

Future frameworks for international collaboration on research and innovation: call for evidence

1. Evidence submitted by Geraint Parry on behalf of the GARNet Advisory Committee.
2. GARNet is an UKRI-BBSRC funded community network that acts as an advocate and supporter of academic plant science research in the UK and worldwide¹. The network has existed for over 18 years and is funded until 2020. GARNet is overseen by a group of twelve UK academic plant scientists who are elected by their peers. We are a respected voice for academic plant scientists in the UK, particularly those involved in the type of discovery-led research that is essential for gaining fundamental knowledge as well as underpinning future translation into crop species or bioproduct pipelines. GARNet's primary goal is to ensure that the plant science community remains competitive and productive at the national and international level.
3. From the GARNet perspective we feel these are the important considerations when planning future strategies for international collaboration.
- 4. Maintain funding mechanisms to support outstanding individuals undertaking blue-skies fundamental plant science**
5. The UK plant science research is ranked in the top 2 worldwide in terms of citations per document and H index². The UK has significant strengths in both fundamental and applied plant science yet the current funding landscape is characterised by a fall in support for fundamental plant science, which is largely limited to obtaining funding from UKRI-BBSRC Research Committee B³.
6. Therefore in this funding environment an important component of support for the UK plant science comes from the EU. Since the beginning of Horizon2020 program in 2014 UK plant scientists have received **€43M of funding through European Research Council (ERC)** grants. Therefore GARNet believe it is of primary importance that this funding source is maintained over the coming years, either through full participation in Horizon Europe or through an equivalent funding mechanism administered by the UK.
7. However it is important that any new UK funding mechanism distributes funding in an equivalent manner to the ERC so that plant science does not lose out the other research areas that have had a stronger focus in the recent Industrial Strategy Life Science sector deal⁴.
8. More widely, the UK is the major beneficiary from the multiple funding opportunities available through EU Marie Skłodowska-Curie Actions (MSCA)⁵. In future it is essential that equivalent funding mechanisms are available for UK

¹ <http://garnetcommunity.org.uk/>

² https://www.scimagojr.com/countryrank.php?category=1110&area=1100&min=1000&min_type=it&order=h&ord=desc

³ https://www.garnetcommunity.org.uk/sites/default/files/GARNish_BBSRC_Piece.pdf

⁴ <https://www.gov.uk/government/publications/life-sciences-sector-deal/life-sciences-sector-deal-2-2018>

⁵ https://ec.europa.eu/research/mariecurieactions/resources/document-libraries/h2020-marie-sklodowska-curie-actions-msca-country-factsheet-unitedkingdom_en

researchers to support the outstanding fellows, PhD students or industrial interactions that are provided by MSCA. If the UK sits outside of Horizon Europe then it is important for UK research productivity that a government department (UKRI or other) is expanded to administer grants of the type currently provided by MSCA.

9. *Key Output: Maintain and expand mechanisms that support outstanding open science that are separate from UKRI funding streams; as currently provided by ERC and MSCA.*

10. Ensure that the UK remains a welcome environment for plant science research.

11. The UK attracts many of the best plant scientists to its research institutions. In particular EU nationals who are part of the UK plant science community play a key contribution toward its outputs. The John Innes Centre and Rothamsted Research are major UK plant science research centres and over 20% of their staff are non-UK EU nationals⁶. We anticipate that similar numbers exist at other academic and research institutions.

12. The continued success of UK plant science is dependent on international researchers to both to enhance research outputs and in the training of the next generation of home researchers. Therefore despite current political upheaval it is essential that the same opportunities exist for researchers to obtain Tier 1 and Tier 2 VISAs irrespective of their country of origin. By making it more challenging for researchers from one particular region to work in the UK will diminish the entire research community.

