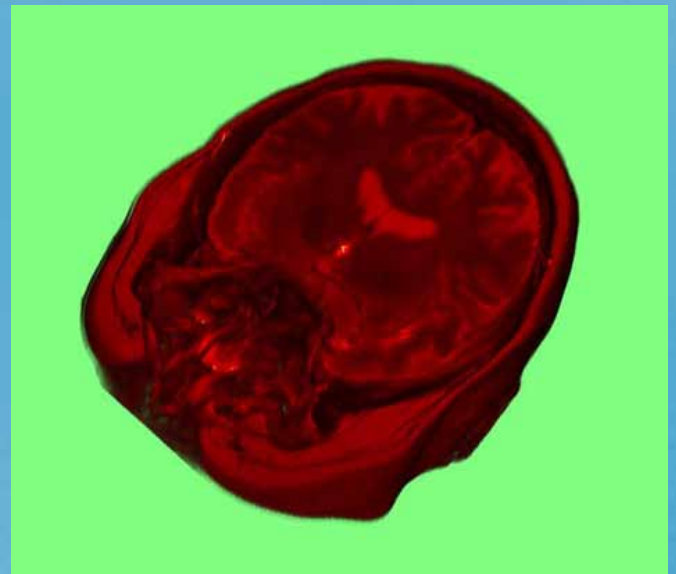




Medical Research Funding Boost



Prof. Nigel John



The Unit Logo is a volume rendered image of MRI scan data of a human head, using a transfer function based on the colours of the Welsh Flag

RIVIC's collaborative approach to research has resulted in a significant grant win of £1.2M to establish a new Biomedical Research Unit. The Advanced Medical Image Analysis and Visualisation Unit is led by Professor Nigel W. John from Bangor University in partnership with the NHS in Wales and Aberystwyth, Cardiff and Swansea universities. The successful win is listed on the Welsh Government's NISCHR page.

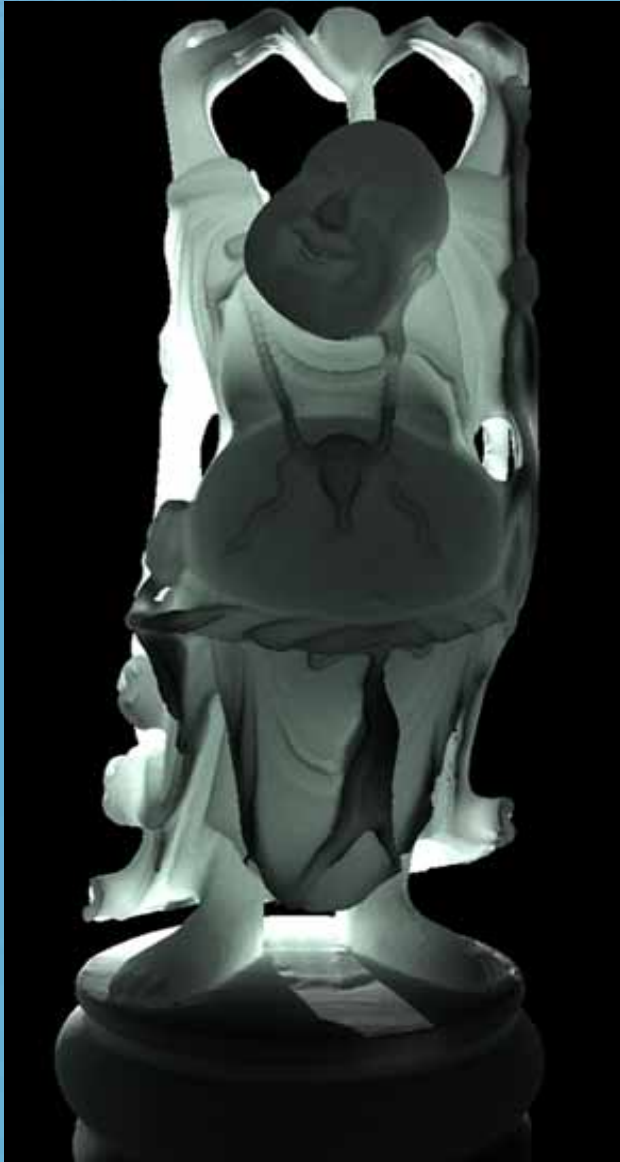
The Advanced Medical Image Analysis and Visualisation Unit

