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**Nurse Review of  
research councils**

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Institute of Physics response to  
a Department for Business,  
Innovation and Skills call for  
evidence

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17 April 2015

# **IOP** Institute of Physics

17 April 2015

Nurse Review Secretariat  
Research Councils Unit  
5/ Victoria 1  
Department for Business, Innovations and Skills  
1 Victoria Street  
London SW1H 0ET

Dear Sir/Madam,

## **Submission to the Nurse Review of research councils**

The Institute of Physics is a leading scientific society. We are a charitable organisation with a worldwide membership of more than 50,000, working together to advance physics education, research and application. We engage with policymakers and the general public to develop awareness and understanding of the value of physics and, through IOP Publishing, we are world leaders in professional scientific communications.

The IOP welcomes the opportunity to contribute to Prof. Sir Paul Nurse's review of research councils. Our response to the questions listed in the call for input is presented below.

Yours faithfully,



**Dr Frances Saunders CB FREng CEng CPhys FInstP**  
President, Institute of Physics

## 1. Strategic decision-making

### Strategic investments and peer review

The UK research base is world leading. This strength is built on past investment and a research landscape heavily informed by peer review. For this strength to be maintained into the future, especially in straitened economic times, the broad research community must remain centrally involved in decisions on the priorities and strategic direction of investment in the sciences, providing peer review of programmes, and also a cross-science view of priorities, connectivities and opportunities.

Over the past few years there has been evidence of an increased focus on government-led investments, particularly in terms of capital investments, rather than through competitive, research council-led peer review processes. There is a real danger that the UK may make poorer funding decisions when such decisions bypass the research councils and practitioners and fail to undergo rigorous peer review. This is particularly relevant in research areas where a balance is required between funding for capital investments and a lack of planning for long-term resourcing, including in skills and in basic underpinning research. Capital investments that are not evaluated against the research base and subject to an options analysis or a competitive peer review may find they are unable to operate optimally or compete effectively on the world stage. This concern extends to the skills base, where if there is not suitable support for developing skills in any area, whether in applied research or in support for the fundamental, underpinning research behind many large capital investments, the success of these investments may be limited.

While it is natural that some major decisions around strategic investments in science are taken at government level, it is essential that the research community are involved in decisions and that thorough peer review processes are carried out. Without this, such investments may not fulfil their potential and may even cause damage to the long-term viability of the science base.

### Equipment funding

Physics departments are among the most equipment-intensive departments in any university. The move towards 50% match-funding<sup>1</sup> of university equipment is beginning to threaten the economic viability of some research with some departments unable to adequately fund certain research as they are unable to fund their half of the funding for equipment. The effect of this may be to incentivise a move towards less equipment-intensive areas. A solution may be to encourage greater investment in equipment on a regional basis. There are some good examples of this within for example the N8 Research Partnership of Northern Universities<sup>2</sup>. While this model has been seen to work well, all research fields and equipment have different requirements and there should be 'no one size fits all' solution enforced. Other models may be hosting equipment centrally within a region, such as at a major laboratory, for example AWE host the Orion laser but open up its use to university departments.

### The role of the Government CSA

The Government Chief Scientific Adviser occupies a privileged position in advising and influencing government policy on science, including on strategic investments and funding of

<sup>1</sup> Imperial College London – *RCUK equipment guide*:  
<http://www3.imperial.ac.uk/researchsupport/newsandsupport/funderpolicyupdates/rcukequipmentguide#overviewequippolicy>

<sup>2</sup> N8 Research Partnership: <http://www.n8research.org.uk/>

the research councils. The Government CSA clearly has a role to play in supporting and advising decisions on science policy and funding, and has certain expertise and experience to provide significant and effective input. However it is clear that any single Government CSA is unlikely to have the range of expertise to effectively review all matters alone and as such the role should engage readily with a representative, effective and inclusive process of peer-review among the wider research community when funding decisions are taken.

