This international review of UK engineering research was the first to have an exhibition. The exhibition was liked by the review panel because it gave a "structured and well-presented picture of UK research that was available to industrial supporters, academics, the press and governmental representatives". It would seem likely that future research reviews by EPSRC will incorporate such an exhibition. In fact it may well be that future reviews have even larger exhibitions that are more accessible. The panel saw it as a way to disseminate work not only to the public but also to others interested in technology like journalists and museum curators.

Supercomputing Conference 2004

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November 2004 saw the 17th annual Supercomputing Conference take place in the David L. Lawrence Convention Center in Pittsburgh, USA. The theme of the conference was Bridging Communities, which represented not only the technical communities participating in the conference but also the architecture of Pittsburgh. The Conference brought together global expertise from industry and research, giving individuals the opportunity to exchange ideas and discuss future developments in high end computing. As in past years, the University of Manchester participated in the conference, exhibiting amongst the research section.

A variety of individuals with a diverse range of skills travelled to the University to Pittsburgh, not only to take part in the conference, but also to demonstrate their own work. Fiona Cook co-ordinated the University's presence at the 2004 event and also worked on the booth during the conference. The booth had a complete overhaul this year; a new exhibition stand was designed encompassing the new University logo along with promotional material. Demonstrations were given on two eight-processor Onyx machines which were kindly loaned by SGI. RealityGrid and AVS/Express demonstrations presented by Robert Haines and George Leaver respectively, created a lot of interest across the HPC, Visualization and e-Science communities. Kevin Roy from the CSAR team also attended the conference and provided expert advice and support in High End Computing. Michael Robson from the University's network team ensured that all of our networking needs on the booth were satisfied, ensuring that demonstrations ran smoothly.

The demonstrations on the University of Manchester stand were the first opportunity for people to see the RealityGrid visualization applications running in AVS/Express Multipipe Edition.

RealityGrid is an EPSRC-funded e-Science pilot project that brings together a consortium of universities and commercial partners. The project is grid-enabling the realistic modelling and simulation of complex condensed-matter structures at the nano- and meso-scales. A further benefit is the production of generic technology for grid-based scientific, medical and commercial activities. The University of Manchester's contribution to RealityGrid is two-fold. Manchester Computing is developing software designed to give existing scientific codes significant steering capability, including on-line visualization of potentially large datasets. The Centre for Novel Computing (based in the School of Computer Science) is developing feedback-guided techniques for performance control, including performance prediction and job migration.

AVS/Express Multipipe Edition (MPE) is the result of a joint project between AVS Inc., Kubota Graphics Technology (KGT), SGI and the University of Manchester. It adds multipipe rendering capabilities to the popular AVS/Express visualization software, allowing visualization in large scale immersive environments, driven by high end SGI systems and PC graphics clusters. The Multipipe Edition allows the user to move their AVS application (or "network") from standard desktop systems to an immersive environment without modification. Hence the visualization can be viewed in whatever display environment is available to the user and MPE will take advantage of the rendering resources available, whether it be multiple SGI pipes or additional graphics cluster nodes.

For the stand, SGI loaned two eight-processor Onyx machines each with two InfiniteReality3 graphics pipes. These machines had to be entirely commissioned on site and it is with gratitude to the SGI conference set-up crew that this was achieved in time. The bulk of

the demonstrations consisted of an eight-processor simulation running on one of the machines with live on-line visualization provided by the other. This was controlled by a laptop running the lightweight RealityGrid Launcher and Steerer applications and all communications were over standard TCP/IP. The application used for the demonstrations was a Lattice-Boltzmann simulation of a water + surfactant system.

