Design guru attracts big audience to public lecture

It was a full house for internationally-acclaimed user-advocate Don Norman when he gave a free public lecture in Christchurch this month sponsored by HIT Lab NZ Ltd.

The University of Canterbury's A2 lecture theatre which seats 200 was packed with members of the public and faculty, and computer and design professionals from a wide range of fields.

In a brief visit to Christchurch, Professor Norman, the “guru” of design usability, visited the HIT Lab . . . which he warmly praised . . . addressed Lab students and gave the free lecture.

His lecture, Emotional Design: Why we love (or hate) everyday things, focused on new research on human affect and emotion and its implications for application to the design of products. He used the three-level theory of human effective functioning, developed with Andrew Ortony and Bill Revelle of Northwestern University, and applied it to design.

The three levels of processing . . . visceral, behavioral, and reflective . . . played different, but equally important roles in design, he said. Good design should satisfy all three levels.

Professor Norman said that he used to be known as a critic of unusable things, but had changed, and was now an advocate for pleasurable, enjoyable products. Successful products should a pleasure to use, and convey a positive sense of self, of accomplishment, and pride of ownership.

Praise for HIT Lab and partners

During his visit to the HIT Lab Professor Norman said he was very impressed with the Lab’s work.

"Mark (Billinghurst, HIT Lab NZ Director) has done an excellent job of getting bright, motivated people to work together, both with one another and with their industrial partners.

(continued on page 2)
“That is no small feat, and although mostly invisible to onlookers, getting academic researchers to work well with both one another and with people from industry is often quite a challenge. Mark has pulled this off extremely well.

“I think the focus of the lab — on augmented reality and other visual enhancements — is relatively unique and therefore a powerful addition to joint university/industrial endeavours.”

Of the projects, he was particularly attracted to the MagicBook “which I think has an extremely exciting future”. “That same technology can be applied in a number of areas, as other HIT Lab work demonstrates.”

He said he also saw considerable potential in the joint work being done with Trime Navigation: “This is an area where augmented vision could be of immediate assistance”. The work with Pulse Data on devices for the blind was another highlight for him, and he considered the company “a major success story”.

HIT Lab also works with NavMan, and as a result of his visit to the Lab, Professor Norman visited NavMan in Auckland and is now testing one of their products.

Professor Norman (BS and MS in Electrical Engineering and a PhD in Psychology) is Professor emeritus at the University of California, San Diego.

He was a Vice President at Apple Computer, and as head of Apple’s Advanced Technology Group (ATG) he helped change the product process to emphasize the total user experience from product conception through shipping.

After Apple he was an executive at Hewlett Packard until he left and joined with Jakob Nielsen to form the , which he describes as “user advocates”.

“We help companies move toward human-centred products and internet interaction, the better to play a major role in the new world of customer-centred goods and services”.

He is author of The Design of Everyday Things, Things that Make Us Smart, and The Invisible Computer. His latest book Emotional Design: Why we love (or hate) everyday things has been an international hit.

---

**Tourism and technology team up in a whale of a venture**

The award-winning tourist adventure Whale Watch Kaikoura and the HIT Lab NZ are teaming up to develop an interactive experience that will go well beyond a conventional tourist attraction.

Whale Watch Kaikoura (WWK) approached the HIT Lab NZ to look at investigating ways to enhance the company’s visitor experience and support its vision to create a world class facility that provides an inspiring understanding of environment and culture.

One of the goals of the HIT Lab NZ is to teach and empower people through the use of innovative technologies, using computer interfaces with advanced technologies that will engage, teach and inspire. HIT Lab NZ General Manager Richard Bishop says a collaboration with the HIT Lab NZ will allow Whale Watch Kaikoura to develop an experience that goes “beyond the conventional attraction”.

“As part of this collaboration the HIT Lab NZ will provide tools to enhance the dreams of Whale Watch Kaikoura. Partnering with the HIT Lab NZ will enable them to tell their stories more effectively. It will also ensure that new technology is utilized in ways that best serve storytelling and the guest experience as a whole.