The formation of this new unit is in direct response to current pressure for change in accepted medical practice. Patient safety has been highlighted as a key issue which needs to be addressed and the technology being developed in Wales will be leading the revolution. The main goal of the institute is to bring together the world-leading medical image analysis expertise that already exists in Wales to facilitate a change in support for medical practice. The research unit will provide leading expertise in Wales that will have significant added value for diagnosis, treatment, rehearsal, education, and training applications. The Unit will be operated by the Research Institute of Visual Computing (RIVIC), a successful pan-Wales research collaboration involving Aberystwyth, Cardiff, Swansea and Bangor universities. The School of Psychology at Bangor is also bringing its expertise to the Unit particularly in the area of neurology where problems can be assisted by imaging.

For more details : www.medical-imaging.org.uk



Ray Tracing Programming Library



Ben Mora, Naive ray-tracing: A divide-and-conquer approach, ACM Transactions on Graphics (TOG), Volume 30, Issue 5, Article 117, October 2011

Ben Mora, Swansea University has developed a new Ray-Tracing (RT) programming library called Direct-Trace that provides tools for developers to solve geometrical intersections between light rays and 3D objects efficiently. The API has been designed to work in the same way as OpenGL, but with some improvements in the language that increase overall productivity. As such, Direct-Trace allows creating realistic 3D images that consider indirect illumination of objects, which is something that is not possible with rasterization-based libraries like OpenGL or Direct3D.

On a more technical side, the RT engine itself uses the first efficient algorithm that does not use spatial subdivision data structures to solve Ray-Tracing problems. This allows tracing of rays as soon as the scene primitives are stored in some appropriate lists. It has the advantage over other RT algorithms that dynamic scenes are processed in a quicker manner as no complex pre-processing is required, and hence its suitability to real-time environments. On a single 3GHz core, the engine traces between 1 and 10 millions rays per second, depending on both the coherency of rays and the scene size, which can contain several million primitives. Unlike other Ray-Tracing platforms providing a high-level language and hiding most internals from the programmer, the new Direct-Trace library has been designed as a closer-to-hardware-but-programming-friendly layer. Principally, the library manages memory objects like buffers of rays, images and scene elements such as its geometry, and computes intersections. Other elements of a 3D rendering pipeline such as shading or ray-generation can also be supported by the Direct-Trace API as it provides programmable shaders in a simple manner.

In addition to RIVIC funding, EPSRC has heavily supported the project as well, on both its theoretical aspects through a 3-year grant and a 1-year follow-on funding to create the Direct-Trace library and make it available to 3D developers. The Direct-Trace algorithm has just been accepted for publication by ACM Transactions on Graphics (pictured).

Programmers have now access to beta versions of the DirectTrace driver through the library's website www.DirectTrace.org.



RIVIC Hosts Eurographics 2011



Event organiser Dr Jonathan Roberts of Bangor University with Prof. John Hughes, Vice Chancellor, Bangor University

The international conference brought top researchers in computer graphics to Wales for the first time recently when the Eurographics conference took place in Llandudno in April. Organised by RIVIC staff from the School of Computer Science at Bangor University, the delegates visited the University's Pritchard Jones Hall for a Gala Dinner on the final evening. 350 delegates from 32 countries attended the 32nd annual Eurographics conference.

Dr Jonathan Roberts, chair of EG2011 said "It is a great opportunity for Computer Science researchers and developers to learn about the new trends and research ideas in computer graphics".

Three keynote speakers enlightened the audience, with Kurt Akeley, one of the founders of Silicon Graphics and formerly of Microsoft Research, presenting insights into past graphics architectures and current stereoscopic displays; Frits Post, Delft University of Technology challenged the Conference to think about how to visualise extremely large data sets, while Guillaume Thierry from Bangor University's School of Psychology entertained delegates with ambiguous art that confused the eyes and enlightened the mind!

Jonathan Roberts said "There were several highlights, it was great to meet with the other graphics researchers and discuss the research they are doing and to present my research, and it was great to listen to their technical presentations; another highlight was the Welsh themed gala dinner at Bangor University, the male voice choir entertained us and got everyone involved, and all the guests had a great time".





