Consortium Meeting attracts international audience

Researchers, academics and business people gathered to share ideas at the HIT Lab NZ’s third International Virtual Worlds Consortium in Christchurch in February

The highly successful Consortium at the University of Canterbury attracted more than 300 delegates from around the world.

Themed Industry Creativity and Research: Partners in Innovation the programme opened with a keynote address from New Zealand’s Minister of Economic Development the Hon Jim Anderton (see separate story).

Other keynote speakers included MIT’s Associate Professor of Media Arts and Sciences Hiroshi Ishii, an expert researcher in human-computer interaction, and Dr Carl Gutwin, a rising star in the world of collaborative computing who is Associate Professor of Computer Science at the University of Saskatchewan, and holds a Canada Research Chair in Next-Generation Groupware.

Professor Tom Furness, Founding Director of the HIT Lab at the University of Washington and the International Director of HIT Lab NZ Ltd, and HIT Lab NZ Director Dr Mark Billinghurst, also gave presentations.

Topics for discussion included how academics can help industry invent the future, mixed reality gaming, artists and technologies in collaboration, and the next generation Internet and enhanced applications. Latest technologies and applications being developed by the HIT Lab NZ and its partners were showcased during the consortium. The programme also included a virtual art-themed cocktail party.

Set in the stunning new Christchurch Art Gallery the event proved a huge hit, as guests viewed artworks “come to life” in augmented reality.

Robotic head demonstrated by David Hansen

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Visionary project gets major funding

The HIT Lab NZ has successfully gained funding from the Tertiary Education Commission’s Innovation and Development Fund to develop an immersive stereo projection system, the first of its type in New Zealand.

The funding will provide the HIT Lab NZ with $540,000 over two years to develop the system, called VisionSpace.

The goal of the VisionSpace project will be to develop a three screen stereo projection system that will enable small groups of people to view an interact with spatial data in new ways.

This facility will be able to show both 2D and 3D (stereoscopic) images in a wide field of view (120 degree) environment. The theatre will be large enough to support simultaneous use by a group of participants, such as entire classrooms or research teams. Similar systems overseas have reported that users are 50% more efficient at finding critical elements in an immersive dataset as compared to traditional non-immersive (desktop) methods.

The VisionSpace system will provide advanced visualization capability to compliment cluster computing efforts at the University of Canterbury and other locations. In this way it will be able to support research in bio-engineering, geographic information systems, physics, chemistry, architecture and a range of other application areas.

In addition to providing a new visualisation platform, the VisionSpace facility will also be used to research new interaction metaphors, resulting in the development of tools that will allow multiple people to simultaneously interact with complex scientific data in an extremely intuitive manner.

One of the reasons for success of the TEC application was the strong indication of industry support for the proposal.

HIT Lab NZ Director Dr Mark Billinghurst said he was particularly grateful for the 28 letters of support from a variety of industry and research organisations. “We intend this facility to be a resource for researchers throughout New Zealand and are keen to find collaborators who have need for technology like this.”

Construction of the VisionSpace facility will begin in July with an expected opening in November.

VisionSpace demonstration
HIT Lab a “great research resource”

From Associate Professor of Computer Science at the University of Saskatchewan Dr Carl Gutwin: collaborative computing expert and Consortium keynote speaker . . .

“ I was very impressed with the HIT Lab NZ’s ability to get industry, government, and academia, and students to come out in such numbers, and to get them all talking to one another at the meeting. I know that this is through a great deal of hard work, forming relationships with all of the partners, but the turnout you had is a testament to the success of your methods.

I was really impressed with the quality of the students and with the degree of innovation that I saw in the demos. The students were doing some incredible things - really clever stuff on a shoestring budget (good Kiwi ingenuity), and some great one-off projects that they just did in their spare time. Your students are your future, and I think you’ve done an excellent job in attracting a great bunch.

The meeting was exciting - the ‘inventing the future’ theme, and Hiroshi’s presentation on taking risks and working creatively really got me thinking about the way I do my own work and projects that I could start working on. The HIT Lab NZ has to be a mixture of innovation and hard work in the trenches, but you certainly have the right mindset to do the innovation part.

The great thing is that you’re probably the most visible IT research lab in New Zealand now, and so you’re going to attract a lot of industry interest, and those industries are going to give you a wealth of real-world HCI problems.

What a great research resource!”

