RIVIC
Research Institute of Visual Computing

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Winter 2010

RIVIC Attends Services-to-Business-Events in Bangor and Aberystwyth

RIVIC attended two business focussed events in Bangor and another in Aber last month. These events are a new university-lead initiative designed to engage local businesses and will now be a regular feature of RIVIC's calendar. The stands and displays created a good focus for discussion and delegates were given a taste of the research areas that RIVIC is involved with.

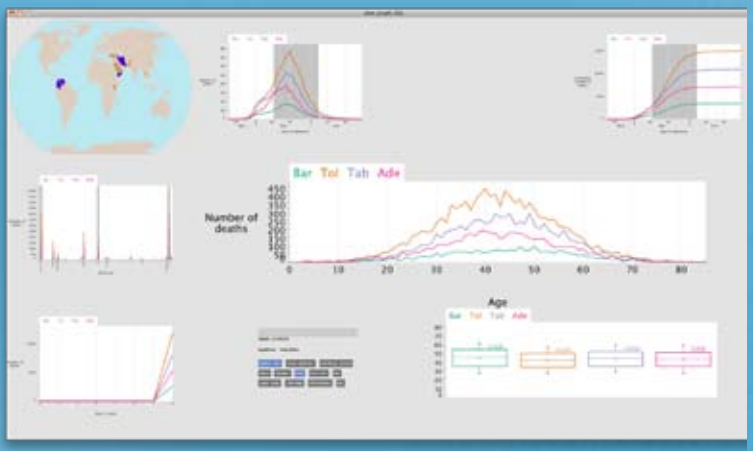
RIVIC Sponsors Eurographics 2011

The prestigious International conference comes to Llandudno, North Wales this year from the 11th -15th April and will be hosted by Bangor University. RIVIC are the main sponsors of the event which will attract over 400 visitors from all over Europe to take part in workshops and listen to world-leading experts in the field of visualisation.

Dr Roberts, event organiser explained: "We are keen to showcase North Wales to such an important International audience. We are delighted to be able to announce that our keynote speakers for the event are Kurt Akeley, Principal researcher at Microsoft Research Silicon Valley, Guillaume Thierry, Professor of Cognitive Neuroscience at Bangor University and Frits H. Post, Associate Professor of Computer Science at TU Delft."

For further information visit the event web site: www.eg2011.bangor.ac.uk

Bangor Wins VAST Award



Screen shot of the winning tool

Dr Jonathan C Roberts and his team of post-docs Serban Pop, Rick Walker and Llyr ap Cenydd entered the VAST 2010 Challenge. This annual 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 Bangor team tackled the challenge which was concerned with the spread of a pandemic across several countries. By building a tool to analyse the data provided, using a combination of multiple views and statistics, they were able to successfully answer all the mini-challenge questions.

Dr Robert's team received the award for "Good analytic process and explanation", and have presented and discussed the work at the VAST Challenge 2010 Participant Workshop in Utah in October Dr Roberts commented "This provides further evidence of our international reputation as a leader in visual analytics".

Airbus Sponsor New PhD Student

Cardiff University have recently recruited a new PhD student who will be working on developing research on making mosaics on surfaces into a method for making meshes for computational fluid dynamic analysis of aircraft. It is hoped that this research will enable accurate prediction of patterns of airflow over wings during aircraft design.

www.cs.cf.ac.uk

New staff for Aberystwyth

Dr Hannah Dee, Lecturer

Hannah has a BSc in Cognitive Science (1996), an MA in Philosophy (1998) and a PhD in Computing (2005) all from the University of Leeds. Her research areas are computer vision for the analysis of human behaviour; the detection of shadows and reasoning about shadows; and student attitudes to the study of computer science. She has held post doctoral positions in Grenoble (France), Leeds, and Kingston upon Thames. She is also a women in computing activist and deputy chair of BCSWomen, the British Computer Society's group for women.

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Grant Success for New Staff

Yu-Kun Lai

Yu-Kun Lai was recently appointed as a lecturer at the School of Computer Science and Informatics, Cardiff University and has been awarded an EPSRC grant for his project on intelligent shape editing with robust feature analysis.