Bangor Collaborates with International Partners to Provide 3D virtual Training Environments



Students interpreting within virtual space

Social media and virtual worlds are now being used to facilitate world wide business interactions, experts at the school of Computer Science in Bangor are collaborating with Surrey University and a consortium of other international partners to provide suitable 3D virtual environments for the training of interpreters. The 2 year framework project called IVY (Interpreting in Virtual Reality) is responding to the increase in European-multilingualism sparked by the recent rise in migration. The need for professional interpreters in business, legal, medical and other settings has therefore increased. The IVY project will address the needs

of both trainee-interpreters and the users of interpreters in; higher education, vocational training and adult learning contexts, the project will use the exciting features of 3D virtual environment technology to create an environment that supports the learning and practising of skills required in interpreter-mediated communication.

Future interpreters need to master an ever broadening range of interpreting scenarios and skills, which is difficult to achieve with traditional teaching methods. In many of the emerging interpreting scenarios, a client-side perspective is crucial to understanding what is involved when working with an interpreter, but efforts to educate potential clients of interpreters are scarce and normally separate from interpreter education. Project IVY will not only look at the training of interpreters but the clients who will be employing them. Bangor's expertise in the area of 3D technology is being used to create the interactive virtual environment, be this virtual boardrooms, or classrooms. Surrey University are leading on the project. Dr Rob Gittins from Bangor University said: "We are really pleased to be the technology partners for IVY, virtual environments and augmented reality are specialist research areas at Bangor and it is important to us that we extend the reach of our research into a variety of different disciplines." The IVY project is supported by RIVIC researchers and was born out of a previous A4B research project conducted at the school of Computer Science called VRLink where a group of experts were looking at how to maximise the business potential of 2D social media and 3D virtual environments by creating social media and virtual office facilities for business meetings and professional training programmes.





Forthcoming Symposium - Visual Computing & Heritage Recalling our Past through Visual Computing



Dr Rob Gittins

The one day symposium will be bringing together top researchers and practitioners from academia and industry who are interested in the development and application of emerging technology. The event will be exploring new ways of working in visual computing to record, explore and exploit the benefits of our heritage and historical sites. Presenters at the event will be explaining new ways of using technology to use information encapsulated in terrain, buildings and artefacts using 3D images. Specific workshop sessions will be held to forge collaborative research partnerships between industry and academia in order to target funding opportunities to meet the challenges identified.

The symposium will take place at Ty Menai, Parc Menai in Bangor on 28 November 2011. For further information and to get involved contact the event organiser Dr Rob Gittins on: r.gittins@bangor.ac.uk

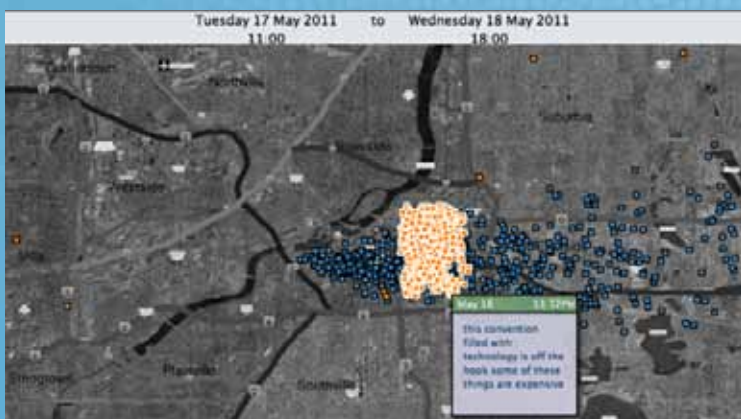
RIVIC Academics Win “Outstanding” Award at IEEE VAST Challenge

This year, a team of academics at Bangor entered the IEEE VAST Challenge 2011. <http://hciil.cs.umd.edu/localphp/hcil/vast11/> The contest provides synthetic data sets with an embedded ground truth surrounded by obfuscating data, and challenges teams to correctly answer a series of questions on the scenario.

The mini-challenge was concerned with tracking the spread of an epidemic within a city using Twitter messages. The team built a tool to help understand the underlying narrative of the scenario, and to analyse the data. They discovered not just the spread, but also the transmission method and cause of the epidemic. A short video summarising the analysis is also available at.

The team received notification at the end of July that their submission had been selected for an award -

“Outstanding Analysis Using Custom Tools” – they have been invited to write up the work for publication and to present at a workshop as part of Visweek 2011 <http://visweek.org/> which is to be held in Providence, Rhode Island, USA in October. This is the second successive year that the team at Bangor has received an award, and is indicative the international-level of expertise in the field of visual analytics.