## **2. Collaborations and partnerships**

### **Support and encourage, but don't create**

Research councils should foster a positive environment and infrastructure to allow collaborations and partnerships to emerge when necessary and when they give added value, and efforts made to reduce things that discourage them. This may include creating the right infrastructure so that organisations are able to easily find consortia for co-working. There also needs to be mechanisms to ensure that each institution in a consortium is both rewarded and acknowledged for funding, otherwise collaborative working may be indirectly discouraged. However, it should not be the role of the research councils to actively seek to create collaborations and partnerships. Collaborations should go forward when they have a good scientific rationale with added value to all parties, and not be pursued in and of themselves.

Existing EU programmes, for example the COFUND programme<sup>3</sup>, provide a useful model for how collaborations and partnerships can be effectively encouraged through well-designed funding and eligibility mechanisms. There are also good examples in the UK, such as the recent funding and call for quantum technologies<sup>4</sup>. Here, funding was divided between EPSRC and Innovate UK with the former funding the lower technology readiness level (TRL) R&D and the latter the higher levels. Although all funding has yet to be deployed, creating this clear connection between funding streams could be an effective model in encouraging collaboration at all levels, through fundamental to applied research, and from conception to market. We support such long-term strategic thinking in other areas of the science base with a potential industrial presence in the UK.

On a practical level, some funding policies with research councils may also be hindering possible collaborations. For example, within STFC it is only possible to access consolidated grants for collaborations across institutions if all sub-themes are linked. But this fails to take account of, and may hinder the kind of collaborations that occur in certain research areas, such as in nuclear physics, within which project grants play a different role. Additionally, such policies may also serve as a further disincentive towards interdisciplinary research.

### **Extending research council funding beyond the university sector**

Collaboration between university departments and public sector research organisations have yielded many benefits, particularly in more applied and mission-led areas of research, however it is not clear the bringing both kinds organisations under the same funding regime would be of benefit to these collaborations, or the research undertaken by the individual institutions.

For universities, it may lead to unequal competition for funding where different parties are

<sup>3</sup> European Commission – *Co-Funding of Regional, National and International Programmes (COFUND) – Marie Curie Actions*: [http://ec.europa.eu/research/mariecurieactions/about-mca/actions/cofund/index\\_en.htm](http://ec.europa.eu/research/mariecurieactions/about-mca/actions/cofund/index_en.htm)

<sup>4</sup> EPSRC – *EPSRC calls for Quantum Technology Hubs to Put UK in super position*: <http://www.epsrc.ac.uk/newsevents/news/quantumtechnology/>

operating under very different financial constraints and accounting rules. For example, while universities expect staff to divide their time between teaching and research, this would not be a constraint for many non-university organisations. For public sector research organisations, a move to the competitive funding environment of research councils would not allow the stability of funding to make the kind of long-term mission-oriented decisions they need to make to operate.

Any move to a common funding structure would also raise questions around the balance between responsive-mode and directed funding streams. Many of the non-university sector organisations identified perform research which is largely applied and rely largely on directed funding. To include them within the research councils funding mechanism would have significant implications for the allocation of these budgets. It may also endanger one of the key objectives of the research councils, that of training PhD students and postdoctoral researchers. Moving resource from university research budgets to other organisations could severely hamper this primary objective.

Both university-led research and non-university sector organisations need to be properly funded. Having them compete under the same model for funding would not be an effective way to provide this funding, and will likely threaten the viability of the operations of such organisations.

A way to promote efficiencies in funding could be to encourage closer collaboration between government laboratories and university departments. Instead of competing for funds, universities and government labs could be encouraged to collaborate by allowing them to jointly bid for Innovate UK funds, perhaps whilst also encouraging and incentivising them to include industry partners. Another option could be to allocate a separate budget for government labs to bid for to support already funded university research. This money could be allocated only on the proviso that the labs were part of the original research grant application, and thus would encourage better engagement around grants and collaboration between university departments and labs.