Partners in innovation

Unleashing the innovation and creativity of New Zealanders is the strategy behind the New Zealand’s Government’s support for business partnerships, according to the Minister of Economic Development, the Hon Jim Anderton.

Mr Anderton gave the opening address at the 2005 HIT Lab NZ International Consortium meeting at the University of Canterbury, Christchurch.

He spoke of the Government’s support for innovation and partnerships, citing the HIT Lab NZ and Consortium members such as Pulse Data International, Ectus, and IRL as successful examples.

Mr Anderton said the Government recognised the fundamental importance of business success to sustaining living standards.

“Our strategy to grow more successful businesses in New Zealand is to unleash the innovation and creativity of New Zealanders.”

“The ICT and Creative industries were vital innovation sectors, he said. They also had vital positive effects on other sectors.

The government had begun collecting figures about the level of innovation in individual firms. The figures showed businesses in New Zealand were introducing innovations at about the same rate as businesses in the EU.

“But they also show we haven’t been reaping similar gains in productivity and in real wages.

While New Zealand had some success in bringing innovation into individual businesses, “we need to get better at harnessing world-class innovations that command a premium in international markets”. “We know we have capable, innovative people. Our focus is to do better at unlocking their potential.”

Individuals like (HIT Lab NZ Director) Mark Billinghurst, were an example of the extraordinary tal-

(continued on page 4)
A further example cited by Mr Anderton was the partnership between Palmerston North company NZ Pharmaceuticals and HIT Lab Consortium member Industrial Research Limited (IRL).

New Zealand Pharmaceuticals had launched a three-year research and development project to develop capability in chemical synthesis, and the company was collaborating with the Crown research institute IRL.

“The initiative is designed to produce raw materials to meet strong global demand for special carbohydrate derivatives used in manufacturing some of the latest drugs. The research will help to develop drugs that prevent and treat cancer, heart disease and a range of other life threatening conditions.

Partnerships like these were necessary “to drive our economic performance higher”. Mr Anderton said that recently the Ministry of Economic Development and the Treasury released an Economic Indicators report.

It found that New Zealand had a high level of entrepreneurial behaviour, that skills were improving, and that business investment was improving too.

“But there are things we need to work on. Our productivity needs to improve further – though it has been getting better in recent years.”

There were a number of factors behind New Zealand’s productivity performance. The most important included:

- Levels of private sector research and development;
- Skills shortages – both at management and employee level;
- And Business investment in new technologies.

“We’re working in partnership with industry to solve these issues.”

“And as the results come in, they show the new strategy is working, in lifting our national income and in creating more jobs and opportunities for New Zealanders.”
To become a brightly burning star

With more than 300 attendees, the February 2005 Consortium meeting confirmed that the HIT Lab NZ has accomplished what it set out to do that of becoming an NZ Icon.

Since the formal opening of the Lab in February 2003 (unofficial opening was April 2002) the Lab has built a NZ brand, growing to 49 people in the HIT Lab NZ with 26 industrial partners and 23 academic partners. The Lab is conducting projects with many of these partners. In the process we have spun off three companies. In the cosmology of the HIT Lab NZ we have termed this first phase as the ‘Big Bang’. We wanted to prove that the university can work with industry…not only to industry itself, but to the government and to ourselves at the university…and we did it!

But by itself, this model is not sustainable and does not fulfill our ultimate objective of growing the economy of New Zealand and operating in the global marketplace. We anticipated that about this time we would need to switch to a new mode, somewhat like changing from a floodlight (as characterized by our trying to be everything to everybody) into a laser. In this new mode we direct our energies toward developing transformational technologies. We would need to broaden our partnerships and gather the best and brightest academic staff and students across New Zealand to create ‘critical mass’ that builds this economic engine.

In the last session of the recent consortium meeting, with the partners help, we gave ourselves a grade. Probably the average grade was B+/A-. It was clear that we were doing well in terms of bringing in consortium members and working on short term projects. But we were not fulfilling other objectives such as building our complementary academic program and directing our research to build transforming technologies. In that session, I presented a plan for moving from our first ‘big bang’ phase on to Phase 2 or the ‘star formation’ stage. In this stage we focus, coalesce greater partnership and technologies and work to a research roadmap. We open HIT Lab NZ outposts in our academic and research institutions around NZ, and in essence, raise the HIT Lab NZ to a national institute standing. Over the last two months we have been meeting with central government to ask for substantial block funding over a five year period to implement Phase 2.

