

Innovations

This issue: 1 *RSE/STFC Enterprise Fellowships 2011 2 STFC supported work leads to IBM's 'world's greenest supercomputer' 3 Blackford Analysis Wins Two Nexxus Life Science Awards for Innovation and Collaboration 5 UK company set to transform electronics for security scanners and cancer detection 6 Meet the buyer, Mechanical Engineering 7 The 2010 ROE Workshop – Applications of Astronomy

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http://www.royalsoced.org.uk/research_fellowships/stfc/index.htm

NEXT CLOSING DATE
6 May 2011

 Science & Technology
Facilities Council

 THE ROYAL
SOCIETY
OF EDINBURGH

 enterprise
fellowships

* The Royal Society of Edinburgh, Scotland's National Academy, is Scottish Charity number SC000470

*RSE/STFC Enterprise Fellowships 2011

STFC are inviting applications for Enterprise Fellowships with the objective of increasing exploitation from the STFC research programme. The closing date is 6 May 2011.

The Enterprise Fellowships are designed to enable an individual to advance the commercialisation of existing research results or technological developments and will be tenable for a period of one year commencing on 1 October 2011. The Fellowships enable the holder to concentrate on developing the commercial potential of STFC funded research, whilst also receiving formal training in relevant business skills.

The Fellowships provide one year's salary costs and some additional support funding, and can be held at any UK Higher Education Institution or Institution that agrees to host the work.

Please contact afraser@royalsoced.org.uk for further details on the scheme and contact Rachael.jack@stfc.ac.uk on questions of eligibility.

** The Royal Society of Edinburgh, Scotland's National Academy, is Scottish Charity No. SC000470*

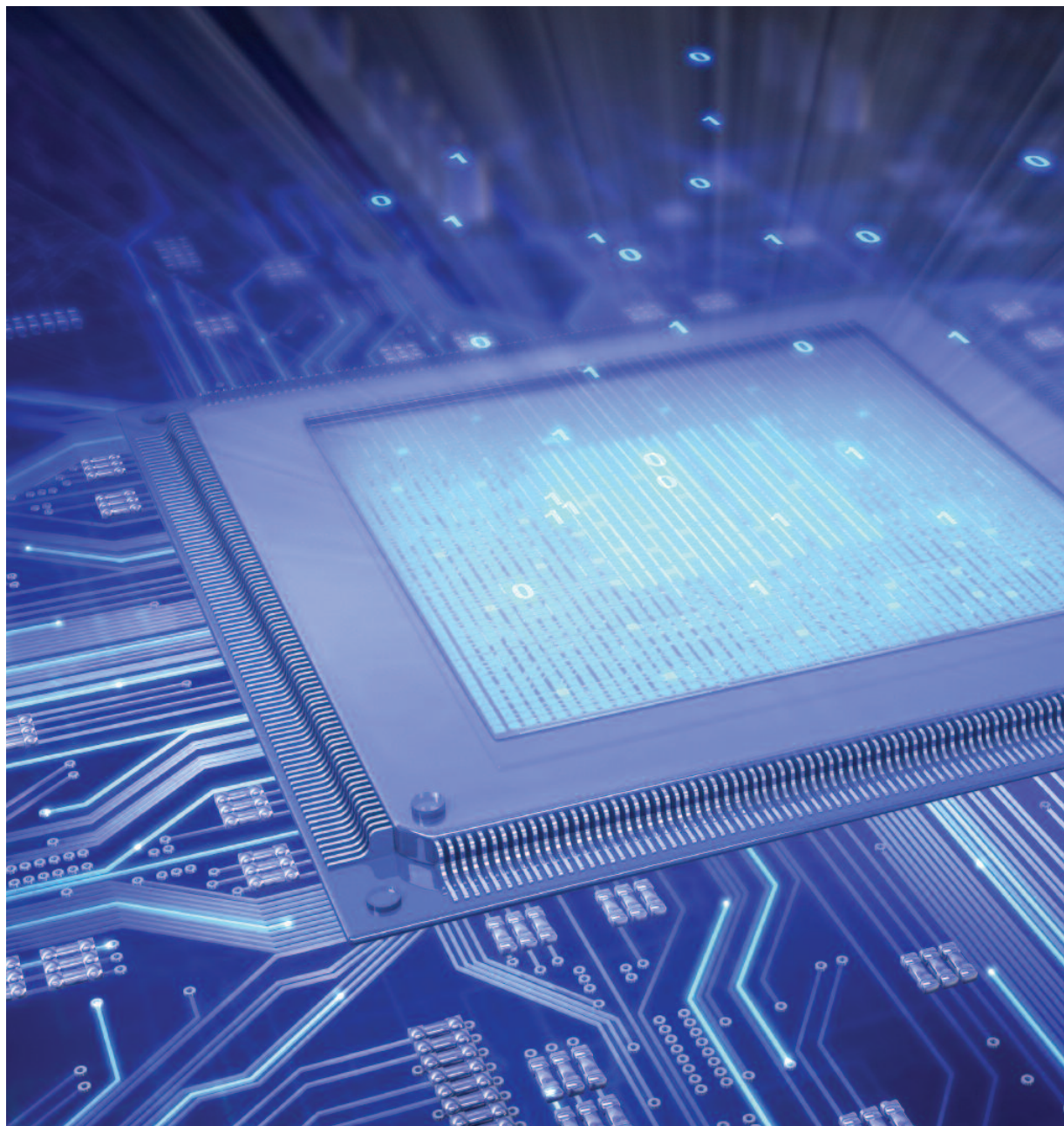
STFC supported work leads to IBM's 'world's greenest supercomputer'

