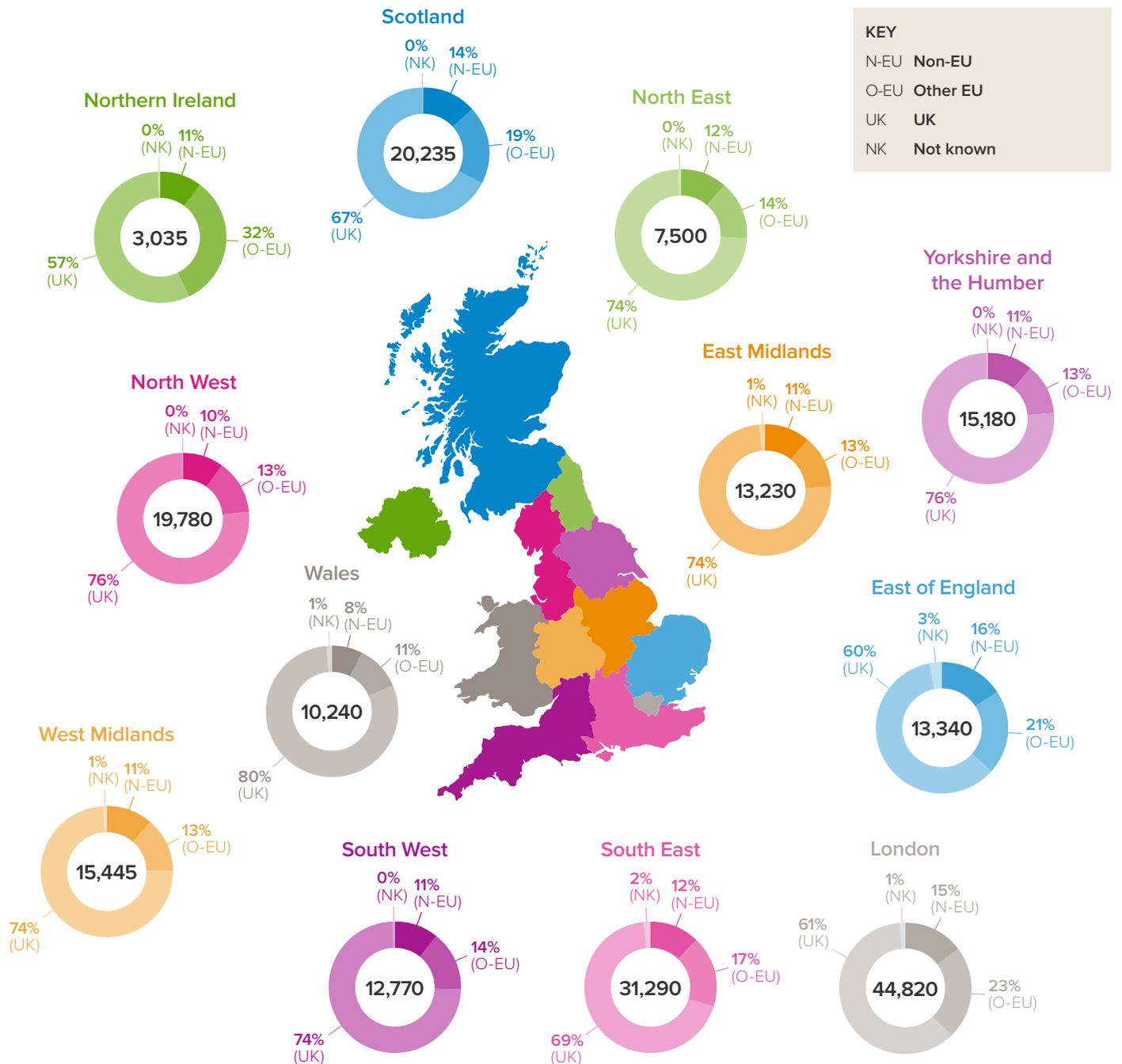
1. RAND Europe. 2017 International mobility of researchers: A survey of researchers in the UK.
2. Higher Education Statistics Agency via Heidi Plus. See <https://heidiplus.hesa.ac.uk> (accessed 26 October 2017). Further details available in the Royal Society submission to the Migration Advisory Committee Call for Evidence on EEA workers in the UK labour market, para 8.
3. RAND Europe. 2017 International mobility of researchers: Supplementary report: Perspectives from industry. See <https://royalsociety.org/topics-policy/projects/international-researcher-mobility/international-mobility-researchers-industry/> (accessed 29 March 2018).
4. Business, Energy and Industrial Strategy Select Committee. *Leaving the EU: implications for the aerospace industry*, 21 November 2017, HC 380. Oral evidence, Q6.
5. RAND Europe. 2017 International mobility of researchers: A survey of researchers in the UK.
6. Higher Education Statistics Agency. 2017 Staff numbers and characteristics. See <https://www.hesa.ac.uk/data-and-analysis/staff> (accessed 14 March 2018). Figures include academic staff with functions in research, in teaching or neither. Numbers are rounded.

