

Big Data Dilemma
Science and Technology Committee
House of Commons
London
SW1A 0AA

From the Biological Secretary and Vice-President, Sir John Skehel FRS and Physical Secretary and Vice-President, Professor Alexander Halliday FRS

3 September 2015

Dear Committee Members,

The Royal Society welcomes the opportunity to respond to the House of Commons Science and Technology Committee Call for Evidence on the “Big Data Dilemma”. The Society is the national academy of science in the UK. It is a self-governing Fellowship of many of the world’s most distinguished scientists from academia, charities, industry and public service.

Big data is a promising new source of knowledge. Making the most of the data revolution will be key to future scientific and economic progress. It has the potential to improve lives across a multitude of areas, ranging from business to health, and from tackling climate change to aiding civic engagement. However, any public benefit must be balanced against the need for the intelligent use of data, including concerns about privacy.

The terms of reference of the Committee’s “Big Data Dilemma” inquiry encompass a wide range of complex topics that make it a challenging subject for investigation. The Society has among its Fellowship experts in different aspects of big data and could arrange for them to provide evidence to the Committee in an individual capacity. The Committee might also be interested in recent and future work by the Society relevant to the topic of big data:

- **Big data and big science:** Data are likely to become more important as part of large-scale international projects. For example, the Square Kilometre Array is a powerful new telescope for surveying the night sky 10,000 times faster than hitherto possible.¹ It will have the potential to generate more data per second than does the entire current global internet.² A number of the Society’s Fellows are engaged with this international project.
- **Big Data and Earth observation:** Science helps tackle global challenges that also often require collaborative solutions. The European Space Agency’s Copernicus earth observation satellites will generate terabytes of data that will be combined and analysed to generate new knowledge. The Society was recently commissioned by the Government Office for Science to undertake a review of environmental observation.³ Experts highlighted the importance of long-term funding, infrastructure and a skilled workforce to collect data and translate it into value for the economy and wider society.
- **Big data and industry:** In 2014 the Society hosted a conference on “Science, Industry and Big Data”⁴ and this year it brought together key stakeholders to discuss the future of “Machine Learning.”⁵ Big data will be central to this area of science, and the Society is currently scoping a major piece of policy work on machine learning. It is also undertaking a sizable policy project to inform decision-making about unclassified cybersecurity research in the UK and recently organised a PolicyLab on consumer data.^{6,7}



President Sir Paul Nurse
Executive Director Dr Julie Maxton

Founded in 1660, the Royal Society is the independent scientific academy of the UK, dedicated to promoting excellence in science.

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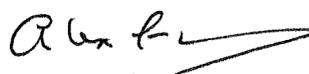
- Big data and skills: Without an appropriately skilled workforce, the UK will struggle to get the most out of the opportunities offered by big data. Currently, 77% of all big data roles in the UK are difficult to fill,⁸ whilst 58,000 new jobs a year may be created in the UK big data marketplace between 2012 and 2017.⁹ The Royal Society's 2014 report *Vision for science and maths education*¹⁰ emphasises the importance of inspirational science and mathematics school curricula, teachers and careers education to ensure that a strong stream of STEM qualified people come through the education and training system.
- Investing in big data: Recent government capital commitments for big data are welcome but corresponding resource funding is also needed to ensure efficient and cost effective use of equipment.
- Big data and open science: In 2012 the Society published a report entitled *Science as an Open Enterprise* that highlighted the need to grapple with the deluge of data created by modern technologies in order to preserve the principle of openness and to exploit data in ways that have the potential to create a second open science revolution.¹¹

The Society hopes this information is of help in your deliberations. If you have any queries, or if the Society can be of any further assistance, please do not hesitate to get in contact with Becky Purvis (rebecca.purvis@royalsociety.org or 020 7451 2261).

Yours sincerely,



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¹ Square Kilometre Array (2011) *Factsheet* See: https://www.skatelescope.org/wp-content/uploads/2011/03/SKA_Factsheet-for-Journalist_web.pdf

² Square Kilometre Array (2015) See: <https://www.skatelescope.org/signal-processing/>

³ The Royal Society (2015) Observing the Earth - Expert views on environmental observation for the UK. See: <https://royalsociety.org/topics-policy/projects/environmental-observation/>

⁴ See <https://royalsociety.org/events/2014/04/big-data/>

⁵ See <https://royalsociety.org/events/2015/05/breakthrough-science-technologies-machine-learning/>

⁶ See <https://royalsociety.org/policy/projects/cybersecurity-research/>

⁷ See: <https://royalsociety.org/events/2015/04/consumer-data/>

⁸ SAS/ Tech Partnership (2014) Big Data Analytics, Assessment of Demand for Labour and Skills 2013–2020. See: https://www.e-skills.com/Documents/Research/General/BigData_report_Nov14.pdf

⁹ The British Academy (2015) Count Us in: Quantitative skills for a new generation. See: <http://www.britac.ac.uk/news/news.cfm/newsid/1285>

¹⁰ The Royal Society (2014) Vision for science and maths education. See: <https://royalsociety.org/topics-policy/projects/vision/>

¹¹ The Royal Society (2012) Science as an open enterprise. See: <https://royalsociety.org/topics-policy/projects/science-public-enterprise/Report/>