Yukun explained "3D geometric models are widely available nowadays thanks to modern acquisition techniques. Unlike traditional CAD models used in the manufacturing industry, representations such as triangular meshes are often used as they provide more flexibility in representing fine details or complicated topology. To promote model reuse and reduce costs, editing existing models is an extremely effective way of generating new models. In allowing efficient and effective editing, another important problem remains largely unexplored: how do we train computers to understand a users' editing needs. To address this problem, this project aims to develop a new editing framework based on robust feature analysis."

Robust feature analysis techniques are fundamental to more general settings when geometric models are used, it is hoped that the framework focussing on feature analysis and interactive techniques may also stimulate further research.

Celebrations at Cardiff

Professor Dave Marshall, Michael Johns, Professor Sir Martin Evans and Grace Jones

Two budding computer scientists joined Cardiff University's President Professor Sir Martin Evans last week to celebrate projects completed as part of the Nuffield Bursary Scheme.

Grace Jones and Michael Johns collected certificates from Sir Martin for their project 'Analysing Facial Movement with 3D' which they worked on with Professor Dave Marshall from the School of Computer Science & Informatics.

The project, which was completed during a summer placement within the School, focused on the creation of a database detailing facial movement analysis to be used by the worldwide research community. The students, both from Gower College in Swansea, used a 3D video camera to research how people's faces change dynamically when talking and smiling.

The aim of the research, which is ongoing, is to develop realistic models of facial dynamics for a variety of applications including Computer Graphics, Film and Animation. The tools developed will also help those working in medical and psychological fields determine the normalities and ab

normalities in facial expressions which will assist of the early onset of certain motor/neuron diseases.

Future research will include inviting people back to repeat the process, allowing the team to monitor the affects of aging and how this impacts on the way we say certain words.

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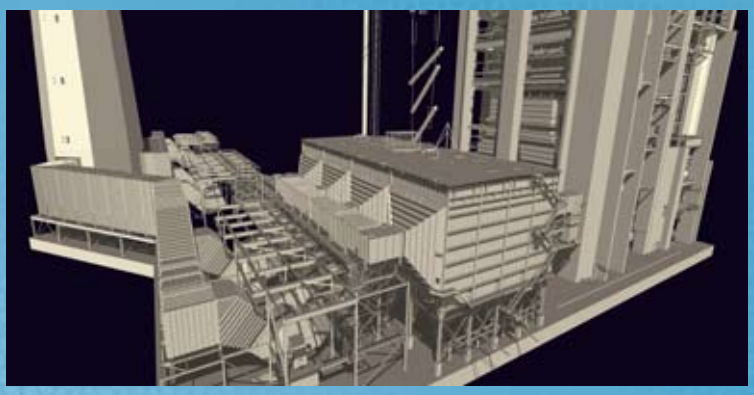
Dr Benjamin Mora wins EPSRC funding



High Performance high-definition Ray-Tracing of the powerplant model generated in 1.3s for primary rays, and less than 3s including shadows (Timings include full image pipeline, with 3840*1728 pixels, 12 million triangles & single core 2 processor @ 3GHz)

Dr Mora's project recently won EPSRC funding, The Direct-Trace Project: is entitled "real-time highly realistic computer graphics for the masses".

Here he explains the essence of the research proposal: "Ray-tracing can provide significantly more realistic effects in 3D graphics, but requires a huge amount processing power. The Direct-Trace project aims at providing tools for ray-tracing that, for the first-time, are applicable to real-time renderings and dynamic scenes. This project will provide a proof-of-concept API for the basic algorithms behind the Direct-Trace technology, which has been supported by a former EPSRC grant and by a recently-filed patent on the technology."