Funding from STFC has helped IBM and researchers from the University of Edinburgh and Columbia University to develop the most energy efficient supercomputers in the world. A prototype of IBM's next generation Blue Gene supercomputer has been named top of the latest 'Green500 List' and STFC funded part of its cost.

The list includes supercomputers from China to Germany and the United States that are being used for a variety of applications such as astronomy, climate prediction and pharmaceutical research.

An academic team from the Institute for Particle and Nuclear Physics in the University of Edinburgh and from the Physics Department at Columbia University have collaborated with IBM over the last three years on the chip design of IBM's prototype computer in a unique industrial-academic collaboration.

The Edinburgh system is funded by STFC and will be installed in the Advanced Computing Facility at the University of Edinburgh next year and will be applied to Quantum Chromodynamic (theoretical physics) simulation. The Columbia University design effort was carried out in partnership with the RIKEN BNL Research Center which, together with the Brookhaven National Laboratory (BNL), will fund a system to be installed at BNL.



Blackford Analysis Wins Two Nexxus Life Science Awards for Innovation and Collaboration

A couple of star-gazing astronomers could help save your life. Dr Ben Panter and Professor Alan Heavens, from the University of Edinburgh's School of Physics and Astronomy, developed a technology to analyse the starlight of distant galaxies, and now they're using it for medical imaging. They realised that this technology, with its incredible processing speed, can apply to astronomy, medicine, or any field where incredibly large amounts of data present a problem. They have built a company called Blackford Analysis to apply their algorithm to medical imaging and other fields.

From looking at millions of galaxies in outer space to examining the minute details of medical images depicting hearts, brains, and bones, Blackford Analysis has shown amazing ingenuity and an ability to collaborate across disparate fields. These qualities have led to their rapid success, and to their receiving two awards – one for Innovation, and another for Collaboration (the latter sponsored by the Edinburgh Science Triangle) - at the Nexxus Life Science Awards (East) event in Edinburgh on 16 November.

"We're delighted to win these awards – it's a great reward for the effort that our team has put in over the years, taking this from a piece of blue skies research to a real clinical application – both technically and commercially. The support of Scottish Enterprise and the University of Edinburgh throughout this process has been considerable, and I'd really like to thank both bodies for recognising the potential of the idea at an early stage. We look forward to working with medical imaging companies to get our innovation into routine clinical use worldwide," said Dr Ben Panter, Chief Executive of Blackford Analysis, on accepting the two awards.

"Convergence of technology can greatly assist Scotland's life science industry," said Graeme Boyle, Nexxus Director.

"The ability of the scientists at Blackford Analysis to transcend traditional boundaries and instigate cross-disciplinary collaborations has led to an incredibly innovative solution to a real technological and medical need. Vision such as this is just what Scotland needs to keep its place on the global life science stage."

The technology Ben and Alan developed, called MOPED, is an algorithm that has a remarkable capacity to compress data. They invented it because they wanted better data processing speed in their astronomy research – which it achieved, improving performance over standard techniques by a factor of one thousand and enabling the interpretation of spectra from half a million galaxies where previously only a few hundred had been possible. It soon became clear to them that this technology had many more applications. The first one they are addressing is medical imaging. [more](#)



Image © Photodisc, Inc

Blackford Analysis Wins Two Nexxus Life Science Awards for Innovation and Collaboration

The collaborative effort to move the star-gazing technology from the heights of Edinburgh's Royal Observatory into the medical clinic started when Ben and Alan reached out to Dr Mark Bastin of the Scottish Funding Council Brain Imaging Research Centre. Funding from Scottish Enterprise enabled them to extend the team further with Drs Rob Tweedie and Will Hossack joining from the Institute of Physics. This multi-disciplinary team applied MOPED to the problem of aligning MRI and CT scan data, which can take many hours using standard techniques.