The proportion of researchers from outside the UK varies across regions

Changes to the UK's migration policy may impact on the mobility of researchers from overseas. Academic research institutions with a higher proportion of overseas staff will be more sensitive to these changes.

FIGURE 3

Where do academic researchers working in each UK region come from?



Source: Higher Education Statistics Agency. 2017 Staff numbers and characteristics. Figures include academic staff with functions in research, in teaching or neither. (see <https://www.hesa.ac.uk/data-and-analysis/staff> accessed 14 March 2018). Numbers are rounded and figures inside circles refer to total number of researchers in the region.

Researchers often move around throughout their careers

The ability to move is important for researchers seeking to develop their career, or work with others around the world.

72% of active UK researchers have trained or worked as researchers abroad⁷.

38% of UK doctoral students take up a position in another country after completing their training⁹.

More than half (58%) of the Fellows and grant recipients of the National Academies have spent a sustained period of a year or more working abroad.

79% of researchers agree that there is an expectation of international mobility in the research community¹⁰.

91% of National Academy Fellows and grant holders report that mobility was very important to their careers⁸.

Highly-mobile researchers publish research articles with citation rates about **40% higher** than non-mobile ones¹¹.

7. RAND Europe. 2017 International mobility of researchers: A review of the literature.

8. Opinion Leader. 2017 The role of international collaboration and mobility in research: Findings from a qualitative and quantitative study with Fellows and grant recipients of the Royal Society, British Academy, Royal Academy of Engineering and the Academy of Medical Sciences.

9. Zubieta Ana. 2009 Recognition and weak ties: is there a positive effect of postdoctoral position on academic performance and career development? Res Eval **18**, 105–15. doi:10.3152/095820209X443446

10. RAND Europe. 2017 International mobility of researchers: A survey of researchers in the UK.

11. Nature. 2017 Scientists have most impact when they're free to move. See <http://www.nature.com/news/scientists-have-most-impact-when-they-free-to-move-1.22730> (accessed 17 April 2018).

International mobility – Dr Marina Petri



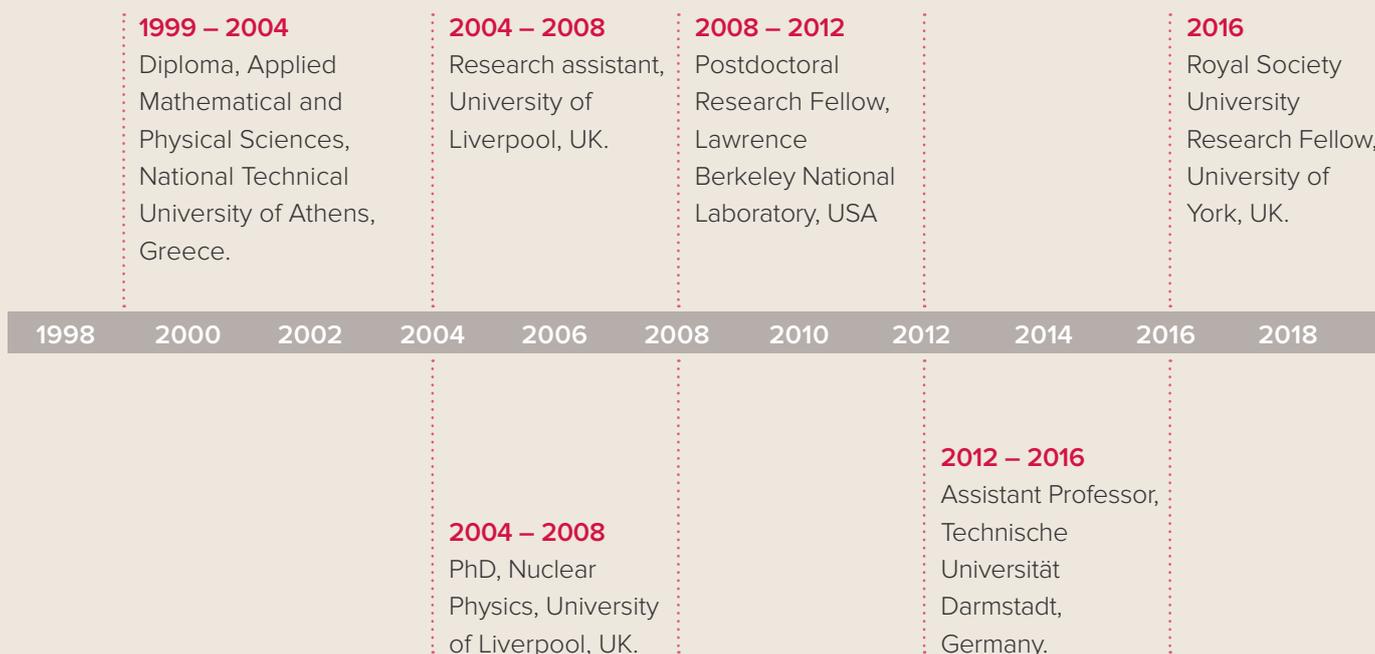
Dr Marina Petri is a nuclear physicist who was born in Greece but built her research career across Greece, the UK, the USA and Germany before returning to the UK in 2016 to take up a Royal Society University Research