Over the next five years the goals of our Phase 2 strategy are the following:
• Generate six research outposts
• Create 50 patents/ 100 invention disclosures
• Spin off eight companies
• Conduct 10 primary/secondary school projects
• Work with five regional incubation centers
• Graduate 100 students (30 Ph.Ds)
• Build a HIT Lab NZ Technology Exhibition Center
• Teach Human Interface Technology curriculum across all research centers

But what of the future beyond this Phase 2 five year plan? When a star goes NOVA it can burn up to a million times brighter than normal, and yet not consume itself. Beyond Phase 2, we want the HIT Lab NZ Ltd to become a Nova star, and burn brightly for all of New Zealand and the world. Our current thinking is to float the HIT Lab NZ Ltd so that we can raise substantial out-year funding to sustain the HIT Lab NZ and it partnerships for many years in the future.

HIT Lab NZ consortium partners can continue their journey with the international HIT Lab by attending our next Virtual Worlds Consortium meeting at the HIT Lab US, 9-10 August at the University of Washington in Seattle. All NZ Consortium members are invited to this event. Douglas Trumbull will be our keynote speaker and guest. Doug is a film director, producer, cinematographer, inventor, and special photographic effects supervisor. His visual effects credits include Stanley Kubrick’s 2001: A SPACE ODYSSEY, Steven Spielberg’s CLOSE ENCOUNTERS OF THE THIRD KIND and won an Academy Award for his invention of the SHOWSCAN 65mm high speed camera system.

We hope to see you in Seattle.

Tom Furness
International Director
An augmented surface for storyboard presentations

A prototype around-the-table application for storyboard presentations using tabletop technology with augmented content has been developed by a team led by Michael Haller from the Upper Austrian University of Applied Sciences.

The system, Coeno-Storyboard was presented for the first time to the HIT Lab NZ’s 2005 Consortium meeting in February.

The prototype is based on the Coeno-framework, a flexible plug-in framework that allows fast development of tabletop applications. The goal of the prototype is to present new ways of interaction and communication for the next generation by using projection-based AR technology.

Michael Haller says mixed reality has become a popular buzzword used by many researchers moving from the area of virtual reality to augmented reality (AR).

“Inspired by the ideas of the Future Office from Henry Fuchs and the Augmented Surfaces presented by Jun Rekimoto, we wanted to develop a multi-user shared tabletop application for storyboard presentations.”

Michael says tables provide a convenient environment for people to meet, discuss, look over prepared documents, and to present ideas that require face-to-face collaboration.

“Our flexible Coeno1-framework allows us to further explore, experiment, and design novel tabletop interfaces for a face-to-face collaboration and it provides an infrastructure to quickly integrate new interaction metaphors and to set up new tabletop applications.”

The seamless integration of heterogeneous hardware devices and the combination of different input and output metaphors achieved a better user acceptance, which is one of the primary goals of creating a better face-to-face interface.

“The computer as a device disappears and is almost ‘invisible’, but the functionality is ubiquitously available. This does not necessarily mean that users will not use their laptops or any other hardware devices, but we want to have it ‘disappear’ into the background and make it as much as invisible for the user.

Michael says participants should not feel lost in, or intimidated by, the complicated hardware devices. “Instead of fighting with the hardware, they should concentrate more on the content creation process. So, we wanted to experiment with new interaction media, test it with different interaction metaphors, evaluate them and combine them as much as possible to achieve the best interaction possibilities we can with respect to usability and flexibility.”

The system consists of a projector above the table and a projector for the wall-display. Both projection images are rendered by the server. The number of connected clients is limited by the size of the table. The environment was tested with three people simultaneously. For rendering the content, the framework was based on OpenGL (for rendering 3D content) and ClanLib (for rendering GUI elements); the seamless integration of ClanLib on top of OpenGL allowed a combination of both libraries. The team used the component model of ClanLib for the inter-component communication and the network extension for the communication between the clients and the server. The integration of the virtual keyboard also included the integration of OpenCV in the Coeno-framework. The fingertips were tracked by the usage of a Philips webcam and a red line laser module that projects a thin line on to the surface.

Michael says the goal of the project was to present new ways of interaction and communication for the (continued on page 8)
next generation by using projection-based AR technology based on a flexible plug-in framework.

“However, we also want to find novel interfaces, that are easy to understand and accepted by people. Instead of using a scrollbar or a ride-wheel for transforming (rotate/scale/translate) data on the table, we want to find more intuitive interaction methods, for example, using a hand/finger tracking system.