An event such as SuperComputing is an opportunity to meet with collaborators from around the world and to see first hand the research they are undertaking. Of particular interest this year were developments within the fields of visualization and Access Grid. The SGI stand hosted a presentation by the Scientific Computing and Imaging Institute from the University of Utah of their *ray (pronounced star ray) ray tracing
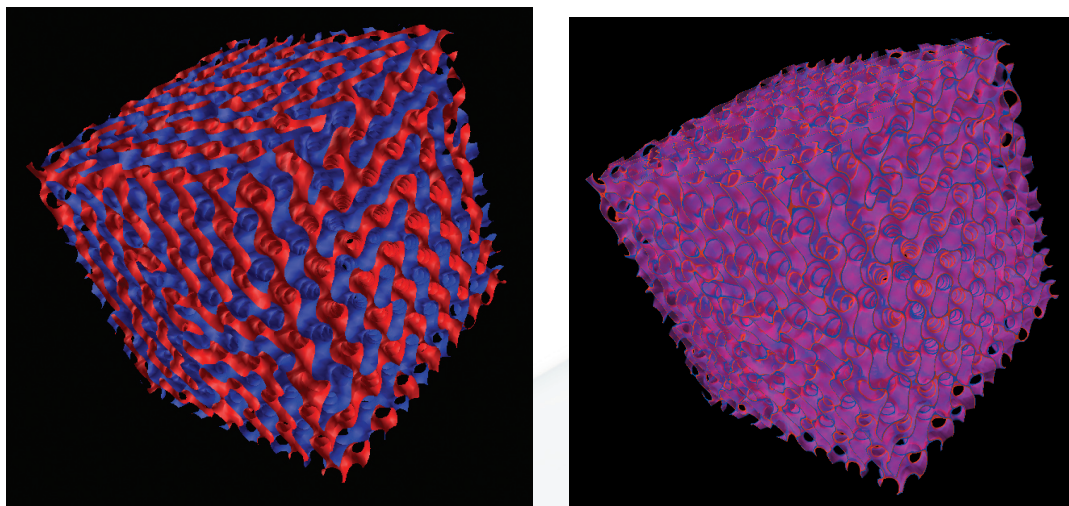

Figure 1: Two visualizations of the same output from a Lattice-Boltzmann simulation shown in AVS/Express MPE. The isosurface (left) is rendered on one IR3 pipe and the volume rendering (right) is produced by the other pipe.

These systems stabilise to form a structure called a gyroid, the progress of which was monitored in MPE on the second Onyx. Judging by the numbers of people attracted to the stand it is clear that the visualization of data is becoming increasingly important to HPC users and that the integration of tools such as RealityGrid and AVS/Express is becoming more important as a result.

Robert Haines also participated in a RealityGrid presentation on the UK DTI e-Science stand with Professor Peter Coveney and Shantenu Jha of UCL. Professor Coveney presented the session from London via the Access Grid while Robert and Shantenu provided a live demonstration of the RealityGrid computational steering system on the show floor. During the demonstration a NAMD simulation was started at SDSC using the RealityGrid Launcher. This simulation was then checkpointed and a new simulation was spawned from this checkpoint on the UK National Grid Service machine at Leeds. While this second simulation was being migrated across the Atlantic, VMD was launched and connected to the original simulation in SDSC providing live feedback on its progress. When the simulation in Leeds had migrated, a RealityGrid Steering Client was attached to monitor and steer it as it ran.

software. This application takes advantage of the shared memory architecture of SGI Onyx and Altix machines to produce ray-traced images of large datasets in real-time. HP were demonstrating their Sepia visualization system which provides dynamic hardware compositing for clusters of render nodes. The Sepia system uses commodity graphics cards and FPGA logic for the image compositing to allow distributed rendering of a partitioned dataset at interactive rates. A number of exhibitors were running Access Grid nodes on their stands, but of particular interest was that of Purdue University who had a stereoscopic display attached to theirs. Two projectors with light polarised at 90 degrees to each other were used in conjunction with suitable glasses to produce a stereo image. The University of Manchester now has its own stereoscopic Access Grid node as part of the e-Science North West Centre.

A small team will travel to Heidelberg in Germany to take part in the International Supercomputer Conference (ISC). The conference takes place in June (21-24) and this year the event will celebrates its 20th Anniversary. For further information please visit the ISC website at www.isc2005.org.