UK COMPUTING RESEARCH COMMITTEE

Science and Innovation Strategy for Scotland

A Response to the Scottish Executive Consultation Paper

Theme 1: maintaining and developing the excellence of the science research base
Theme 2: enhancing international connections and capturing overseas investment
Theme 3: intensifying knowledge exchange between academia and business
Theme 4: expanding business innovation
Theme 5: modernising science education and promoting science careers

The following point addresses themes 1-5.

Scottish Computer Science and Informatics is world leading. As such, it attracts top quality overseas staff and students to work in Scotland. In particular, we get many applications from world-class students to study for a PhD in Scottish universities. Under the Fresh Talent Scheme, these students are encouraged to stay in Scotland for up to two years after the completion of their postgraduate studies. Many will use this opportunity to start-up high-technology companies in Scotland, transferring knowledge and expanding business innovation. Others will stay to work in academia to develop the excellence of the research base. On their return to their home countries they will help to enhance the international connections of Scottish academia and/or industry.

The main bottleneck to realising this vision is the under-supply of studentships to support postgraduate study in Scottish universities. Most of the postgraduate funding available to academic departments comes from the research councils and is restricted to UK citizens (or other EU citizens, but only for fees). Universities are left with no choice but to reject very high quality students through lack of funding, especially those coming from developing countries where their home governments have very limited funds. Scottish Executive investment in these students could have a disproportionate effect.

Now is an especially opportune moment to make such an investment. Our main rivals in attracting overseas students are in the USA. However, current travel restrictions, government anti-science attitudes and consequent under-funding are making the USA an unattractive destination. Scotland is now the destination of choice for many prospective overseas postgraduate students.

Theme 6: increasing public engagement with science

Promoting an increased public understanding of Computer Science and Informatics has never been more important. Computers are embedded in an increasing array of products in the home, in industry and public places. An increasing number of people use computers to send email, surf the web, write documents, buy and sell. But the influence of computers goes much deeper. They are enabling questions to be asked and answered that were previously infeasible to address. More profoundly, computational concepts and ideas are influencing the way we think; psychologists, linguists, philosophers, biologists, physicists and many others are increasingly expressing their hypotheses and theories in computational terms.

However, despite this multi-layered and pervasive influence of computing in all our lives, there is widespread ignorance about its nature. This leads to misunderstanding and misguided decisions, so must be addressed urgently. Part of the problem lies in understanding software, which is central to computing but is not amenable to physical examination, so is difficult for a non-programmer to appreciate. UKCRC is keen to engage with the Scottish Executive, and other bodies, to promote a wider and deeper understanding of the nature of our field.

Theme 7: developing better use of science by government

One consequence of the generally poor understanding of Computer Science and Informatics is an underestimation of both its potential and its risks and limitations, by the general public, including by politicians and civil servants. There is a strong need for briefing by experienced computing experts, both from academia and industry, to those who will make important decisions in which computing plays

a role.

For instance, large ICT procurements have been dogged by budget overruns, failures to meet deadlines, failures to satisfy user needs and system failures following deployment. Public sector ICT failures have attracted a great deal of adverse publicity. There has been considerable academic research into the causes of such failures, which are for a mixture of technical and human factors reasons. There has also been considerable research into software engineering methodologies that avoid or mitigate many of these problems. Despite the success of these methodologies, there has been poor industrial take-up, and some of this is due to customer ignorance of the kinds of requirements they should be insisting on during the procurement process. Briefing of those making important procurement decisions could help avoid these problems.

However, existing mechanisms for initiating dialogue between the Scottish Government and scientists rely on the initiative coming from the Government side. Unfortunately, Government may not be aware of the help that scientists could provide, so may not initiate the necessary dialogue. This has happened, for instance, in the case above, probably because Government is unaware that computer scientists can help solve the problems they face in ICT procurement. Again, UKCRC would be delighted to brief the Scottish Executive on these matters.

More generally, successful knowledge transfer between academic and business depends on understanding the nature of engineering as well as science. Computer Science is both science and engineering, and both of its aspects are in play during knowledge transfer. The consultation document fails to mention or discuss engineering, but engineering plays a central role in its concerns.

UKCRC

This evidence is submitted by the UK Computing Research Committee (UKCRC), an Expert Panel of the British Computer Society, the Institution of Engineering and Technology and the Council of Professors and Heads of Computing. The UK ranks first or second in the world in many areas of computing research. UKCRC was formed in November 2000 as a policy committee for computing research in the UK; its members are leading computing researchers from UK academia and industry.