13. *Key Output: Continue UK access to researchers from around the world through established VISA programs. Maintain current access to VISAs for outstanding international students to wish to continue their studies in the UK.*

14. Establish global collaborative opportunities for UK scientists.

15. UK plant scientists are leaders in collaborative research programs. Since 2012 three rounds of the ERA-CAPS plant science program⁷ has funded 39 collaborative projects, which must each include at least 3 European partners. These projects are focused on discovery-led plant science and UK researchers have **participated in 69%** of these projects. In addition they have taken a **leadership role in 38%** of projects. These are the highest proportion of any country involved in the program. This demonstrates that the UK research community is a trusted leader within European plant science.

16. These projects are funded individually by home research councils (UKRI-BBSRC) and sit outside of Horizon2020 funding. We encourage future expansion of this type of program that uses UKRI funding to support cross-border collaborative

⁶ <http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/science-and-technology-committee/leaving-the-eu-implications-and-opportunities-for-science-and-research/written/35091.html>,
<http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/science-and-technology-committee/leaving-the-eu-implications-and-opportunities-for-science-and-research/written/35890.html>

⁷ <http://www.eracaps.org/>

projects. Although this has proven successful with EU partners we would encourage similar interactions with other nations. For example we would encourage partnerships with the National Natural Science Foundation of China, who have recently committed significant resources to discovery-led science (an 18% increase in funding for basic research between 2016 and 2017, up to US\$14B).

17. The opportunities provided by the Global Challenges Research Fund (GCRF) are expanding the global influence of UK science. From a plant science perspective this favours more applied projects that will have an appreciable impact 'on the ground' in ODA countries. The fundamental plant science community is mostly unable to access this significant source of funding so, as outlined above, we recommend establishing funding that will provide similar opportunities for discovery-led research programs and can capitalise on UK excellence in this area.

18. Key Output: Establish mechanisms to support international discovery-led collaborative projects with a wide array of countries.

19. Establish pathways for long-term multidisciplinary international collaborations

20. By its very nature plant science needs to take a longer view of the research required for the development of new crop varieties that will be able to combat the challenges of climate change, maintaining global food security and in the development of non-food uses for plants. The pipeline from discovery of the novel functional alleles, testing their effectiveness in greenhouse and field trials, transfer to elite varieties and interaction with seed companies for distribution and/or commercialisation will take at least a decade of R+D, even with the use of new breeding technologies.

21. To facilitate this challenging pathway we would support funding mechanisms that enable long-term multidisciplinary international collaborative projects. This is particularly important for UK plant science given the current challenging regulatory environment that limits the prospect of growing crops generated by new breeding technologies, such as genome editing.

22. Providing opportunities for multi-country long-term academic-industrial partnership projects will facilitate the development of new crop varieties or plants for non-food uses. Buy-in from industry will be critical to ensure an end-point for successfully developed varieties. This commitment will be matched by interactions between teams of academic researchers who have a proven track record of success. These grants might take a similar form to current UKRI Strategic Longer or Larger Grants (sLOLA) with an added industrial component. Given a compelling and outstanding scientific case, these would link discovery-led scientists with those further along the translational pathway as well as with industrial partners and therefore provide a clear pathway for plant scientists to develop novel crops.

23. Key Output: Longer multi-partner multi-country grants to facilitate the development of plants for food and non-food uses.

24. It is an concerning time for the UK research community due to the uncertainty surrounding the possible loss of support that it receives from EU research programs. During upcoming negotiations to define the UKs' relationship with the EU it is essential that the UK either continues as a full participant in the Horizon Europe programs or establishes equivalent funding mechanisms to support outstanding blue-skies research.

25. We encourage the government to move toward its 2.4% R+D funding target by initiating innovative international funding mechanisms that take a long-term view and focus on multi-disciplinary approaches to generate outputs that address grand challenges both at home and overseas. The UK plant science community is demonstrably world leading and for the benefit of future productivity it is important that mechanisms continue to exist that will support the international collaborations that will future enhance this research community.

Reference: ANON-16TS-CHPH-H