

Scottish Parliament Election 2016



The Institute of Physics in Scotland is a scientific membership society devoted to promoting physics and bringing physicists together for the benefit of all. We have over 2500 members and are part of the Institute of Physics, a charitable organisation and leading scientific society.

The Scottish Parliament election on 5 May is a chance to build upon Scotland's scientific pedigree and help to inspire future generations. This briefing outlines the actions we believe the next Scottish Government should take in the areas of schools, funding, innovation, advice and engagement that can help to secure Scotland's scientific future.

Schools

Students who study science, technology, engineering and mathematics (STEM) subjects open up a huge range of productive and lucrative career options.

Students from all backgrounds in Scotland should be able to access the benefits of a Science, Technology, Engineering and Mathematics (STEM) education, and to have this delivered by subject specialist teachers. Specialist teachers in the sciences use their knowledge to generate excitement and enthusiasm in their subject, and have been shown to raise attainment.

However the current number of specialist teachers is not enough to meet student numbers. There is evidence that, for example, many schools in Scotland are teaching physics across classes of students from different year groups.

In England, there are generous financial incentives given to physics graduates to encourage them to teach, but these do not exist in Scotland.



The next government should provide additional funding incentives to train new specialist physics teachers in Scotland.

Science teachers, whether specialists or not, should be confident in teaching the subject and well supported in doing so. Improving teacher confidence also improves retention. The IOP has developed expertise in providing support to teachers through its Stimulating Physics Network, including improving the knowledge of nonspecialist teachers. Our work has also been shown to improve attainment and further progression in students studying physics.



The next government should commit to fund schemes to improve teachers' subject knowledge.

No. of physics teachers at secondary level in Scotland 2007–15

Year	No. physics teachers
2007	906
2008	887
2009	865
2010	868
2011	850
2012	837
2013	822
2014	823
2015	807

Scottish Government figures



Science funding and research

Scotland punches far above its weight in terms of the quality of the research it produces and its success in attracting research funding.

Scottish universities came out strongly from the 2014 Research Excellence Framework, with 85% of research judged as “world leading” or “internationally excellent”. Scotland has particularly strong research communities, including in photonics and space science.

However, aside from the United Kingdom Astronomy Technology Centre in Edinburgh, there are no other major physics-based national research facilities based in Scotland, and Scotland receives less of a share of capital spending on national facilities.



The next government should support the establishment of a new physics-based national research facility in Scotland.

Innovation

A successful and innovative economy needs to invest effectively in research and development, both public and private – and R&D investment is an ecosystem.

Research for the Campaign for Science and Engineering (CaSE) found that public investment in R&D crowds in private investment: for every £1 spent by the government on R&D, private sector R&D productivity would rise by 20p per year in perpetuity.

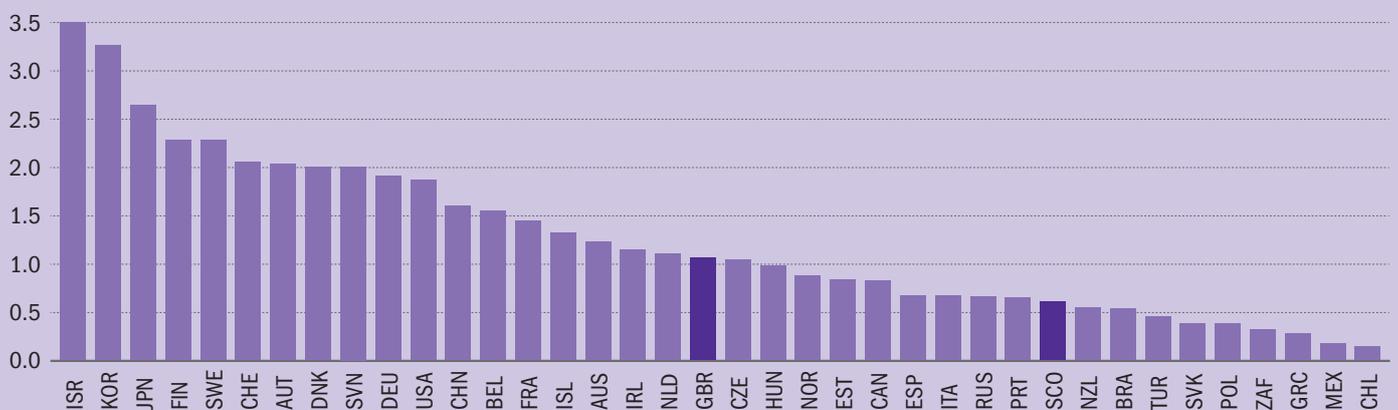
In 2013, business expenditure on R&D in Scotland was only 0.60% of Scottish GDP, compared to 1.06% for the whole UK. More needs to be done to link the higher levels of R&D investment found in the public sector in Scotland with increasing R&D investment from businesses.

This could be done, for example, by promoting the further generation of university spinout companies, or by building on collaborative schemes such as Interface.



The next government should generate incentives to encourage businesses to increase their investment in private R&D to bring Scotland up to the UK average.

Business expenditure on R&D (% of GDP)



OECD Figures 2013



Chief scientific adviser

Government chief scientific advisers provide independent advice at the heart of government, ensuring that evidence is readily available to decision makers.

Scotland is one of just a few European countries with the position of a chief scientific advisor (CSA), alongside the UK, Czech Republic and Ireland. Previous holders of the role have been experienced advocates for science and for evidence-based policy. That the position of a CSA for Scotland, vacant since December 2014, is currently in the process of being filled is welcome.

But for the holder of the position to be truly effective, the CSA needs to have direct access to the first minister and proper access to government, as the UK CSA does with the UK Government. Greater importance needs to be placed on the role of the Scottish Science Advisory Council (SSAC), which supports the work of the CSA in providing science advice.



The next government should ensure that the CSA, when appointed, is able to feed into policy discussions wherever possible, and that the SSAC is reconvened following the appointment of a new CSA.

Public engagement

The ability for the public and in particular younger generations to access and engage with science is an important step in nurturing and sustaining an interest in science.

The fact that access to many public art, cultural and scientific bodies is free of charge in both Scotland and much of the rest of the UK is therefore welcome.

However, the Science Centres, including in Aberdeen, Dundee, Edinburgh and Glasgow, maintain charges for entry. This may serve to limit access to many people, particularly those from the least financially well-off families, who are less likely to be able to access the benefits of a science education. Free public access to the Science Centres would open them up to a much wider audience and be a positive demonstration of the importance of science to Scotland.



The next government should provide additional funding for Science Centres in Scotland to enable them to offer free public access.

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April 2016

Registered charity number 293851 (England & Wales) and SC040092 (Scotland)