The next step is a formal evaluation of the system.

“We want to find out into which of the in- and output techniques we have to put more effort. Apart from new input and output techniques, we want to invest more effort in different application domains such as novel interfaces for team collaboration, tabletop games and so on.”

• The project was developed at the Upper Austria University of Applied Sciences (Media Technology and Design). Team members are Michael Haller, Daniel Leithinger, Jakob Leitner and Thomas Seifried.

Adventures in Germany

During the second week of March HIT Lab NZ student, Jeorg Hauber, and director Mark Billinghurst left warm New Zealand to travel many hours to Germany in winter.

As part of a New Zealand delegation to attend the CeBIT 2005 consumer electronics conference, CeBIT is the largest conference of its type in the world with over 6,000 exhibitors and nearly 500,000 attendees.

For the first time New Zealand Trade and Enterprise (NZTE) sponsored a New Zealand branded booth at CeBIT enabling 16 New Zealand organizations to showcase their technology and gather business leads.

The HIT Lab NZ was invited to be one of the participants and HIT Lab NZ technology was used as a drawcard to pull people into the booth. Students Jung Shin and Claudia Nelles developed a simple game that allowed people with a postcard to see virtual models appear on the real card and have a chance to win New Zealand branded prizes.

Hans Frauenlob, the acting director of ICT for NZTE said that involvement in CeBIT provided “a unique opportunity to launch ‘New Zealand, New Thinking,’ as a brand.” He was delighted at the response of the conference attendees to the stand.

NZTE also sponsored a New Zealand night where Mark Billinghurst, Ian Taylor from Animation Research Limited, and Scott Houston from the NZ Supercomputing Centre spoke. The evening attracted around 150 attendees and one of the CeBIT staff commented that the presentations were the best that he’d ever seen.

For the HIT Lab NZ, CeBIT gen-
Finding Focus

In February we held our annual industry consortium meeting and celebrated the third year of the HIT Lab NZ. Around 300 people attended the event from Government, Industry and Academia and it was wonderful to see old friends again as well as making new contacts.

After two years of building the HIT Lab NZ now it is time to sharpen the research focus. The lab currently has nearly 40 staff and students engaged in 15 projects with a range of different industry and academic partners.

In the beginning it was necessary to develop connections with industry by working on a wide range of different projects in often unrelated areas. This has enabled us to develop a sustainable research environment and attract some amazing staff and students.

However, after the initial explosion of interest it is time to deepen the research and focus on the areas that have the potential to develop truly innovative computer interfaces.

Adding value to the products of our industry partners is important and we will continue to work closely with them. It is also important to conduct longer term research that will lay the groundwork for future innovation.

For long term research our main focus in the coming year will be on enhancing face to face and remote collaboration. We will explore how augmented reality, perceptual user interface and tangible user interface technologies can be combined to build the next generation of collaborative tools. This builds on past work we have completed as well as laying the groundwork for future research.

Already our students have been developing some innovative interfaces for collaboration. For example, this month in Japan at the World Expo in Aichi our Smart-Screen interface will be unveiled. This is a large touch sensitive screen developed by master’s student David Thompson under the supervision of Dr. Richard Green. The Aichi installation is almost 10 meters by 1.5 meters in size and unlike many touch screens allows multiple people to touch the screen at the same time. During the expo groups of 20 to 30 people will be able to play together moving images around on the screen with their natural hand gestures.

We are also developing new interface concepts in desktop conferencing, mobile phone applications and collaborative gaming.

We are excited the opportunity that this sharpened focus will give us to create more research output and look forward to working more closely with companies who are interested in next generation collaborative applications. Please contact us if you’d like more details.

Mark Billinghurst
New Consortium Members

MWH Ltd specialises in developing and managing infrastructure assets in the transport, water, wastewater, stormwater, solid waste and energy sectors.

Less well known, but no less successful, is their expertise in planning, natural resource management, environmental science, sustainable development, health and safety, industrial processes, building services, programme management and design build.

Clients include local and international organisations from the public and private sector. The company’s long-standing track record proves its ability to develop innovative, appropriate solutions that balance global best-practice with local needs, and pragmatism with innovation.

Hana Limited, the Hana Animation Network Agency Limited, came into existence in January 2000. Its mission is to encourage Maori economic growth by promoting education and information among people of the universe.

It exists to facilitate the enterprise of the mission and its activities empower the parties to Maori economic development.