Example of the tool

Bangor’s team this year consisted of Llyr ap Cenydd, Rick Walker, Serban Pop, Helen Miles, Chris Hughes, William Teahan and Jonathan C. Roberts.



New RIVIC Lead for Swansea - Mark W Jones



Dr Mark W Jones

Prof. Min Chen from Swansea has recently taken up a position at Oxford University in the E Research Centre where they specialise in Visualisation. RIVIC wishes Min Chen every future success. Dr Mark Jones will now be the RIVIC Co-Director of Research at Swansea. His interests are: modelling and rendering scientific data, ray tracing and distance fields.

New Staff at Swansea - Rita Borgo



Rita Borgo

Rita Borgo received her BSc and MSc (Laurea with commendation) from the University of Bologna in 2000 and PhD in Computer Science in 2004 from the University of Pisa. Her research interests include scientific visualization, information visualisation, and visual analytics. Human factors in visualisation. Multimedia processing and visualisation. High performance computing. Functional programming. She has held post doctoral positions in Leeds, and Swansea. She is a member of BCS Women in Computer Science and IEEE.



New Staff at Cardiff - Kirill Sidorov



Dr Sidorov

Dr Kirill Sidorov (BSc PhD) joined Cardiff University School of Computer Science & Informatics as a lecturer recently. He is now a member of the Visual Computing research group.

Before joining Cardiff University, Dr Sidorov worked as a research fellow for the University of Edinburgh, on the TOMSY (Topology Based Motion Synthesis for Dexterous Manipulation) project. This project involved investigating applications of computational topology for motion planning of humanoid robots, computer graphics and animation, as well as computational geometry. This topic has now become one of Dr Sidorov's main research interests.

His other major interests lie in the field of computer vision, in particular in groupwise non-rigid registration of images and surfaces, the topic in which Dr Sidorov has achieved several important pioneering results.

His other research interests include computer graphics, statistical modelling, unsupervised machine learning, digital signal processing, physical simulations, and computational mechanics.

RIVIC Student Finalist in “Pecha Kucha” Competition



Kenton Morgan, Rygbi Innovations Ltd. Helen Miles. Professor Nigel John. Gav Lawrence, Institute for the Psychology of Elite Performance, School of Sport, Health & Exercise Sciences

PhD student Helen Miles was one of the finalists at the KESS awards evening held at Bangor University. The evening included a Pecha Kucha competition.

Traditional Pecha Kucha allows 20 slides with 20 seconds presentation per slide, the KESS competition was anything but traditional and anything but easy. Students were only allowed to show only 6 slides with 30 seconds per slide in order to describe and inform the audience about their project.

Helen said: “I am developing a virtual environment to help rugby players improve their skills. We decided to concentrate on passing skills as this has been recommended as a skill that many people overlook.”



Helen presented her work on the use of motion capture to track a real rugby ball that will be tethered to the ground. The player stands in front of a large projection of a virtual 'target'; when the ball is thrown the motion capture device (PST - Personal Space Tracker) will record throwing speed, angles and coordinates before the ball is pulled to the ground by the tether. After the system receives the data from the PST it calculates what the flight path for the real ball would have been and applies it to a virtual ball.

There are several reasons for doing this rather than just practicing outside with a real ball:

- Players can train on their own, rather than as a group, so one player can concentrate on a specific skill.
- The system can be adjusted to reflect different training scenarios: different targets, locations, multiple or moving targets vs. stationary, virtual characters to throw to.
- The system can also simulate different types of weather, as different conditions affect the ball.

The project also aims to provide analysis of a player's throwing technique, in order that the coach can indicate how a throw could be improved upon. The current plans do not include motion capture on the player but they may be employed to give more detailed data.

Dr Simon Watt from the School of Psychology and Dr Gavin Lawrence from Sports Science are also involved in the project as consultants looking at the fields of 3D visualisation and motor control. And Kenton Morgan from Rygbi Innovations Ltd is collaborating on this project.

Helen is studying for her PhD in Computer Science through the KESS programme which means that not only is her research degree fully funded but she is also working in partnership with a local company, Rygbi Innovations Ltd. The KESS programme is based on collaboration – something that is increasingly important to the success of both large and small businesses. A KESS PhD student receives a stipend of £13k per year and an MRes student £9k per year. Students are also entitled to a further £5.2k for conference, consumables, training and support and travel costs.

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