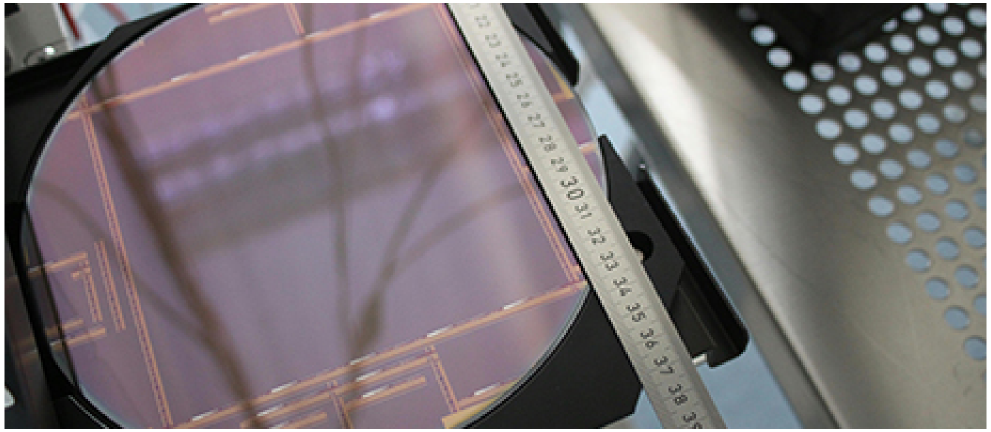

Imaging Technology in the Fight Against Cancer

An internationally renowned expert in image engineering based at the University of Lincoln has developed new medical imaging technology that could revolutionise cancer treatment.

A consortium, led by Distinguished Professor of Image Engineering Nigel Allinson, created DynAMITe, the world's largest radiation-tolerant silicon imager – 200 times larger than the processing chips in current PCs and laptops.

The images it produces show the impact of radiation on tumours very clearly, as well as assisting detection in the earliest stages of disease progression.

DynAMITe was designed primarily for medical imaging, in particular for mammography and radiotherapy. It was funded by a £1.2 million grant from the UK Engineering and Physical Sciences Research Council (EPSRC).

The research also involves medical physicists at the Institute of Cancer Research and University College London, with clinical trials for prostate cancer radiotherapy being undertaken at The Royal Marsden Hospital.

Image Sensor Design and Innovation Ltd (ISDI) was formed as a result of the project. ISDI has signed agreements with a global medical technology company for the exclusive design and provision of all future large area imagers.

Three international patents have been submitted and DynAMITe won the UK’s Institution of Engineering and Technology’s 2012 innovation award for electronics.

The initial development of the technology was funded by previous grants from the EPSRC totalling £8.7 million. More recently, a £1.6 million translation grant for the PRaVDA project was awarded by the Wellcome Trust.

The PRaVDA project, also led by Professor Allinson, will combine the imaging techniques developed at Lincoln with detectors produced at the University of Liverpool to develop unique medical imaging technology that will provide accurate proton therapy doses and 3D images of where radiation is absorbed at a tumour site.

"Perhaps most importantly, we'll be able to see in real time where the dose is absorbed on the tumour. This will be, if you like, the Holy Grail of radiotherapy."

http://sse.royalsociety.org/2014/treating-cancer/

Proton therapy has emerged as the most promising alternative to conventional radiotherapy. Unlike x-rays, very little radiation is lost as a proton beam travels through healthy tissue on course to the target cancer cells. This means much higher doses of radiation can be delivered without the risk of damaging healthy tissue.

Its combination of improved accuracy and potency makes proton therapy the preferred (and sometimes only) choice for treatment of cancers which lie close to vital structures in the body, such as the spinal cord or brain. It is effective for treatment of young children as there is much less likelihood of the development of secondary cancers later in life.

Professor Allinson's work has the potential to make this revolutionary form of treatment a viable option for thousands of cancer sufferers. Radiotherapy would be shorter and more effective and there would be opportunities to combat some common cancers that have resisted conventional treatment. Being able to see how radiation interacts with a tumour in 3D is considered to be the 'holy grail' of radiotherapy.

Professor Allinson leads a team of image engineers at the University of Lincoln and is Visiting Chair of Materials at the University of Oxford.

In addition, he has led a number of high-profile forensic science projects within the criminal justice system and homeland security. Technology related to forensic investigations that he developed is currently in use by three-quarters of UK police forces.