



innovate

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What's **your** problem, New Zealand?

Up to \$1 million in R&D services is on offer to the winner of IRL's *What's Your Problem, New Zealand?* competition.

What's Your Problem, New Zealand? is encouraging New Zealand businesses to look beyond the present tough business environment and into the future. One of the aims of the competition is to increase industry involvement in R&D activities to enable them to develop world-leading, high-value products for offshore markets.

Intellectual property firm, A J Park, is a sponsor of the competition and will also work with the finalists to ensure that they have a strategy in place to protect their IP. Managing Partner, Greg Arthur says it is crucial that businesses continue their R&D in the current economic climate.



"...investment in R&D is key for New Zealand businesses if they are to succeed in tough economic times."

IRL Chief Executive, Shaun Coffey says investment in R&D is key for New Zealand businesses if they are to succeed in tough economic times.

"While the economic outlook is challenging, the current environment also provides opportunities – opportunities for New Zealand businesses to change the way they operate, to ensure they can not only survive the tough times but prosper in the long term and in doing so collectively strengthen the New Zealand economy," he says.

The competition is a two-staged process where stage one requires companies to complete a short two-page application form. IRL will then work with the finalists to establish clear milestones and expectations.

"It's important that, as a country, we're generating ideas and that we protect those ideas. For most businesses, IP is a key asset. Protecting your intellectual property makes good business sense now and for the future," he says.

The Minister for Research Science and Technology, Wayne Mapp, says the Government is encouraged by the aims of the competition.

"New Zealand firms are facing challenges in the current business environment. I believe that innovative R&D solutions have a significant part to play in assisting New Zealand businesses to meet these challenges."

Shaun Coffey says most New Zealand manufacturers understand the need to invest in R&D to develop high value products that would compete on performance, not price, and IRL wants to help them realise that aspiration.

"Far from being a sunset industry, manufacturing could be for New Zealand the goose that lays the golden egg – emancipating the economy from the strictures of the commodity cycle and becoming a catalyst for sustainable economic growth."

The competition was launched at Te Papa recently at a function attended by business leaders, Government representatives and R&D providers.

***For Terms & Conditions, competition guidelines and rules, visit www.whatsyourproblemnz.co.nz phone 0508 CALL IRL or email info@whatsyourproblemnz.co.nz**

Kiwi wind turbine surpasses international standards



It took more than two million cycles of vertical flapping and ever-increasing intensity loads but Windflow Technology's 16 metre Windflow 500 blade has now met a level of certification which no other turbine in the world has achieved.

The International Electrotechnical Commission (IEC) certification fatigue life standard attests to operational performance at the windiest and most turbulent conditions – typical of New Zealand wind farm sites. The achievement represents one of the final steps towards achieving certification of the Windflow 500.

Windflow Technology's marketing manager, Sheralee MacDonald, says this independent certification will open up a multi-million dollar market for New Zealand-made wind turbines here and overseas.

"...each Windflow 500 wind turbine powers approximately 200 average houses..."

"We are Australasia's only wind turbine manufacturer and with over 90% of the turbine components being sourced from New Zealand, this represents ten jobs for every turbine sold.

When you add this to the fact that each Windflow 500 wind turbine powers approximately 200 average houses, this is good news for New Zealanders."

This is the first time the test has been conducted in New Zealand and all testing was carried out at IRL's Parnell site in Auckland.

Handheld foetal heartbeat

Mothers-to-be may be able to listen to their babies' heartbeat at home as the result of promising new research by IRL scientists and their collaborators at Victoria University.

"...many mothers...would welcome the chance to monitor their babies' heartbeat at home..."

Project Leader, Neil Scott says that the new portable device, though still in prototype form, has the potential to be simpler, more convenient and more accurate than anything currently available on the market.

"This research offers to let pregnant mums frequently and simply check their babies' heartbeat themselves," he says.

"We have had considerable success to date in isolating the foetal heartbeat from the internal sounds of the mother, including digestion sounds and the maternal heartbeat, by using an array of sophisticated microphones embedded in a wide belt. We are now applying more complex sensor and processing technology to produce a handheld version."

Both versions use a relatively new processing approach called Blind Source Separation, or BSS. This is a more passive alternative to the widely-used Doppler ultrasound device, called the SonicAid, which sends ultrasonic sound waves into the uterus. By using only microphones, the technique is more like that of the Pinard (pictured right), the foetal stethoscope that midwives used before the invention of ultrasound.

The heartbeat of an unborn baby can give clues to its health throughout the pregnancy and be

HTS magnet a world first for “super microscope”

The world’s first synchrotron magnet fitted with high-temperature superconducting (HTS) coils is poised to be shipped in April from New Zealand to the prestigious Brookhaven National Laboratory in New York.

The new magnet, which is known in the industry as a dipole, is the result of cutting-edge research and development by IRL subsidiary company, HTS-110 Ltd. The Chief Executive of HTS-110, Donald Pooke says that the HTS dipole will be the most economical of its kind worldwide, in terms of electricity use, and represents an exciting advance for HTS-110.

the synchrotron. Synchrotrons are typically hundreds of metres in diameter and cost tens or hundreds of millions of dollars to construct.

The demand for HTS in synchrotrons is driven largely by the potential

“The new dipole will use less than half of the energy of a copper equivalent...”

