The time has come for Computing Science.

The recent Research Assessment Exercise has shown that Computing Science has taken its place among the great research subjects in the UK.

This country is often cited as the source of some of the best medical and biomedical research in the world. Now computing science has joined these disciplines as one of the UK's foremost intellectual outputs.

The recent review of research across 81 institutions found the subject not only healthy and growing, but more rigorous, more interdisciplinary, more experimental and more user-oriented than ever.

Computing scientists are working with researchers from ever-increasing areas of expertise – many of which are in fields where such collaborations are, to say the least, unexpected. For example, they are applying programming languages to model cell biology, retrieving documents from the internet based on quantum theory, and building new kinds of massively parallel computers that mimic the human brain.

The subject area is growing, both in size - nearly 50 per cent more staff submitted to this RAE, compared with 2001 - and in stature. The panel which assessed Computing Science and Informatics found that one fifth of all publications were world leading, with nearly two thirds rated as internationally excellent.

Research funding more than doubled over the 2001 to 2008 RAE period, from £252M to £511M.

A key message from the panel was that "computational thinking", a way of solving problems, designing systems and understanding human behaviour, drawing on concepts of computer science, is having a wide impact across all disciplines.

In the sector report released in early January, the CS and Informatics panel said "Computational thinking is influencing all disciplines. This influence is witnessed by the inherently interdisciplinary nature of this unit of assessment and its strong cross-disciplinary links with a wide variety of other disciplines. In many respects computer science is becoming a key enabling tool for interdisciplinary research and computer science methods are influencing other disciplines. Much of this increased interaction is due to the RCUK e-Science Programme, in which many members of the community are fully engaged. There was especially strong interdisciplinary work with biology (bioinformatics, system biology and synthetic biology), medicine (e-health), physics & astronomy and the earth sciences (GIS). Although much of this is the application of known computing techniques to the problems of other disciplines, there was also evidence of new computing research developed to meet the new challenges."

The panel also pointed out strong economic impact through considerable evidence of start-ups, spin-outs collaborations with SMEs and multi-national companies, and of impact on industrial and other user practice. The new cross research council Digital Economy programme is just one example of the transformational impact of computer science.

Professor Muffy Calder, chair of the UK Computing Research Committee, an expert panel of the British Computer Society and the Institution of Engineering and Technology, said "Research in Computing Science and Informatics has never been more exciting. It covers a wide range of challenges, from how to design and build systems that are fit for purpose, to the impact of computational thinking on the physical and social sciences, to the next generation internet and new paradigms such as quantum computing. This is a great time to be involved in research in computing, and to see the impact of it on other disciplines."

The response from industry has been extremely positive. Dr Andrew Herbert, Director of Microsoft Research (UK), said " Having served on the RAE Computer Science and Informatics panel I am impressed by the breadth, depth and vitality of the discipline in the UK, reinforcing the argument for basing our European research laboratory in Cambridge, England so that we can enjoy fruitful collaborations with the UK academic research community. In our own work we are increasingly making interdisciplinary connections and creating tools to enable "computational thinking" in other disciplines including computational systems biology, computational ecology and environmental science."

In Scotland, the SFC (Scottish Funding Council) and ten universities recently announced investment of more than £29M to pool research expertise and consolidate Scotland's position as international research leader in Computer Science and Informatics.

The creation of the Scottish Informatics and Computer Science Alliance (SICSA) will enable the universities of Aberdeen, Abertay Dundee, Dundee, Edinburgh, Glasgow, Heriot-Watt, Robert Gordon, St Andrews, Stirling and Strathclyde to enhance their research capabilities, attract new academic staff and promote a world-leading international presence. Among its key areas of research, SICSA will be securing, interfacing, modelling and engineering the systems of tomorrow, helping to create the next generation of the internet, and developing new ways for people to interact with computers, beyond the traditional keyboard-mouse-monitor interface.

Notes

1. UKCRC (UK Computing Research Committee) is an expert panel of the Institution of Engineering and Technology and the British Computer Society for computing research in the UK. Its members are leading computing researchers from academia and industry. Website http://www.ukcrc.org.uk/

2. Muffy Calder FRSE is Professor of Formal Methods, Department of Computing Science, University of Glasgow. Email muffy@dcs.gla.ac.uk, tel: 0141 330 4969. http://www.dcs.gla.ac/~muffy

3. Founded in 1991, Microsoft Research is dedicated to conducting both basic and applied research in computer science. Its goals are to enhance the user experience on computing devices, reduce the cost of writing and maintaining software, and invent novel computing technologies. Microsoft Research collaborates with leading academic, government and industry researchers to enhance the teaching and learning experience, inspire technological innovation, and advance the state of the art in computational science. Microsoft Research employs more than 800 people in six labs located in Redmond WA (USA), Silicon Valley CA (USA), New England MA (USA), Cambridge (England), Beijing (China) and Bangalore (India). In the UK's Cambridge lab, there are over 100 researchers working in research areas that include: machine learning, security, information retrieval, online advertising, operating systems, human-computer interaction, computational biological sciences, programming techniques and networking.

4. SICSA website http://www.sicsa.ac.uk/images/SICSA-launch-pr.pdf

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