

House of Commons Science and Technology Committee

University of Edinburgh written submission of evidence on the Risks and Opportunities of leaving the EU for Science and Research

Executive Summary

- **The UK's research is genuinely internationally outstanding**
- **Research is an international activity and the talent pool is global**
- **UK research achieves more in collaboration with international partners, including EU partners**
- **The development of UK talent and skills is enriched by the cross-fertilisation of innovative ideas from different countries**
- **Much comes from our partnerships in the European Research Area (ERA)**
- **Leaving the EU therefore poses risks to the quality, impact and benefits from UK research**
- **It also reduces the influence of UK researchers on the EU science agenda**
- **To mitigate these risks and protect these benefits we recommend that UK government prioritises the following:**
 - **remain part of the ERA**
 - **safeguard the research interests of the UK's university sector**
 - **maintain access to programme funding from Horizon 2020, and future Framework Programmes, preferably through full Associate Country status**
 - **Establish a model that allows the crucial free movement of outstanding scientific and other research talent globally, with a sectoral exception to allow international academic staff recruitment as a minimum requirement (expand Tier 1)**
 - **Recognise that recruitment of earlier career researchers (star postdocs) is highly competitive and desirable (most science Nobel Prizes are awarded for work done in 20s and 30s; suggest Tier 1b "emerging science talent" visa scheme)**
 - **maintain the cross-border training/skilling by continued access to Erasmus+**
 - **Early clarity over the rules that will apply to tuition fees and fee loans for EU students**
 - **Assurances on access to the European Investment Bank**

About the University of Edinburgh

1. The University of Edinburgh is a global institution delivering higher education to outstanding students from across the world. We produce impactful, world renowned research including the Higgs boson and Dolly the sheep, and our informatics research has attracted 2 'Unicorns' - billion dollar start-up companies - to Edinburgh. Our research quality contributes to our consistent high placing in international league tables (global top 25 in both QS and THE rankings). At 42%, we have one of the highest numbers of EU and other international students of any UK university.
2. Our most cited research publications are co-authored with colleagues from other countries, as is the case for HE research as a whole¹. This underlines the importance of international collaboration in the production of research of the highest quality and impact. Our main scientific partners are in the EU and North America: over the last decade, 30% of our research outputs

¹ Chapter 5, International Comparative Performance of the UK Research Base – 2013
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/263729/bis-13-1297-international-comparative-performance-of-the-UK-research-base-2013.pdf

over the last decade were co-authored by EEA partners, followed by 18% with the USA. Working with partners in Europe, we have a greater impact than as a single institution. Funding from Horizon 2020 and its predecessors enables these collaborations. Major developing scientific nations such as China and India² are more minor partners despite our intensive efforts to build links.

3. Our international outlook is also illustrated by the number of staff and students we host from EU nations. In 2015, 15% of UK academic staff were from the EU.³ Twenty-five percent (1,600) of Edinburgh's academic staff, 17% (2,400) of all our staff and 14% (4,500) of our students are from the EU. We are also one of the largest participants in Erasmus+, where students gain knowledge about other cultures and societies that enrich their education, employability and contribution to society.

Evidence from the wider UK and EU research base

4. We encourage the Government to recognise the 'primacy of international talent' for the UK's research industry, one of the few areas where the UK is genuinely world-leading, ranked first by field-weighted citation impact. The free movement of research talent across the EU has been specific success for UK research. Evidence includes:
 - i. the EU is the world leader in global share of science researchers (22.2%), ahead of China (19.1%) and the USA (16.7%)⁴
 - ii. the ERA produces a third of the world's research outputs⁵
 - iii. the ERA's scientific critical mass and its collaborative ethos established by successive EU Framework Programmes has enabled scientific talent to combine and recombine without borders. This generates a critical advantage for research, especially for UK research which has been a net beneficiary of EU research funding⁶
 - iv. participation in the EU science programmes has substantially contributed to placing UK science above the US in measures of productivity and quality⁷

In other words, scientists from the EU have helped drive up our research base and its quality and will help the UK economy thrive in the future.

Risks of leaving the EU for UK Science and Research

5. The overarching risks of leaving the EU are that the UK will be a less attractive place for overseas students to study, and that the impact of our research will be diminished. Subordinate risks are that our research quality will be harmed by loss of the influence that our researchers have in shaping the EU's research agenda. The optimal mitigation strategy for risks associated with research is full Associate Country status.