“Whale Watch has the vision and the story, while the HIT Lab NZ has the tools to enhance it and make it come to life.”

A team of eight staff and students from HIT Lab, led by Director Mark Billinghurst with Richard Bishop, project leader Eric Woods and intern Michal Lahav from the US, has been working on the project. They have already produced a range of technology ideas currently under consideration.

The ideas focus on three areas: the On Boat experience, the On Shore experience at the current Whale Way station, and a multi-sensory experience at the Visitor Centre. Richard Bishop says that the focus of this “outstanding” visitor attraction would be on the experience, not on the technology used. “If we ‘wow’ our visitors, and go into their hearts, that alone will showcase the technology.”
Developing a world class World Expo experience

In 2005 the countries of the World will be showing off their best at the World Expo in Aichi, Japan. Among them, New Zealand will have a unique pavilion designed by Wellington based company Story Inc that emphasises the connection between the people, land and sea. The HIT Lab NZ has been engaged by Story Inc to produce the interactive experience inside the NZ Pavilion. Staff and students have been working since the beginning of the year to develop an engaging interface that can be used by hundreds of thousands of people during the course of the Expo. In total, more than a million people are expected to visit the NZ Pavilion during the nine months it is open.

The centre piece of the interactive experience will be a touch sensitive surface nearly 10 metres in length, developed by Masters student, Dave Thompson, working with faculty member Dr Richard Green. Unlike most touch sensitive surfaces this will allow multiple people to interact with the screen at the same time. The surface will be one of the largest of its type and will allow the presentation of unique collaborative content.

Two of the key developers on the experience, Andre Lichtenecker and Florian Bacher, have developed an engaging graphics application that runs across the touch surface. Just finishing a six month internship from Austria, they are about to head back home, but they are eager to see the final result. However, just like the rest of New Zealand they’ll need to wait until December this year for the grand unveiling.

The HIT Lab NZ director summed up the accomplishment: “It is remarkable the accomplishment: “It is remarkable that all of the academic papers submitted to these conferences were accepted. This shows the strength of the students at the HIT Lab NZ and the University of Canterbury. I’m particularly proud of the graduate and undergraduate students who were able to present papers in a conference for the first time. They have a great future in front of them.”

HIT Lab NZ makes its mark in Singapore

HIT Lab NZ staff and students made a big impact in Singapore last month. The Director, Mark Billinghurst, was invited to give one of the keynote speeches at the first international conference on Advances in Computer Entertainment Technology (ACE 2004). This conference was held 3-5 June at the National University of Singapore and attracted around 120 attendees from academia and industry. Mark spoke on “Augmented Reality Entertainment: Back to the Real World”, emphasising how Augmented Reality can be used to provide enhanced face to face entertainment experiences in a way that is impossible with other computer interfaces.

Four papers and a demonstration were then presented at Graphite 2004, the International conference on computer graphics and interactive techniques in Australasia and Southeast Asia, held this year at Nanyang Technological University, Singapore on 15-18 June.

The HIT Lab NZ also showcased a Digital Art exhibit called PaintSpace: Emergence. PaintSpace was created by Eric Woods, HIT Lab’s head of computer and multimedia services, to investigate the differences between “generative” and “explorative” interactive art and to redefine the roles of the artist and the observer.

PaintSpace is a generative interactive art piece, which allows users to control a 3D paintbrush comprised of 100+ “bristles”, or 3D points locked in a given formation. Movement of the brush leaves mesmerising 3D trails behind each bristle, which exhibit striking symmetry, lighting and colour. PaintSpace is housed in an old, wooden television and uses its buttons, dials and sliders to change parameters of the 3D paintbrush. Users are able to control a 3D paintbrush to draw images that exhibit considerable symmetry. Resulting forms are not related to the form of original brush, but rather related to a collection of trails of points generated from a single tip of the brush over a sequence of frames.