“Seventy synchrotrons have been built, or are in the planning stages of being built, around the world, so the market for these energy-saving magnets is substantial. With IRL being a shareholder in the New Zealand Synchrotron Group, which in turn is a shareholder in the Australian Synchrotron Group, HTS-110 is well positioned to take advantage of this.”

Synchrotrons are powerful instruments key to resolving the structure of matter down to the level of atoms and molecules, and have been dubbed “super microscopes” due to their ability to reveal invaluable information in many fields of research, from physics to biology. The magnets are used to bend the electron beam that goes around inside

for substantial energy savings over traditional magnets that use copper coils. In the Brookhaven dipole, HTS-110 has retrofitted HTS coils to replace the conventional power-hungry copper coils.

The new dipole will use less than half of the energy of a copper equivalent, along with substantially less cooling water. By comparison, copper coils consume 15kW of electricity and significant amounts of cooling water during operation. With each synchrotron operating 50 or more dipoles, the energy usage for an entire copper ring is up to 1MW, and the yearly electricity bill is in excess of NZ\$1 million.



AN HTS-110 TECHNICIAN INSPECTS THE ALIGNMENT OF THE SYNCHROTRON MAGNET POLES.

HTS-110 Senior Designer, Mike Fee says that the new HTS dipole magnet will use two refrigerators to keep the magnet at operating temperature, requiring less than half the energy of a copper system.

“In a full HTS installation a centralised cooling system would realise the full energy savings of 70-80% over copper designs,” he says.

monitor shows promise



THE PINARD FOETAL STETHOSCOPE, USED BEFORE THE INVENTION OF ULTRASOUND.

monitored before and during birth to give early warning of any problems. Although most clinicians believe ultrasound is perfectly safe, anecdotal evidence suggests that

many mothers would like to reduce the degree of exposure to it and would also welcome the chance to monitor their babies’ heartbeat at home.

Senior project scientist, Ranjan Acharyya is leading the development of the handheld equivalent of the heartbeat-monitoring belt, using a smaller sensor and an alternative form of processing. He says



this may be possible by being more attuned to the specific sounds of the heartbeat and other noises.

“The sound environment within the mother changes all the time and many alternative techniques have failed because of this. We are hopeful that this current research will lead to better, more reliable products being available not just to clinicians but to all expectant mothers as well.”

The BSS project is part of a wider, established communications technologies research programme being run by IRL and implemented jointly with Victoria University’s School of Engineering and Computer Science.

Innovation: the key to improved productivity



SHAUN COFFEY, CEO
INDUSTRIAL RESEARCH LIMITED.

From the Chief Executive's desk...

While New Zealand has enjoyed respectable economic growth over the last few years, calls extolling the virtue of increased productivity have seemingly fallen on deaf ears.

The unprecedented financial market turmoil of recent months has changed that, making 2009 a year in which we need to rethink our approach to productivity growth.

The emphasis needs to be on a tried and tested prescription for sustained productivity growth: innovative science and technology solutions.

financially unviable initiative whilst the other a more matter-of-fact practical solution that heralded in a new billion dollar export industry for New Zealand.

The Concorde was the world's first supersonic aircraft and could fly across the Atlantic in three-and-a-quarter hours. Although it was a truly impressive machine, its government-subsidised

export industry. The key to this innovative service was the value that it added by gaining access to a new and lucrative market for the product it transported. Nowhere near as glamorous as Concorde, the advent of refrigerated shipping was nonetheless a far more valuable innovation.

Science and technology innovations like this are successful because they are market led. In the current economic environment, the challenge for New Zealand industry is to use science and technology to create high-value products and services that meet the demands of discerning consumers in offshore markets. Industrial Research Limited (IRL) is well aware of these challenges. In 2009, the company will work even more closely with New Zealand businesses to understand their market needs and assist them to create products and services that are truly competitive in the global marketplace.

It is essential that science maintains a dialogue with business to ensure these advances can be applied to meet the needs of industry. The current economic climate demands that we do better as a country in opening the lines of communication between the two. Only when we achieve this will the economy and ultimately all New Zealanders realise the true value of this country's proud history of scientific achievement.

"...the challenge for New Zealand industry is to use science and technology to create high-value products and services that meet the demands of discerning consumers in offshore markets."

New science and technology solutions can only truly be called innovative when they have the affect of increasing productivity. Multi-factor productivity is a term that has been in common parlance over the last couple of years. This combines labour and capital investment with knowledge and technology to result in productivity growth that enables the creation of high-value products and services that are sought after the world over.

This last point is important and can be illustrated through a comparison of two transportation services: the first a glamorous, iconic yet ultimately

R&D programme ran hugely over budget and it took fourteen years from the development of the first prototype until the first tickets were sold at almost prohibitively high prices. Not surprisingly, Concorde remained locked into the niche luxury travel market and it is generally understood that the iconic aircraft never made a profit.

With the advent of refrigerated shipping, the first cargo of frozen meat was exported from New Zealand to Great Britain in 1882 where the price of lamb fetched twice what it did in New Zealand. This single voyage paved the way for what is today a \$5 billion

To suggest a topic you would like to hear more about, please email t.heketa@irl.cri.nz. Your feedback is always valued.

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