“Mobility is the best way to develop new collaborations and join different research groups. I was lucky to have experienced this first hand. Every move I made represented career development. Mobility is being appreciated by employers as an asset and this is reflected in my career trajectory. I now have a strong international network of collaborators across America, Europe, Asia, and Africa.”

Fellowship at the University of York; “I moved countries to gain experience, widen my knowledge of the subject I am working on, be exposed to different working cultures, build my international scientific network, and challenge myself. Moving between countries and research groups throughout my career, I learned not to be afraid of change and to always be ready to adapt in new environments.”

To read about more UK-based researchers who have moved throughout their careers, visit royalsociety.org/topics-policy/projects/international-researcher-mobility/international-mobility-case-studies

Career timeline

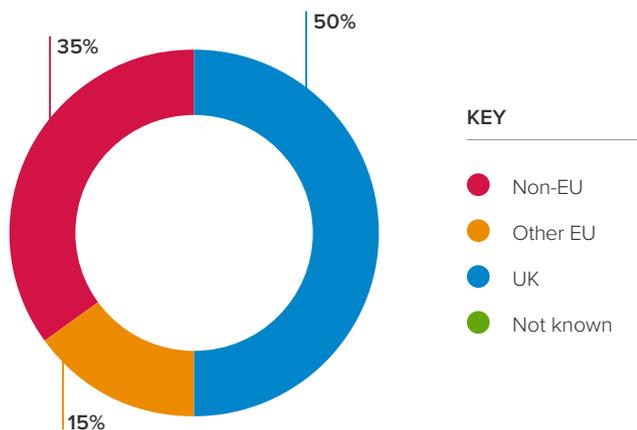


The UK's research workforce includes people with lots of different skills

Strategically valuable individuals include not just successful leaders in research fields, but the early-stage researchers, technologists and technicians with specialist expertise that support them, and the students that learn from and work with them. Mobility is important for all of these people.

FIGURE 4

Where do postgraduate researchers in the UK come from?



Source: Higher Education Statistics Agency. 2016-17 Where do HE students come from? See <https://www.hesa.ac.uk/data-and-analysis/students/> (accessed 20 August 2018). Postgraduate researchers include students undertaking research masters' and PhDs full-time. Part-time students are not included. Numbers are rounded.

International students are worth **£25 billion** to the UK economy per year¹².

Over half of UK postgraduate research students – a key part of the UK's research workforce – come from overseas¹³.

"At my institute, we recruit researchers and technicians at all levels from across the world. Our success is built not only on their diverse contributions while working at SLCU, but also on the international networks they bring with them and continue to help us to build after they leave."

Professor Ottoline Leyser DBE FRS

Director of the Sainsbury Laboratory,
University of Cambridge

CASE STUDY 2

Maria Pakendorf – Research technician



Maria is a research technician in the Department for Biomedical Science at the University of Sheffield in the research group of Professor Walter Marcotti, who is funded by The Wellcome Trust to conduct research into

hearing loss. Maria came to the University after completing an MSc and MPhil at the University of Leicester. Prior to this she completed her undergraduate studies at the University of Leipzig in Germany. She is part of a large group of

researchers (PhD students and postdoctoral researchers) who are mostly experienced in electrophysiological techniques. Maria is the only person with molecular biology experience, and this is critical to all of the research group. Maria is training the other researchers in the technique of polymerase chain reaction (PCR), and also carries out individual research projects to investigate new areas of interest and feasibility studies.

