



Bayer

# INNOVATORS AWARDS

Bayer in association with The National Business Review



*On November 30, The National Business Review – in association with Bayer – will publish The Innovators Awards winners. It will shine a light on the people who, in our judgment, are among the best and brightest in New Zealand*

## #SIX RESEARCH & DEVELOPMENT

# Discovery begins path to prosperity

Any great journey begins with research. Discovery is about new things, new explanations, new products or new processes: it's what keeps humanity progressing.

It is what scientists train for and is what inspires passion and enthusiasm.

The level of research and development carried out in New Zealand has increased considerably in recent years.

The latest (2006) biennial survey by Statistics New Zealand shows total expenditure of \$1.8 billion, a 10% increase over the previous corresponding period (2004).

Spending by the business sector was \$763 million, a 12.7% increase.

The manufacturing and services industries contributed to this growth, increasing 18.5% and 19.6%, respectively.

The government sector increase was a far more modest 1.8% increase to \$469 million.

This was due to the privatisation of a Crown Research Institute division.

Meanwhile, the university sector showed strong growth of 13.6% to \$593 million due to more government funding.

Despite these increases, which are in line with economic growth, New Zealand's total R&D expenditure continues to

be relatively low at 1.2% of gross domestic product when compared with other countries in the OECD.

Australia reported R&D expenditure as 1.8% of GDP in 2004 and the OECD average was 2.21% for the same period.

The most significant purpose of New Zealand's R&D expenditure in 2006 was industrial development (at \$360 million), with the business sector the major contributor.

Expenditure on primary industry – agriculture, forestry and fishing – was the second largest purpose. Over the same period, total R&D expenditure directed toward health increased 21.9% to \$269 million.

The result has been much world-class research.

The impact of science is not always immediate and lots of investment, both of funds and skills, is required.

New Zealand companies are known for their appreciation and understanding of the nuances of market needs and are used to competing globally with sophisticated market development skills.

Bayer New Zealand recognises the need for continued investment in research and development and is proud to showcase the top 10 finalists in this category of the Bayer Innovators Awards.



**WORLD-CLASS RESEARCH:** The major contributor to R&D expenditure last year was business

PHOTO: Bayer AG



**TED BAKER**  
The winner of the Royal Society's Rutherford Medal in 2006. He is based at the

University of Auckland's School of Biological Sciences and has been instrumental in developing X-ray crystallography. His research uses this to analyse the structure and function of proteins, particularly those implicated in human disease. His research team aims to identify how proteins work in living systems and develop potential new drugs for diseases such as tuberculosis and cancer. He is director of the Maurice Wilkins Centre for Molecular Biodiscovery, which is developing therapeutics for cancer, diabetes and infectious diseases.



**NIGEL BEACH**  
The R&D manager of Auckland-based Compac Sorting Equipment, which

is a world leader in fruit sorting technology. From a small family business started in 1984, it has expanded to seven offices with more than 160 employees worldwide. Its InVision 9000 system sorts citrus, kiwifruit and apples for surface marks, stains, insect damage cuts and bruises. Its ability to sort kiwifruit in accordance with blemishes is unique. The system can also determine the sweetness of a fruit by measuring absorbed and reflected wavelengths with a spectrometer. Mr Beach estimates Compac spends 10% of its turnover on R&D annually.



**SIMON BROWN**  
He has helped build the nanotech programme in New Zealand

from scratch and is at the helm of the first nanotechnology start-up company, Nano Cluster Devices, at the University of Canterbury. It has been set up to commercialise the techniques his team have developed. His main research interest is in the properties of nanometre scale particles (called "atomic clusters") and in developing ways of building nanoelectronic devices from these clusters. His research group is working on cluster-based devices with applications ranging from chemical sensors to magnetic field sensors to transistors.



**TONY CONNER**  
Crop & Food Research scientist Dr Tony Conner came up with precision breeding

techniques in 1999. While based on genetic modification tools, the technique only transfers genetic material that would naturally cross with a particular plant. While the technique is particularly valuable in crops that are propagated vegetatively, such as potatoes, fruit trees, cassava and sugarcane, it will also have a role in the breeding of major crops such as maize, soybean, rice and wheat. He has developed a vector system that identifies DNA sequences that occur within a particular plant genome and then uses these to assemble vectors for gene transfer.



**ALISON DOWNWARD**  
Her research team at the University of Canterbury is using the

chemistry of "radicals" to attach molecules to carbon substrates. "Smart" materials made in this way would open up a plethora of applications from molecular electronics to sensing devices for disease detection. A layer of gold is evaporated on to a smooth substrate. Groups of different functionality in defined areas are attached. Instability is a main difficulty of these self-assembled monolayers on gold. They tend to lift off particularly on reuse and in biological media. This means few practical devices have been manufactured using this technology.



**SANJAY GARG**  
The deputy head of the School of Pharmacy at the University of Auckland,

where he has established AnQual Laboratories, an initiative to establish teaching, research, and training capabilities and systems to support regulatory compliance with new and existing medicines. The facilities can be used by drug discovery research groups, pharmaceutical and biotechnological companies and academia. AnQual provides research and training to postgraduate research students. AnQual is also involved in a range of projects aimed at developing new and contemporary medicines.



**STEVEN HENRY**  
Head of research activities at AUT's faculty of health and

environmental sciences, chief executive of the Biotechnology Research Institute and founder of Kode Biotech. Kode is a biomedical platform that focuses on cell surface modification, represented by a range of specialised molecules that can be attached to the outside of living cells. Products have already been developed for blood group quality control systems. Professor Henry's research also focuses on immunology and assisted reproductive technologies. Current research suggests Kode modified embryos will greatly improve implantation rates in sub-fertile recipients.



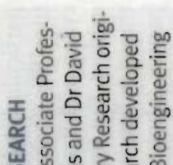
**MICHAEL KESSELL**  
An inventor of consumer products for more than 20 years. He

is the vice-president of research and development at Inveratek, an Auckland company specialising in intellectual property commercialisation, management and advisory services. It arose from Massey University's North Shore incubator. Among a range of other products, he invented the highly successful CrushPak packaging, which has since been licensed by Fonterra. Mr Kessel plays a crucial role in Inveratek's research teams in brainstorming and developing new ideas and concepts. He is also involved in strategy, implementation and coordination of resources for client projects.



**JEFF TALLON**  
A winner of the Rutherford Medal in 2002, Professor Tallon and his

research team have spent more than a decade developing the world's first high temperature superconductors at Industrial Research (IRL). After years of legal battles they have won the exclusive rights to produce and sell their superconducting materials. HTS-110, a new technology business, has been set up within IRL to take full advantage of the market. HTS-110 is also developing applications for specialist motors, generators and power control devices. In a few years inch-by-inch superconducting plates designed at IRL could be found on cell phone towers all over the country.



**TELEMETRY RESEARCH**  
Co-founded by Associate Professor Simon Maipas and Dr David Budget, Telemetry Research originated from research developed at the Auckland Bioengineering

Institute at the University of Auckland. The founders describe their enterprise "as a high-tech innovation company from the ground up. We plan to revolutionise the medical device industry within New Zealand." Telemetry Research, which was a co-winner of the innovation of the year at the HI-Tech Awards in 2006, develops wireless power transfer technology for medical applications, such as artificial hearts and heart-assist devices. The devices allow power to be transmitted through the skin without damaging tissue, using inductively coupled power transfer technology.