The company is dedicated to the creation of compelling, inspirational and motivational tools for use in the classroom and beyond.

HIT Lab NZ released experts

The recent University of Canterbury graduation ceremony was of special significance to HIT Lab NZ with Chandra Harrison graduating with Masters Degree as well Adrian Clark and Kushal Vaghani who achieved B.Sc. (Hons). These students represent an important milestone for the HITLab NZ as they are the first group of graduates to come through the New Zealand chapter.

Chandra and Kushal have now both moved on to bigger things. After recently completing an internship with Siemens AG in the USA, Chandra has begun a PhD at the City of London University. Kushal is now employed as a game developer with Sidhe Interactive in Wellington. Both returned to Christchurch to attend the graduation ceremony in person. We will see a lot more of Adrian over then next three years as he has just begun a PhD program with HITLab NZ working on the Magic Book project.

Stop Press:

Dr Mark Billinghurst appointed to the Growth & Innovation Advisory Board.

In its second term, the Board is chaired by Ann Sherry, CEO of Westpac New Zealand and includes household names such as Theresa Gattung, Craig Norgate and Stephen Tindall.

The Board was established in 2002 as an initiative of the Minister for Economic Development, Jim Anderton. Its objective is to foster active discussion between the public and private sectors about growth and innovation and New Zealand’s economic direction.
New faces at the Lab

**Anders Henrysson** has a MSc in Media Technology from the Linköping University, Sweden. He has studied various aspects of computer graphics and did his masters thesis about procedural media representation. After graduation he joined NVIS at the Department of Science and Technology as a PhD student under the supervision of Dr Mark Ollila and Prof Anders Ynnerman. He is also a member of CUGS, the Swedish National Graduate School in Computer Science.

The topic for his PhD is Mobile Computer Graphics and Interaction. Anders is fascinated about the possibility of using mobile phones to bridge the physical world and the digital domain. In 2004 he did the first part of ARToolkit to the Symbian platform. He sees the camera-enabled mobile phone as an ideal platform for Augmented Reality and he will develop applications and conduct user studies during his internship at HIT Lab NZ.

Beside work, his main interests are martial arts, literature, football and other forms of culture. During his time in New Zealand he will try to see as much as possible of the country and try to learn wind and kite surfing.

**Daniel Leithinger** is an intern from the University of Applied Sciences, Dept of Media Technology and Design in Hagenberg, Austria. Daniel is currently doing an internship at the lab until July 2005. His work here includes modeling and animating content for the “Star Wars: Where Science Meets Imagination” exhibition at the Science Museum in Boston.

His main professional interests include various areas of Human-Computer Interaction and 3D modeling. In his spare time, Daniel watches a lot of movies and tries to experience some of New Zealand’s nature. His personal website is: http://www.leithinger.net

**Jakob Leitner** is an intern from the University of Applied Sciences, Dept of Media Technology and Design in Hagenberg, Austria. Jakob is currently doing an internship at the lab until end of July 2005. Current work includes interface design and programming for project Coeno and creating and editing presentation videos. Future work will include a user study of the first Coeno application and creating new applications for the framework, e.g. a presentation application for 3D-content or tabletop games.

Together with his colleagues Daniel and Thomas, he likes to explore New Zealand’s extraordinary nature by doing a lot of hiking. Jakob is a fan of Japanese movies, especially cartoon and animation movies and a big fan of classical music. Other hobbies include taking photos, eating Indian food and playing computer games.

**Thomas Seifried** is an intern from the University of Applied Sciences, Dept of Media Technology and Design in Hagenberg, Austria. Thomas is currently doing an internship at the lab until July 2005. Together with Jakob he works on the collaborative tabletop framework Coeno (www.coeno.org). He started this project in Austria and is now improving the framework and developing new applications for Coeno.

In his spare time, Thomas likes to get outdoors and back to nature. He is learning surfing and enjoys watching movies.
Publications


Coming Events

**HIT Lab NZ Open House**
Open to all the public to come view the latest research projects which the HIT Lab NZ are working on.

**Venue:** HIT Lab NZ, Old Maths Building, University of Canterbury
**Date:** Wednesday, May 04, 2005
**Time:** 4pm - 7pm

**Converge05**
A celebration of the creative explosion when art, technology and business converge.

**Venue:** Christchurch Convention Centre
**Date:** October 10-12 2005
**Visit:** www.converge.co.nz for more information