A modern radiology department increasingly deals with volumetric data – 3D scans from MRI or CT machines. While this can give much greater insight into many medical conditions, a key problem is the sheer size of the studies. Often gigabytes of data must be aligned before any interpretation can be made, particularly in clinical trials with multiple images taken over time.

This collaboration of Blackford Analysis Ltd, the Institute for Astronomy, a research and teaching group within the School of Physics and Astronomy at the University of Edinburgh, and the SFC Brain Imaging Research Centre resulted in the MOPED-based Registration Engine for medical imaging. This technology is orders of magnitude faster than current software, and allows radiologists to efficiently line up, view and compare multiple images. It can speed up radiologists' work, improve the quality and resolution of medical images, and accelerate analysis of imaging data. The collaborative effort was supported by a Scottish Enterprise Proof of Concept Award and STFC funding.

Blackford Analysis was spun out from the University of Edinburgh in the summer of this year and attracted a six-figure seed investment. The company also received a SMART:SCOTLAND Feasibility Study Grant of £70K to extend the registration engine's capabilities, and has attracted much interest and support from several multi-national medical imaging companies

as well as from radiologists in the UK and US. The company will demonstrate its technology at the Radiological Society of North America meeting in December and plans to launch the Registration Engine in 2011. This product could generate savings of many millions of pounds by increasing radiologists' throughput.

The company also plans to expand its reach by developing further collaborations and exploring applications in other fields. Ben won the THALES Scottish Technology Prize in 2009 for the application of this technology to Improvised Explosive Device detection, one of the many potential applications for the technology.

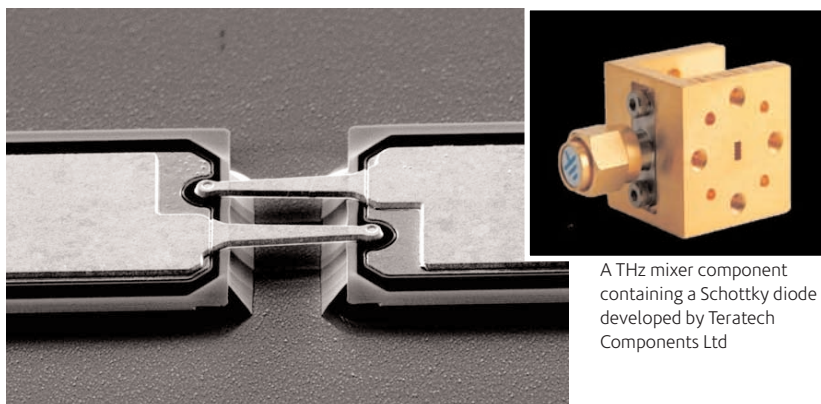


UK company set to transform electronics for security scanners and cancer detection

A new UK company set to transform the use of terahertz electronics for applications in security imaging, telecommunications and cancer detection has today (Wednesday 24 November) won a prize in Research Councils UK (RCUK) Business Plan Competition 2010.

Teratech Components Ltd, a recent spinout from STFC, will use the £10,000 prize towards kick-starting the company's business to exploit the commercial applications of terahertz electronics - engaging with industry and new markets outside of the traditional space sector.

Terahertz (THz) applications span the physical (security imaging), biological (cell formation) and medical (cancerous tumour detection) sciences with a growing interest in the application of THz frequencies to security imaging through clothing in airport scanners and to non-destructive pharmaceutical and manufacturing inspection through multilayered or opaque surfaces.



A THz mixer component containing a Schottky diode developed by Teratech Components Ltd

A Schottky Diode, developed by Teratech Components Ltd, is the fundamental component used for the detection of Terahertz radiation

The unique properties of THz radiation also include high frequency radar to produce high resolution images of objects through cloud, fog and dust storms to support aircraft landing in harsh environments.

The high frequency THz band of the electromagnetic spectrum is still largely unexplored and was originally developed for niche applications in astronomy and monitoring of the Earth's atmosphere. As the technology has matured however, and the costs reduced, new commercial applications are becoming viable.

The Teratech team is led by Byron Alderman from STFC. Byron said, "This is excellent news today and will give the company a real boost. Our vision is to transform the use of terahertz electronics technology and working towards the Business Plan Competition is helping us towards achieving this aim. The competition has involved working closely with business and industry to develop our skills in business planning. In the past the prize money awarded to winners of the RCUK Business Plan Competition has proved invaluable in helping companies grow their business and I know we'll put it to good use!"