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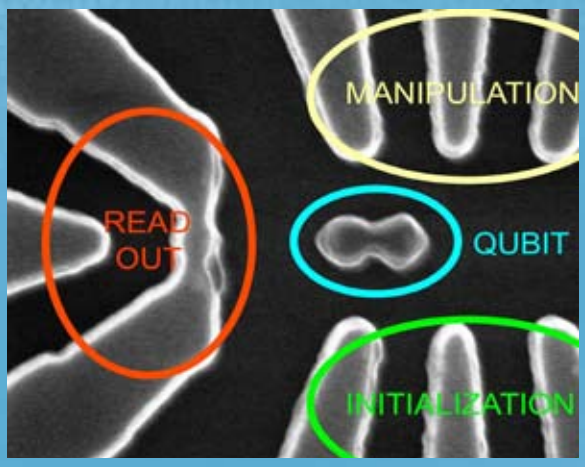
Quantum Engineering: Turning Physics into Technology



While this creates the real possibility of a new age of quantum engineering, the realisation of such devices is still a major challenge.

David Williams speaking at Hitachi Cambridge Lab's 20th anniversary seminar on Physics for Sustainability.

Dr Frank Langbein and Dr Sophie Schirmer recently contributed to the IEEE GOLDRush newsletter with a paper entitled Quantum Engineering: From Einstein's Spooky Action to Sustainable Technology? The paper discusses the need for an interdisciplinary approach to science in order to create the devices of the future.

Until recently quantum dynamics was predominantly in the domain of physics explaining the workings on the universe at tiny scales and also at the heart of many philosophical discussion about the strange nature of our universe. Advances not only in physics, but also in manufacturing, computer science and mathematics now promise a wide range of applications of quantum phenomena from communication, to electronics, computing, biology and medicine. Quantum devices would function quite unlike classical devices and enable new functionalities to create faster, smaller and more energy efficient devices. While this creates the real possibility of a new age of quantum engineering, the realisation of such devices is still a major challenge.

It requires the development of a comprehensive quantum engineering framework, including new tools for modelling quantum devices, simulations of quantum dynamics, continued improvements to existing models by incorporating experimental data and systematic system identification, control to achieve desired outcomes, and robustness analysis to identify robust device designs. Progress related to these areas has been discussed at an industry workshop on "Physics for Sustainability" organised by the Hitachi Cambridge Laboratory, held in May 2010. The first OCTcomp workshop, initiated by Prof Tommaso Calacro, held in March 2010 at Ulm University, concentrated in particular on algorithms and their performance for controlling quantum systems.

Computational methods to address the above challenges in quantum engineering are under investigation as part of RIVIC's sub-programme 7 in collaboration with Dr Schirmer of Cambridge University.

The article can be viewed at:
http://www.ieee.org/documents/goldrush_sept2010_v1c.pdf

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Visual Analytics in Resilience Road-show

Cardiff, Monday 13 September 2010

This event is one of the three major events planned by the UK Visual Analytics Consortium (UKVAC) supported by the U.S. Department of Homeland Security (DHS). It was jointly organised by the Resilience Unit in the Welsh Assembly Government (WAG) and the VIBE project team based at the Swansea University.

The Roadshow was held at the Wales Millennium Centre, which is the most iconic arts and cultural destination in Wales. Over 80 invited delegates attended the Roadshow, including members of Welsh Assembly Government and various local authorities (34%), members of governmental organisations such as national health services and police forces (14%), university academics (17%), industrialists (29%) and international guests (6%). The Roadshow was hosted by Barbara Wilding, CBE, who is the former Chief Constable of South Wales Police. Gareth Hall, the Director General (Enterprise) of the WAG, opened event, and he highlighted the link between visual analytics and resilience and the link between resilience and Welsh economy. Dr. Joe Kielman, Lead of Futures Research at DHS, gave a keynote lecture on the path of visual analytics and the US resilience program. Four other international guests, Professor David Ebert (Purdue University & VACCINE, USA), Dr. Richard May (NVAC & PNNL, USA), Professor Hans Hagen (University of Kaiserslautern, Germany) and Dr. Tobias Schreck (TU Darmstadt, Germany) gave speeches, showcasing the advances in visual analytics and their applications in various governmental operations and economic activities. A follow up meeting was held in the Welsh Assembly Government on Tuesday 14 September 2010.The meeting explored various avenues for raising the level of activities in Wales and increasing international collaboration, outlining an action plan for moving forward.

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