² China (3.5%) and India (1.2%) (Incites – <https://incites.thomsonreuters.com>)

³ Patterns and trends in UK Higher Education, Universities UK, 2015 <http://www.universitiesuk.ac.uk/facts-and-stats/data-and-analysis/Pages/patterns-and-trends-uk-higher-education-2015.aspx>

⁴ Unesco's Science Report, 2015 <https://en.unesco.org/node/252277>

⁵ Comparative Benchmarking of European and US Research Collaboration and Researcher Mobility 2013 http://www.scienceeurope.org/uploads/PublicDocumentsAndSpeeches/SE_and_Elsevier_Report_Final.pdf

⁶ <https://royalsociety.org/~media/policy/projects/eu-uk-funding/uk-membership-of-eu.pdf>

⁷ *The Implications of International Research Collaboration for UK Universities: Research assessment, knowledge capacity and the knowledge economy.* Jonathan Adams and Karen A Gurney, 2016. ISBN: 978-0-9929477-4-3 http://www.international.ac.uk/media/3749507/Digital_Research_Report_Collaboration.pdf

| Risk | Cause | Consequence | Impact | Mitigation |
|---|--|--|--|--|
| The impact and benefit that UK research can have will reduce | <ul style="list-style-type: none"> ◦ Loss of global reputation and influence of UK universities ◦ Loss of opportunities for UK trained scientists ◦ Less high quality advice available to policy makers and businesses ◦ No influence on the H2020 programme and that of future framework programmes ◦ No influence on other aspects of the science agenda such as climate change and agriculture | <ul style="list-style-type: none"> ◦ Reduced ability to make a difference to global threats that require international cooperation ◦ Reduced ability to influence UK policy and practice in matters relating to our local interests, such as social equality and flooding | Could be wide ranging, across any number of policy areas, but includes the development of animal welfare, drug licensing regulation, and carbon accounting ⁸ | <ul style="list-style-type: none"> ◦ Full Associate Country status ◦ Freedom of movement for researchers (expand Tier 1 visas and create “Tier 1b” for postdoctoral early career talent) |
| The quality of our research will be harmed | <ul style="list-style-type: none"> ◦ Fewer excellent researchers from outside the UK can apply to our universities ◦ Fewer international (including EU) universities are willing to collaborate with UK universities and researchers ◦ Less funding is available for UK research from across all disciplines | <ul style="list-style-type: none"> ◦ Loss of global reputation and influence of UK Universities ◦ Loss of opportunities for UK trained scientists ◦ Less high quality advice available to policy makers and businesses | <ul style="list-style-type: none"> ◦ Less benefit from research ◦ Less ability to tackle global problems such as clean energy, aquaculture, food security, ageing populations | |
| The influence of UK researchers on the European research and science agenda, including future Framework Programmes, will be diminished or reduced to zero | <ul style="list-style-type: none"> ◦ No monetary contributions to the H2020 programme ◦ No membership on decision making bodies elsewhere in the EU | <ul style="list-style-type: none"> ◦ No influence on the H2020 programme and future framework programmes ◦ No influence on other aspects of the science agenda such as climate change and agriculture | <ul style="list-style-type: none"> ◦ Future framework programmes will not work in UK interests (even if we continue to pay into these) ◦ Less money for UK science ◦ Less high quality science ◦ Less impact from research on global issues such as climate change, food security, antibiotic resistance | |
| The UK will be a less attractive destination for overseas students | <ul style="list-style-type: none"> ◦ Restrictions on EU freedom of movement include students ◦ Visas available for EU students do not allow post work study ◦ Restrictions on UK immigration in general restrict overseas student numbers | <ul style="list-style-type: none"> ◦ The UK is a less welcoming destination to EU and other overseas students (as has been seen with students from other countries already eg India) ◦ Excellent students choose to study elsewhere ◦ Highly skilled graduates – who might have stayed after their studies - do not consider the UK a viable employment destination | <ul style="list-style-type: none"> ◦ Loss of diversity in UK universities as EU and other overseas student numbers fall ◦ Loss of highly skilled graduates from the UK economy | <ul style="list-style-type: none"> ◦ Remove overseas students from immigration caps ◦ Keep EU students outside immigration caps |

⁸ REF2014 case studies of impacts on EU policy <http://impact.ref.ac.uk/CaseStudies/>

The effect of various models for available for the UK's future relationship with the EU on UK science and research

European Research Area

Priority for negotiation

6. The result of the Brexit vote does not mean that we inevitably leave the ERA.
7. Whatever is decided vis-à-vis the UK's "new relationship" with the EU, it should safeguard the research interests of the UK's research sector, ensuring our continued access to the ERA.