Teratech was spun out from technology developed by the Millimetre Technology (MMT) group at RAL Space. The group have developed THz components over the last twenty years for use in the Earth observation and astronomy fields, and in the security sector.

Professor Dave Delpy, RCUK Impact Champion said: "It is vital to the future prosperity of the UK that research and business work together in partnership. The RCUK Business Plan Competition is just one of the current mechanisms that the Research Councils have to help researchers work with business and industry to gain the relevant skills to turn their work into successful commercial ventures. The five finalists in this year's Competition come from a variety of academic backgrounds and they should each be congratulated for their commitment over the last year, during the demanding process of turning their research into award winning business propositions."

The RCUK Business Plan Competition has been running for six years and has helped researchers work with business and industry to gain the appropriate skills to turn their work into successful business applications.

Meet the buyer, Mechanical Engineering

STFC hosted a Mechanical Engineering Meet the Buyer event on 24th November 2010, at Cosener's House, Abingdon to introduce UK industry to STFC funded facilities, including CERN, ISIS, the Diamond Light Source and the European Southern Observatory. Almost 50 mechanical engineering companies attended the meeting. There were presentations from the facilities on their mechanical engineering requirements followed by networking and nearly 50 'one-to-one' meetings between potential suppliers and procurement and technical specialists from the facilities.

The aim of the meeting was to promote the many opportunities for UK industry at STFC facilities. Supplying to an STFC facility can provide a valuable source of revenue and position a company to supply to other similar laboratories around the world.

The meeting was very well received by the attendees and the facilities and the feedback included:

"I thought this was really the best conference I have attended so far, as it was so efficient and to the point. I met many current contacts and also some new potential contacts."

"The whole day ran very smoothly"

"Overall excellent. As a small business, it is often very difficult to justify the time out to attend conferences and networking events. This was exactly what we needed, it was very well organised, focused with all the key contacts we were looking for in attendance."



"A very well organised , informal and comfortable feel to the event".

"I have now made contact with several new potential customers"

"Found yesterday really useful thanks, also a lovely venue!"

To learn how to supply to STFC facilities or to have more information, contact Julie Bellingham at tenderopportunities@stfc.ac.uk

The 2010 ROE Workshop – Applications of Astronomy

This three day meeting at the Royal Observatory in Edinburgh was organised by STFC in partnership with the University of Edinburgh, to highlight the benefits that can be brought to society by the technologies which have been developed for astronomy. A good practical example of what has already been achieved came in the presentation by Prof Alan Heavens (University of Edinburgh and Blackford Analysis), where a technique for vastly increasing the speed at which physical information could be extracted from multi-terabyte astronomical surveys was being applied to the real-time evaluation of imagery from security screening and medical imaging (see www.BlackfordAnalysis.com). Dr Craig Mackay of the University of Cambridge gave a far-reaching review of the applications and economic impacts which the light sensitive detectors developed by astronomers have made in many areas of industry, whilst Damien Weidmann of RAL-Space highlighted the technological similarity between the detection of ammonia in the atmosphere of Jupiter with that of detecting traces of explosive molecules at shorter ranges.

Other fields where astronomical technology is finding new applications include the increasingly important study of the impact our industrial society is having on the Earth's atmosphere. Optical components which have been developed to enable cameras and spectrometers to make the most sensitive observations of the distant universe are being adapted for use in drone aircraft and Earth observing spacecraft, bringing substantial gains in performance. A key example here is the use of integral field optics to reformat an image so as to measure spectra from a more efficient rectangular area, rather than the long thin slit used in conventional 'push-broom' Earth observing systems. This is being developed by both the UK Astronomy Technology Centre (STFC) and the University of Durham.



From left to right, Professors Alan Heavens, Colin Cunningham, Ian Robson and John Peacock at the ROE Workshop 'Applications of Astronomy', standing in front of the KMOS integral field spectrometer for the European Southern Observatory

The huge but often poorly appreciated cultural impact of astronomy on all areas of society was highlighted in Gordon Love's (University of Durham) keynote presentation, where astronomy as a source of inspiration for Britain's next generation of young, creative innovators was the theme, pointing the way forwards towards closer contacts and collaborations between academic and industrial scientists.

The workshop enjoyed a vibrant and discursive atmosphere, and was a huge success in highlighting the wide ranging impacts to society that astronomical technology has had in the past and will continue to have in the future.

Alistair Glasse
JWST-MIRI Instrument Scientist
UK Astronomy Technology Centre