The Human Interface Technology Laboratory (HIT Lab NZ) is a research centre at the University of Canterbury developing innovative human-computer interfaces.

Mission
Our mission is to empower people through the invention, development, transition and commercialisation of technologies that unlock the power of human intelligence and link minds globally.

Our goals are to:
• Develop and transition to industry leading-edge human-computer interfaces to accelerate economic development in New Zealand.
• Provide multi-disciplinary project-based learning experiences for students.
• Act as a bridge between academia and industry.

This multi-disciplinary approach to research and education facilitates an entrepreneurial climate, which fosters a wealth of innovative ideas, and leads to significant research and commercial outcomes.

Research
The HIT Lab NZ is revolutionising the way people interact with computers, by conducting research in a number of areas, including:
• Visualization
• Augmented Reality
• Next Generation Teleconferencing
• Interaction Design
• Human-Robot Interaction

The leading-edge technologies developed in the HIT Lab NZ have applications in a wide range of areas such as education, medicine, scientific visualisation, telecommunications and entertainment.

The HIT Lab NZ collaborates with a wide range of academic and industry partners in New Zealand and internationally. The lab is also partner with the recently formed HIT Lab Australia based at the University of Tasmania and the Biomolecular Interaction Center (BIC) and the New Zealand Institute for Language, Brain and Behaviour (NZILBB) research institutes at the University of Canterbury.

The HIT Lab NZ has a strong track record in term of peer-reviewed published papers, successfully completed international and domestic research projects, and technology commercialization.

Current Projects
The Lab is currently working on a wide range of projects, including:

Social Robotics
Robots are entering our society and for their successful integration we have to enable them to act socially. They need to understand the emotional aspects of communication and need to be aware of our social norms and values. The users perception of animacy and anthropomorphism play an important role. We are working on computational models that enable robots to act socially and to adapt their behavior towards different types of users.

Mobile AR
The HIT Lab NZ is conducting a number of projects exploring how AR applications can be developed for mobile phones. This involves developing computer vision libraries and graphics code for mobile phones, and ways of interacting with graphics that are very intuitive on a mobile device. The HIT Lab NZ produced the first collaborative AR application for mobile phones and is currently working on mobile games, advertising and outdoor visualization applications.

Augmented Reality Book
Augmented Reality (AR) is a new technology that allows virtual images to be seamlessly overlaid on the real world. One of the application areas for this technology is in providing new reading experiences and creating books with virtual content overlaid on the real pages. Research is being conducted on user interaction, computer vision tracking, advanced GPU technology and spatial sound rendering for this new type of digital book. This project has applications in enhancing education, entertainment and engineering.
The HIT Lab NZ is involved in the multidisciplinary MARS-CT project currently conducted at the University of Canterbury. The MARS-CT is a new generation of spectral CT scanner providing multi-energy volumetric data, using the Medipix chip (developed by CERN) as part of the core technology of the system. The goal of our research in this project is to develop new visualization algorithms and techniques and an innovative interface that will allow users to efficiently and intuitively manipulate and interact with the generated multi-volume scalar datasets.

Next Generation Videoconferencing
The Next Generation Videoconferencing project focuses on key video conferencing methods, collaboration and applications that are available now in New Zealand over high speed IP networks (KAREN the Kiwi Advanced Research and Education Network). It aims to enable people to collaborate remotely as easily as having a face to face conversation. This project will develop very intuitive ways for people to connect over high speed networks.

Multimodal Interfaces
This project explores how speech and gesture input can be used as an intuitive way to interact with computers. Multimodal interfaces use common communication skills adapted from human-to-human conversation. The first sample application uses speech and 3D computer vision-based free hand gesture input to manipulate virtual graphics in an AR setting. We are also exploring how speech and gesture can be used to interact with intelligent room size environments. This work will lead to new ways for people to interact with virtual content.

Facilities
The HIT Lab NZ is one of the best equipped labs in the world for doing AR and interface research and has a number of unique pieces of hardware such high definition teleconferencing suite, or high end graphics workstations. One of the most significant pieces of hardware is VisionSpace, the HIT Lab NZ’s Virtual Reality and Visualization facility that enables end-users to view and intuitively interact with 3D virtual data in real-time. The VisionSpace system provides advanced visualization capability which compliments the Supercomputer efforts at the University of Canterbury and elsewhere. It can be used to support research in bioengineering, geographic information systems, physics, chemistry, architecture and a range of other application areas. The VisionSpace facility is a resource for teaching and research, for academia, business and industry.

The lab also features an advanced hardware laboratory that enables us to work on physical interfaces to Human-Interface Technology. The combination of innovative hardware with advanced software tools enable us to design novel interaction techniques.

Teaching & Study
The HIT Lab NZ currently hosts postgraduate students who are undertaking their Masters and PhD degrees. Many of the students are from a computer science, engineering or art background and are from a range of countries around the world. There are opportunities for students from a wide range of backgrounds to complete graduate study through the HIT Lab NZ, including enrolling for a PhD degree in Human Interface Technology.