### **3. Balance of funding portfolio**

UK research is world-leading in many areas.<sup>5</sup> The research councils play a major role in helping to maintain the UK's research status, including maintaining the essential balance between basic and applied research strength. While there are a number of areas where the research councils could improve their processes to support for world-leading research, the number of research councils and their current subject area divisions are about right, and there is no need to make any substantial changes in this regard. Significant changes to the way in which they operate are likely to be detrimental to a currently successful system. What matters is that the 'overlaps' and 'gaps' between the remits of the research councils are treated correctly.

#### **Interdisciplinary research**

There is a strong feeling within the research community that the research councils can struggle when dealing with interdisciplinary research proposals, and there is a need for both improved models for measuring interdisciplinary research quality and improved mechanisms for identifying opportunities for funding interdisciplinary research.

<sup>5</sup>Thomson Reuters – *The Research & innovation performance of the G20*  
<http://sciencewatch.com/sites/sw/files/images/basic/research-innovation-g20.pdf>

The particular challenges faced by different interdisciplinary fields are unique in terms of funding access and research assessment for example, biological physics is often described as “a community split by two research councils”, and many researchers struggle to navigate the interdisciplinary gap between EPSRC and BBSRC; nuclear physics falls between both STFC and EPSRC, and this creates problems as the latter supports more applied research and the former more fundamental research in the field. Bridging such gaps between the councils would result in a huge benefit for UK research and for those conducting research in interdisciplinary fields, reducing doubt and bureaucracy in the funding process. Researchers who submit interdisciplinary research proposals often feel that they are disadvantaged by the review process as there is pressure to prove the quality of their work in both fields in which they are working. In some cases, PIs report being advised to write interdisciplinary proposals with particular panels in mind, distorting the logic of the science. Specific sections of interdisciplinary research communities have suggested that these issues could be alleviated through merging the research councils that cover their areas. However, whilst this may have benefits for some, doing so may risk creating other problems by making significant changes to an otherwise effective model. There are several options that may address the concerns, while not damaging the ability of the research councils to fund excellent research in other areas. One solution may be to construct a mechanism to act between panels in certain subject areas, such as in biological physics, medical physics or medical engineering. Another might be for pairs of councils to create multidisciplinary sub-panels that can take account of interdisciplinary research that may fall between the cracks.

In either case, a decision would need to be made on funding allocations: whether funding is shared between relevant research councils, or one lead research council funds the whole interdisciplinary project. It may be that the second option, having one research council provide the funding leads to greater efficiencies; however, to support this, there will need to be an acceptance within research councils (and research communities) that it is beneficial to their communities for them to fund research that isn't within their immediate remit.

#### **Databases and metrological work**

Databases and metrological work are essential to the effective exploitation of fundamental advances, as well as for reviewing existing research. Areas such as climate science rely heavily on accessible and accurate data, such as the central England temperature series and carbon dioxide measurements from various sites around the world. It is often difficult for researchers to receive funding for this kind of work, and mechanisms need to be improved to make access to funding much easier for this essential but not necessarily headline-grabbing work. One option might be to place this funding with government laboratories, as this would create a central repository for data and allow for the greater stability in funding that this kind of work requires.

### **4. Effective ways of working**

#### **Addressing bias**

In order to ensure that the research councils are attracting and retaining the most talented researchers and ensuring that those researchers reach their full potential, they need to ensure that all of their processes and decision-making mechanisms are free from bias. To ensure effective monitoring, there is a need for research councils themselves to better understand the diversity of those who they are funding, and to collect and publish data in this area.

#### **Bureaucracy**

While it is clear the applications for research funding must be rigorous, it is also the case that

a significant proportion of funded researchers' time goes towards administration within departments that enables them to apply for grants and deal with research councils, limiting the effect of this research money, and serving as an impediment to researchers to perform research.

There is a need for research councils to make uniform their support of administration, travel and other costs for grants, and, in some areas, their routes of application, which would simplify the process of applying for funding and also make it easier for researchers who deal with multiple research councils to access funding.

**5. Any other comments?**

No additional comments.