The papers presented at Graphite 2004 covered a wide variety of different topics. For example, the work of PhD student Julian Looser focussed on the use of lenses as an interface tool for Augmented Reality applications, while the FingARTips paper presented by Volkert Buchman described how to use natural hand gestures to interact with Augmented Reality scene. Eric Woods gave a presentation summarizing several of the innovative works that he had completed in the museum exhibit space and undergraduate student Graham Aldridge presented an advanced graphics rendering technique for shadow volumes.

In parallel to the Graphite 2004 conference, at the Nanyang Technological University, there was the ACM conference on the Virtual Reality Continuum and its Applications in Industry (VRCAI 2004). At this conference a paper was presented on Occlusion based Interaction Methods for Tangible Augmented Reality Environments. This was written by Gun Lee while he was an intern student from Korea at the HIT Lab NZ.

The HIT Lab NZ director summed up the accomplishment: “It is remarkable that all of the academic papers submitted to these conferences were accepted. This shows the strength of the students at the HIT Lab NZ and the University of Canterbury. I’m particularly proud of the graduate and undergraduate students who were able to present papers in a conference for the first time. They have a great future in front of them.”
Students get a “real” advantage studying with Lab

Working with a real company on a real project to produce a real product. That’s the unique and invaluable collaboration the HIT Lab NZ’s first graduate, Chandra Harrison, says the Lab provided during research for her masters degree.

A Canterbury BA graduate in Psychology, Chandra completed her MSc in March this year gaining a first class honours degree. She now hopes to embark on a PhD overseas, while also working towards a Master of Ergonomics through Massey University.

Chandra’s Masters thesis focused on the user-testing of a low vision reading aid in conjunction with Christchurch company Pulse Data, a world leader in the blindness and low vision electronics industry and a HIT Lab NZ industry partner. The product she worked on with PulseData is just able to enter the marketplace and promises to revolutionise the low-vision market.

Chandra has also just been awarded a six-month internship with Siemens Corporate Research User Interface Design Centre (UIDC), in Princeton, New Jersey, starting this month. UIDC acts as a consultant to Siemens and analyses the company’s new designs from the user perspective. She says it was the industry experience and the global links the HIT Lab NZ has that helped her win the internship.

Chandra believes the unique HIT Lab collaborative structure provides research students with a “massive advantage” over students based solely in an academic environment.

“Students have a direct link into industry as well as into academia. We are encouraged to publish and to present internationally. And Mark [HIT Lab NZ director Mark Billinghurst] has a huge international reputation and is widely known and respected, which gives students a real advantage in forming relationships and getting into industry overseas.

“It was those links and the fact that HIT Lab NZ provided me with an industry-based thesis working with Pulse Data that got me into the Siemens post.”

In the meantime, Chandra is applying for fully-funded positions - at City University, London and the Open University Milton Keynes - with the aim of starting a doctorate later this year.

“We will be sad to see her leave,” says Director Mark Billinghurst. “Chandra has been one of our most outstanding students. I’m proud of what she has accomplished and know that she has a great future ahead of her.”

Chandra’s masters research was funded by a Technology in Industry Fellowship, from the Foundation for Research Science and Technology.
Do you remember what life was like without television? How about radio?

When I was young my sister and I looked forward to Tuesday nights when we would rush across the road to our neighbour’s house. There we would watch the Flintstones in glorious shades of grey on the only television on the street. A few years later we got our own black and white set and our lives were changed forever.

Just as I can’t imagine life without radio, my children won’t be able to imagine life without television, and for their children the internet will be something that has always been in the home.

Not only is each generation accepting new technology as the norm, the pace of adoption and change is accelerating. It was nearly forty years from the invention of television until Saturday morning cartoons appeared in my home, while it took less than a decade for most New Zealand families to have access to the World Wide Web.

One of the reasons for this accelerated adoption is the interface to the technology itself. For example, although the internet was first developed in the 1960’s it was Tim Berners-Lee’s user-friendly web browser and mark-up language that brought it out of the universities and into the home. Similarly, decades old wireless technology forms the basis of today’s almost ubiquitous cell phone. Clearly, as technology is easier to use it becomes pervasive and disappears into the fabric of everyday life.