This case study was produced by the University of Sheffield who kindly shared it for this document. To read more, visit <https://www.sheffield.ac.uk/staff/spotlight/stories>

12. Universities UK. 2017 The Economic Impact of International Students. <http://www.universitiesuk.ac.uk/policy-and-analysis/reports/Documents/2017/briefing-economic-impact-international-students.pdf> (accessed 29 March 2018).

13. Higher Education Statistics Agency via Heidi Plus. See <https://heidiplus.hesa.ac.uk> (accessed 02 March 2018). Postgraduate researchers include students undertaking research masters' and PhDs full-time. Part-time students are not included. Numbers are rounded.

Researchers, innovators and entrepreneurs from overseas travel to and work in the UK in many different ways

People with in-demand skills may choose to come and work for long periods or settle in the UK. Others come to develop their career and may choose to take part in exchanges, studentships or secondments based in the UK. In other

cases, people may make short visits to meet collaborators, deliver lectures, attend conferences, or make use of equipment or research infrastructure that is in the UK in the course of their day-to-day work.

5,736 researchers from other EU countries worked in the UK between 2007 and 2013, funded through EU Marie Skłodowska-Curie Actions¹⁴.

International travel enables more international collaboration. **86%** of National Academy Fellows and grant holders consider international travel essential to research as a whole¹⁵.

CASE STUDY 3

Dr Lucas Edelman

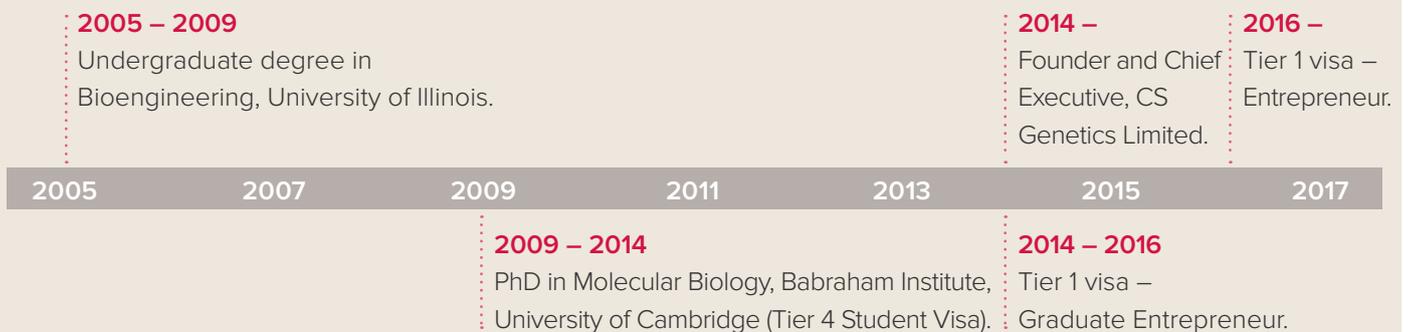


Lucas Edelman is a molecular biologist from Chicago, United States, who came to the UK as a student and is now an entrepreneur. After his undergraduate degree in Biological Engineering in Illinois, Lucas decided to move to the UK

in 2009 to study for a PhD in Molecular Biology at the University of Cambridge. “I came here for reasons both personal and academic – my PhD project was engaging, but I also liked the adventure of living in a new place.”

Encouraged by a growing genomics sector in the UK, Lucas decided to stay in Cambridge after the PhD in 2014 to found his own company, CS Genetics. His start-up is developing a new ‘molecular indexing’ technology using DNA sequencing that has led to a new type of diagnostic test for cancer and other diseases. “As an entrepreneur with some ferocious global competitors, I need to base my business in the best, most supportive place in the world – or close to it. The UK has sensible visa schemes for entrepreneurs; this is important, but rarely a decisive factor. I need as many advantages as possible to compete in the global marketplace, particularly with sophisticated, well-capitalised American firms.”

Career timeline



14. Avramov D. 2015 PEOPLE Specific Programme (2007-2013): Rationale, Implementation and Achievements (FP7 Ex-Post Evaluation), European Commission, Directorate General for Research and Innovation.