Access to funding

8. Currently 10% of the University's research portfolio comes from EU government. In 2014-15 we received £31.5 million of awards from EU government sources, out of £304.9 million. 99% - £31.2 million - is from the European Commission.
9. We currently have 91 Horizon 2020 projects waiting for results with a potential value to the University of €77.6M. These include prestigious European Research Council Starting and Consolidator Grants, interviews for which have begun in Brussels. The next Horizon 2020 call rounds for Collaborative Projects will begin in September and finish around Easter time. These collaborations that will be feeling pressure from co-ordinators on their willingness to collaborate with the UK, and it is here that we would expect to see most distinctly the indirect effects of Brexit.
10. Our Science and Engineering subjects have the greatest share of our research grants from EU government sources, but other areas including Social and Political Sciences also receive a high proportion of their research funding from EU sources. We will move to diversify funding over the next two years, however the fact remains that these research areas will be hardest hit.
11. Horizon 2020 and Framework Programme funding is generally regarded as more amenable to supporting cutting edge research than other sources of funding available in the UK. Our humanities and social sciences researchers have particularly lauded the opportunities that these funding sources have afforded and there is a perception that other funding mechanisms would not support the breadth and scale of projects with multiple partners, such as one held by our researchers on Strengthening EU Food Chain Security.

Priority for negotiation

12. **Universities continued access to programme funding from Horizon 2020, and future Framework Programmes.** As evidenced above, the UK can achieve more working together with international partners, most notably with the EU countries. We should protect our ability to do this by seeking full Associate Country status. This will give the best return on our investment and be the most efficient in continuing to secure the UK's place as a leading research and innovation nation.
13. Without this, to achieve a similar outcome the UK government would need to commit to replacing this funding with a ring fenced equivalent level of funding and a similar approach to awarding funding. However, even if all displaced H2020 funding is fully replaced and ring fenced, it is possible that UK researchers will still be disadvantaged if industry partners perceive that

their contributions are better leveraged through Horizon 2020, with a consequent net drain of industrial sponsorship from UK universities in favour of their European rivals.

Collaboration

14. Researchers from across the spectrum of disciplines have benefited from collaborations with EU universities. The risks to collaboration are tied to those associated with access to funding. The collaborative approach has a greater impact on global challenges affecting the UK than would be possible from the interventions of a single country. Researchers from the University have been and are partners in collaborations with EU researchers including:
 - i. the development of next generation clean low carbon energy. Led by a consortium which received EU funding until June 2016, this has been developing the research, processes and technologies for clean nuclear fuel recycling in Generation IV nuclear power plants
 - ii. the European Space Agency EUCLID mission to search for dark energy, as part of a consortium that contains over 800 scientists from 110 institutions
 - iii. the interdisciplinary training of PhD students from across Europe at the European University Institute
 - iv. FISHBOOST, a project involving 14 European research partners aiming to improve the efficiency and profitability of European aquaculture by advancing selective breeding of six main fish species
15. Brexit poses twin threats to this type of collaboration: firstly, it will make access to funding that enables these collaborations much harder, and secondly it sends negative signals on our willingness and ability to engage in – and especially lead - international partnerships and collaboration. **Negotiating full Associate Country status would both resolve the funding issue and send the right signal to other countries, within the EU and beyond, on our attitude to collaboration.** If we have third country status we can no longer show leadership in these consortia. Participation in EU framework programmes has not and will not prevent us from working globally.

Free movement of researchers and students

16. For our EU staff and our students, assurances about their status and that they remain welcome in the UK are crucial. Continued freedom of movement for EU researchers and students remains key to retaining the benefits that come from the exchange of ideas that makes UK science a powerful influencing force. We welcome the short term assurances given to current EU nationals residing in the UK. However, the implications are long term and we need to be able to give reassurance of status and funding arrangements to EU students and staff, and any students planning to take part in international exchanges.
17. We urge the government to work with universities to develop an immigration system that enables UK universities to recruit research talent (staff and students) from the EU and beyond to enable our continued international competitiveness.