One of our goals at the HIT Lab NZ is to help New Zealand companies add a user-friendly interface to their technology and so gain an edge in the world marketplace. A good example of this is the work we have been doing with our partner company, PulseData.

PulseData is one of the leading suppliers of low vision aids, and next month they will introduce their newest product. This will allow people with visual disabilities to place print material under a camera and see the text enlarged on a screen in front of them. It will be the first all digital print magnifier on the market. This represents a significant milestone for PulseData, but also for the HIT Lab NZ. Our first graduate, Chandra Harrison, worked for over a year on testing and improving the usability of PulseData’s already excellent product. This formed the basis of her Masters thesis.

Although this will not have as big an impact as the development of television or the web browser, for those with visual disabilities it will be more significant. Perhaps for the first time in many years they will be able to read a newspaper again, or see the smiles on the faces in the family photos.

We would love to be able to help your company to have the same experience. New Zealand already produces some of the best technology in the world, now it’s time to make sure that this technology also provides the best user experience.
Project given thumbs up by children and experts

The eyeMagic MagicBook project and an associated series of children’s workshops run in Christchurch last year by HIT Lab intern Claudia Nelles have received a positive report in an academic paper.

*The MagicBook* A report into augmented reality storytelling in the context of a children’s workshop by John McKenzie, and Doreen Darnell, from the Centre for Children’s Literature, Christchurch College of Education, was released this month.

The eyeMagic project was an innovation in the application of augmented reality technology to children’s literature. A story by Gavin Bishop entitled Giant Jimmy Jones was written specifically for the purpose of being transformed from the physical reality of a picture book to an Augmented Reality (AR) artifact mediated by computer technology.

In September, 2003, during the development of the eyeMagic story, a group of Christchurch children experienced the technology and constructed their own Augmented Reality (AR) scenes using the Anim8or modeling program.

Ten children, seven girls, three boys, aged 10-14, attended a five-day workshop during which they were introduced to AR technology, shown Gavin Bishop’s work in progress, and given lessons on picture book art (including paper engineering). They were finally led through a process of 3D computer modeling to construct scenes for their own version of Giant Jimmy Jones to be incorporated into an AR environment.

(continued on page 7)
Surveyed about the experience, almost all of the students commented that the technology was “very exciting” or “mostly exciting” on a scale of “not very exciting” to “very exciting”. For all of the students “the best part” was one aspect or another of their use of the Anim8or program.

The report noted some concerns with the technology and with the amount of involvement required, by students and teachers, but overall the response was positive. For example, one teacher noted the technology could be a very powerful tool for a special learner who recognized their limitations in other learning styles, and another saw a particular value in 3D animation in areas of non-fiction in which difficult 3D concepts needed to be taught.

The researchers made some specific comments on the suitability of AR technology for education:

“Like any new venture, there will be supreme moments of success where future possibilities seem to be realized in the moment and there will also be time where desire does not meet reality.

“In the case of the Magic Book, it is the view of these researchers that the window of opportunity has been partially opened: but there are gaps and spaces that need to be reconsidered.

“There seems to be no question that AR will prove to be a highly effective medium both for entertainment and education and the enthusiasm and pleasure of children involved in the workshop is evidence of this. As participating teachers asserted, little imagination is needed to recognize how AR could potentially greatly enhance learner achievement and curriculum delivery. This project points to some of the ways that this may be achieved.”

The report commended the HIT Lab NZ and UltraLab for pushing the boundaries of what constitutes the book as an artifact. Copies of the complete paper are available from the HIT Lab NZ website.

John McKenzie is the Head of Centre for Children's Literature and a Principal Lecturer at Christchurch College of Education. He was a researcher-participant in the children's workshop. Dr. Doreen Darnell is a staff member of the Centre for Children's Literature and has many years experience in educational research. She was the main researcher in the children's workshop.