15. Opinion Leader. 2017 The role of international collaboration and mobility in research: Findings from a qualitative and quantitative study with Fellows and grant recipients of the Royal Society, British Academy, Royal Academy of Engineering and the Academy of Medical Sciences.

Perceptions are important. Choosing where to live and work is a personal decision as well as a professional choice.

Nearly three-quarters of the British public would like to see the same number or more international students coming to study in the UK¹⁶.

Professional drivers are more important to men and to early career researchers. Women and more senior researchers are more likely to consider a mix of personal and professional factors, although professional drivers remain important¹⁷.

Scientists are more likely to move between countries which are geographically closer, socioeconomically similar and have comparable scientific cultures, placing a similar importance and funding on R&D¹⁸.



“The UK has always been an open country and it is one of the reasons our research community has thrived. The vast majority of the British public remain happy to accept skilled immigration, from Europe and elsewhere.

However, this is not always how the UK is perceived today. We need to make sure that a strong and consistent message is sent that we will continue to remain open to talent from around the world, or we risk pushing highly sought after researchers away from the UK¹⁹.”

Sir Venki Ramakrishnan
President of the Royal Society

16. ComRes. 2017 Poll: public views on international students. See <http://www.universitiesuk.ac.uk/news/Documents/comres-poll-public-views-international-students.pdf> (accessed 29 March 2018).
17. RAND Europe. 2017 *International mobility of researchers: A survey of researchers in the UK*.
18. Appelt S *et al.* 2015 Which factors influence the international mobility of research scientists? OECD Science Technology and Industry Working Papers <http://dx.doi.org/10.1787/5js1tmrr2233-en>
19. Sir Venki Ramakrishnan refers to a poll by New Scientist published on 4 April. See <https://www.newscientist.com/article/mg23731720-800-brexit-batters-science-job-market/> (accessed 17 April 2018).

We all benefit from highly mobile researchers choosing to come and work in the UK.

International researchers choosing to work in the UK help upskill our workforce, sharing knowledge and ideas. They also benefit their source countries by continuing to collaborate with them and, for those that choose to return, bring back skills, knowledge and networks²⁰.

In 2016, **117** highly prestigious European Research Council grants were awarded to researchers who would work in the UK, contributing to the strength of the UK's research base. **72** of these grantees were from outside the UK²¹.

40% of researchers based away from their home country report on-going research collaborations with researchers in their country of origin²³.

UK research benefits from the immigration of top foreign researchers to the UK. These include several Nobel Prize winners, such as Russian-born physicists Sir Andre Geim FRS and Sir Konstantin Novoselov FRS, rewarded for their work on graphene.

Among engineering, science, and hi-tech firms, **nearly half (44%)** report difficulties in finding experienced recruits with the right STEM skills, particularly high-level STEM skills²⁴. The research system plays a key role in training skilled people in the UK to fill these skills shortages.

Three of **the last five** Presidents of the Royal Society were born abroad.

The US and UK are key destinations for top scientists²⁵.

A snapshot of **135** of the UK's research infrastructures found that they employ a high proportion of non-UK EU nationals²².

20. RAND Europe. 2017 International mobility of researchers: a review of the literature.

21. European Research Council. 2016. ERC Consolidator Grants 2016 Outcome: Indicative Statistics and ERC Starting Grants 2016 Outcome: Indicative Statistics.

22. Royal Society. 2018 A snapshot of UK research infrastructures. Note: the survey found that a total of 32% of staff at UK research infrastructures come from overseas, 23% of whom are from other EU/EEA countries. This compares to 17% of academic staff in UK universities coming from other EU countries.

23. Scellato G, Franzoni C, Stephan R. 2014 Migrant Scientists and International Networks. *Research Policy* **44**, 108–20. (doi:10.1016/j.respol.2014.07.014)

24. Confederation of British Industry. 2015 Inspiring Growth: CBI/Pearson education and skills survey 2015.

25. *Ibid.* note 20.

the 1990s, the number of people with diabetes has increased in all industrialized countries. In the Netherlands, the prevalence of diabetes is estimated to be 6.5% in 1995, which corresponds to 1.2 million people (1).

Diabetes is a chronic disease, and the long-term consequences of the disease are determined by the degree of glycaemic control. The most serious complications of diabetes are cardiovascular disease, nephropathy, retinopathy, and neuropathy. The prevalence of these complications is directly related to the duration of the disease and the degree of glycaemic control (2).

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