

28 September 2018

## Submission to the Budget Representations

The Royal Society is the national academy of science for the United Kingdom (UK) and Commonwealth. A self-governing fellowship of many of the world's most distinguished scientists, it draws on the expertise of fellows and foreign members to provide independent and authoritative scientific advice to UK, European and international decision-makers.

The Society regularly engages with the UK government in the course of providing authoritative, accessible and independent scientific evidence to policy makers and other stakeholders on issues of public interest and advocating for the conduct of excellent science and the establishment of the best environment for researchers in the UK and the Commonwealth.

Below we have provided links to a number of reports that contain within them policy suggestions relevant to the upcoming Budget. All of the below provide clear arguments on how these suggestions will contribute to improving people's lives, delivering economic returns and helping to achieve the government's broader ambitions.

The Society would be very happy to provide further information on any of the below.

[Open for business: a nation of global researchers and innovators](#) - This statement from the UK's National Academies – the Royal Society, Royal Academy of Engineering, Academy of Medical Sciences and British Academy – outlines action needed to send a bold, positive message that the UK is one of the best places in the world to research and innovate, and capture the benefits stemming from this to improve the lives of people in the UK

[Progress and research in cybersecurity](#) - Digital systems have transformed, and will continue to transform, our world. They have the potential to deliver significant benefits to society and are central to our security, wellbeing and economic growth. To realise these benefits, we will need robust cybersecurity. This report considers the policy frameworks necessary to address these cybersecurity challenges, and the emerging research challenges over the next five to ten years.

[Machine learning: the power and promise of computers that learn by example](#) - Machine learning is a form of artificial intelligence that allows computer systems to learn from examples, data, and experience. Through enabling computers to perform specific tasks intelligently, machine learning systems can carry out complex processes by learning from data, rather than following pre-programmed rules. This report sets out the action needed to maintain the UK's role in advancing this technology while ensuring careful stewardship of its development.

[After the reboot: computing education in UK schools](#) - This report explores the challenges and issues facing the subject of computing education in primary and secondary schools since the subject was introduced in English schools in 2014.

[Data management and use: Governance in the 21<sup>st</sup> century – British Academy and Royal Society project](#) - A review by the Royal Society and the British Academy on the needs of a 21st century data governance system.

[Greenhouse gas removal](#) - a report produced jointly with the Royal Academy of Engineering to outline methods of greenhouse gas removal and how other influences like legislation, the environment, economics or social factors will affect their deployment. The report also considers how they might plausibly be used in the UK and globally to meet climate goals.

[Observing the Earth – expert views on environmental observation for the UK](#) - An overview of environmental observation in the UK that highlights a need to think strategically about how to create an integrated system for environmental observation – one that manages the increasing volume of observation data in a way that serves the breadth of uses and users, and allows data to be accessed and processed in a way that creates knowledge to inform policy and action. Key to this capability is a stable, long-term funding commitment and an adequately skilled workforce to ensure that environmental observations are used to their full potential.

We have also produced a number of reports that may inform policy decisions in the following areas.

[Options for producing low-carbon hydrogen at scale](#) - Low-carbon hydrogen has the potential to play a significant role in tackling climate change and poor air quality. This policy briefing considers how hydrogen could be produced at a useful scale to power vehicles, heat homes and supply industrial processes.

[The potential and limitations of using carbon dioxide](#) - This policy briefing examines the science of using captured carbon dioxide as a feedstock for a variety of applications such as manufacturing fuels, chemicals and materials. The interest in using this carbon dioxide has been raised due to the economics of large scale carbon capture and storage.

[The impact of artificial intelligence on work](#) - The Royal Society and British Academy have produced an evidence synthesis on the impact of AI on work to support a well-informed discussion about the impact of AI on work and to inform policy debates about potential steps to help prepare for this future.

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