---

**Online article creates huge interest**

HIT Lab NZ has been creating a storm of interest internationally following the publication of an interview with Director Mark Billinghurst in the BBC NEWS, the BBC's online news magazine. The article focused on HIT Lab's Magic Book project.

The Lab has been inundated with requests from the media in Spain, South Africa, the United States and all points in between.

Dr Billinghurst said the breadth and depth of interest was proof that HIT Lab was pushing the boundaries of innovation and working at the cutting edge of interactive technologies.

The article can be viewed at: http://news.bbc.co.uk/1/hi/technology/3733249.stm
New consortium members

SmartHome

SmartHome is a cooperative of like minded companies that design, develop, manufacture, install, and service all facets of home and business automation systems. By coming together to work as a collaborative team, SmartHome business partners are able to develop and deliver world class integrated solutions for the home or office.

Homes have traditionally been wired to provide fully manual operation of devices such as lights and heating. In today’s environment of advanced technology, SmartHome brings the benefits already experienced from commercial industry into the home, by integrating security, video, telephone, Internet, home theatre, lights, and auto locks among other things.

SmartHome technology provides systems that are not intimidating for humans, and where human interaction with technology feels natural and convenient.

Exctus Ltd

Exctus Ltd is a private company commercialising collaborative learning, video conferencing and video streaming technologies developed by Waikato University. Exctus was created out of the Waikato Innovation Centre for electronic Education (®) which was established in January 2001 to support the University of Waikato in its aim to be a global leader in personalised online education. Exctus is a team of learning and collaboration specialists, computer graphic designers, programmers, researchers and experts in video conferencing, streaming, and digital audio/video. Exctus works with clients to transform face-to-face teaching and learning to online teaching and learning. Their development focus is on video conferencing and streaming media technologies as well as learner-centred education in online learning communities.

InFact

InFact is an industrial design and product engineering and automation systems development company providing design, development and new product introduction services to high technology manufacturing and export companies.

The company specialises in developing and managing the implementation of new products, machines and systems for clients in consumer, industrial, military and commercial industry.

Products developed by InFact are typically for New Zealand clients who export their technology to Europe, Asia, and the States.
New proposal: Let’s see how u play

A world-first software program, called See U Play, that will help cricket players better understand how their training in the “nets” relates to their play in an actual game is being developed at the HIT Lab NZ in partnership with Christchurch-based Sports Guidance Limited, a HIT Lab NZ industry partner.

Sports Guidance aims to assist sports training in general, particularly through the use of technology, and it is hoped the project will produce a technology that can be applied to a number of sports.

A substantial amount of cricket training is done in ‘nets’. They are used because they control the travel of the ball and make it possible to practice without wasting time retrieving cricket balls. However, a key problem is working out if the shot selected would result in runs scored. In motor learning terminology this is called (KR) or Knowledge of Results.

See U Play will provide a way to track balls and understand how net practice would translate into play in a real game. It will provide knowledge of shot selection and bowling speed and advanced parametric analysis of play for player learning and skill development . . . as well as enhancing the fun and enjoyment of cricket.

Sport Guidance is managing the project and providing mechanical and graphic expertise. The HIT Lab NZ is developing the low level tracking algorithms for 3D ball tracking in real-world conditions and the sample See U Play application. There is no similar device in existence throughout the world, thus See U Play could potentially put New Zealand on the map as an innovator for sports training devices.

Until this project, Sport Guidance has been working in the Christchurch market alone. Collaboration with the HIT Lab NZ will give Sport Guidance an exportable product, to Australia and the UK as a cricket training aid and to the USA as a baseball training aid.

MagicBadges a hit at Converge05 launch

The HIT Lab NZ provided a fascinating visual display at the launch in May of Converge05, a showcase of creative convergence to be held in Christchurch in May 2005.

Launch guests, including business and civic leaders experienced the MagicBadges application. Name badges were produced for all guests and coded with an image depending on whether the person represented the creative, research/technology, or business sector. A virtual image then “popped out” of the square badge as the wearer passed by large projection screens placed around the event venue.