Staff

18. Twenty-five percent of our academic staff are EU citizens. Of these, 97% have been with the University for five years or less. This includes experts who make significant contributions to UK research - more than 20% of our REF 2014 submission was made up by EU researchers.

19. Global universities compete to attract high-quality international research talent, and this is not confined to senior ‘superstars’: early career researchers make most of the critical discoveries that will fuel future knowledge and economic gains. In the natural sciences most Nobel Prizes are awarded for research undertaken by researchers in their 20s and 30s. Over the last four years we have recruited early career colleagues to almost 250 early-career tenure-track posts – 60% are non-UK nationals, the majority from the EU. These researchers have already authored over 2000 outputs, raised over £120 million in competitive grants, and 50 have contributed to their salaries by winning prestigious fellowships. This outstandingly talented cohort spans the full spectrum of interests. They will fuel UK research and its impact for decades to come.

Priority for negotiation

20. **The Government should prioritise a model that allows the crucial free movement of scientific and other research talent globally: both for existing staff currently working in the UK and allowing for the recruitment of new staff.** This world-wide movement is the life-blood of research and is essential to maximise our ability to realise the substantial beneficial effects of research on wealth, health, culture and society. **We seek, at minimum, a sectoral exception in order to maximise the value of researcher mobility in exposing UK science to innovative ideas and new knowledge as well as helping to address skills gaps in the UK science base.** We also expect that this would be necessary to achieve full Associate Country status for Framework Programme funding. We recommend that Tier 1 visas be expanded to include international academic staff, and that a Tier 1b visa scheme be created to protect postdoctoral early career talent.

Students

21. We currently have 2,500 EU undergraduates, nearly 1,000 EU taught postgraduates and around 1,000 EU research postgraduate students. EU students contribute to the diversity and richness of UK students’ experience at university, and the wider community benefits from the different cultural perspectives these students bring with them.

22. We expect that prospective EU students may reassess the attractiveness of UK universities if the UK no longer offers post-work study opportunities. There may also be perceptions that the UK is less welcoming to overseas students in general, and UK universities need to be part of the conversation to offer assurances to EU citizens and beyond that the UK remains a viable destination for students to study.

Priority for negotiation

23. We have specific concerns about the tuition fees that universities can charge EU students, and the access to tuition fee loans for these students. It will be important to **establish what fee rate non-UK EU students will move to, when this will come into effect, and whether different rules will apply between the devolved nations.** It is not clear whether EU students would legally come under the international fee rate immediately after Brexit. Any change in fee status will need to be phased in gradually over the recruitment cycle, as universities will be held to contractual liabilities to charge students the fees as advertised for the duration of their course. In Scotland, this is normally four years and can be more.

Erasmus+

24. As part of the Erasmus+ scheme, in 2015-16 we have 550 students outgoing from the University to placements overseas, and expect at least 540 incoming students on placement at the University. We recognise that there will be no change to programmes before 2017, but urge the **Government to negotiate for the UK to have continued access to the Erasmus+ programme beyond 2017**. Students applying to university in the current cycle will not take part in exchanges until 2018 or later.

Access to EU-funded research facilities, both in the UK and abroad

25. UK universities have access to over 800 research infrastructures across the EU and beyond which play a vital role in underpinning large, complex and collaborative research projects and add to the UK's competitive advantage. The UK is the headquarters to six major research infrastructures supported by the EU, and hosts ten facilities that are headquartered elsewhere. As part of negotiations of an Association Agreement, the Government should seek to maintain access to all of these research infrastructures under the same or broadly equivalent conditions.

Intellectual property and commercialisation of research

26. IP needs to be considered as a component when reviewing the impact of Brexit on other areas of activity including research funding and university procurement policies. The major impact is likely to be the change in the research funding landscape, together with the availability of skilled researchers, and how those translate into the number of commercialisable opportunities available. The withdrawal of EU funding may have a knock on effect of restricting ready access to some licensees that would have been available through engagement in Horizon 2020 programmes.

EIB loans

27. Like other UK universities, we have benefited from favourable terms in taking out EIB loans as part of a large scale investment in our estates programme. While we understand that the referendum vote should not immediately impact EIB lending in the UK in the short-term, we seek assurances that the loan repayment conditions will remain unchanged and for the government to negotiate the UK's continued participation in EIB loans going forward.