When three guests wearing creative, technology and business badges gathered in front of a screen, the flaming circles of the Converge05 logo appeared, illustrating the convergence of the three sectors, the theme of the showcase.

The MagicBadges application was based on the ARToolKit software library, a video tracking library that can calculate the real camera position and orientation relative to physical markers in real time. The camera continuously captures pictures of what the person is looking at and sends them to the computer. The computer software then recognises special patterns embedded in the markers and replaces them with virtual three-dimensional objects.

The technology has many possible applications in education, architecture and entertainment.

Researchers who contributed to developing the MagicBadge technology were Florian Bacher, Michal Lahav, André Lichtenecker, and Jung Shin.

The HIT Lab NZ is a founding sponsor of Converge05 and will be playing a crucial role in providing workshops and other activities at the event.

More information about Converge05 can be found at:
http://www.converge.co.nz
New staff members:

Raphaël Grasset
Raphael has started a year-long post-doctoral research post at the HIT Lab after a PhD in Computer Science at Joseph Fourier University of Grenoble (France). His PhD thesis investigated the Multi-users Augmented Reality Environment for small group configuration and his research interests focus on augmented reality, mixed reality, 3D interaction, CHI, CSCW or virtual reality.

Raphael's graduate and undergraduate degrees majored in mathematics, computer science and applied computer science, computer graphics, vision and robotics.

While at the HIT Lab NZ, he hopes to extend his knowledge in augmented reality through AR usability evaluations, collaborating with students and working on ARToolKit enhancements.

Raphaël is from the small town of Biol near Grenoble and has a younger brother, whom he hopes will visit New Zealand later this year. His personal interests include the cinema, rock music, globalization and science fiction literature, museums, traveling, snowboarding and basketball. During his spare time in New Zealand he would like to explore the country, tramp, experience New Zealand's magnificent scenery and try bungee jumping.

Marcel Lancelle
Marcel is a computer science and electrical engineering student from Germany. Computer graphics and image processing are his main research interests. Recent projects are a low-cost 3D scanner and a master's thesis on 3D city models. He finished his master's at the Technical University of Braunschweig, Germany and also studied at the ENSIMAG in Grenoble, France for half a year. During his internship at the HIT Lab he will be working on a PhD project.

Marcel's brother and parents live in Braunschweig (in the northern part of Germany) and his sister lives with her family near Mainz (in the west of Germany).

In his free time Marcel enjoys a lot of sports and likes to get out and enjoy the outdoors. He particularly enjoys canoeing, and played badminton until recently. But for the next few months the emphasis will be on tramping and snowboarding.

Presentation promoted as a highlight at major international conference

Papers and courses to be presented at the upcoming SIGGRAPH 2004 have been described by conference organizers as an excellent mix of the hottest topics in computer graphics and interactive techniques.

One of the presentations, co-organised by HIT Lab NZ Director Mark Billinghurst and Dieter Schmalstieg, from the Technische Universität Wien, has been listed as a highlight. Billinghurst and Schmalstieg's presentation, Developing Augmented Reality Applications which will give a detailed introduction to augmented reality (AR) and how to build AR applications. Attendees will also learn about current research and explore hands-on demonstrations.

SIGGRAPH 2004, the 31st International Conference on Computer Graphics and Interactive Techniques, is being held 8 - 12 August, at the Los Angeles Convention Center. The 33 sessions an tutorials will teach beginning, intermediate, and advanced skills on topics in computer graphics and interactive techniques.

Organisers said this year's response to the call for submissions had been of such a high level of quality that it had been a challenge for the jury to select the programme.
New Publications


Upcoming Events

August 1-October 24  Lord Of The Rings exhibit at Boston Museum of Science

August 4-5  HITLab consortium meeting (Seattle, Washington)

August 8-12  Siggraph 2004 (Mark Billinghurst and Dieter Schmalstieg)

September 16  HIT Lab Open House 4-7pm

September 24  Consortium lunch symposium