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LECTURE

2009

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**FROM AUSTRALIA TO THE WORLD:  
THE STORY OF  
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**DELIVERED BY DR LARS RASMUSSEN, GOOGLE**

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AusIndustry delivers a range of more than 30 business programs - including innovation grants, tax and duty concessions, small business development, industry support and venture capital - worth about \$2 billion to more than 10,000 businesses and about 100,000 individuals every year.

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**3** launched Australia's first 3G mobile network in April 2003. Today, over 2 million customers know firsthand just how good it is to be 3.

Our customers enjoy live Mobile TV, full length audio and video music tracks, multiplayer games, Mobile Broadband, face to face Video calling and much more in 3's Broadband Zones. 3's Broadband Zones are available in most parts of Sydney, Melbourne, Brisbane, Adelaide, Perth, Canberra and the Gold Coast. Outside of 3's Broadband Zones we've introduced 3G Roaming Zones, so customers with a capable device can now access 3G services in areas covering 96% of the Australian population. And, thanks to our great Caps and plans, they get great value.

3 has recently launched the HTC Magic which delivers a fantastic internet experience and access to the Google suite of services including Gmail™, Search, YouTube™ and Google Maps™.

Founded in 1997, **HTC Corporation (HTC)** is a global leader in mobile phone innovation and design. Since its establishment, HTC has developed strong R&D capabilities, pioneered many new designs and product innovations and launched state-of-the-art mobile phones for mobile operators and distributors in Europe, the US, Asia and around the world. HTC is one of the fastest growing companies in the mobile device market. The company is listed on the Taiwan Stock Exchange under ticker 2498. For more information about HTC, please visit [www.htc.com](http://www.htc.com)

**NICTA** is a world-class research institute able to drive innovation through high-quality research, training and technology transfer.

NICTA uniquely combines excellence in research, education, commercialisation and collaboration. It seeks to create intellectual and economic wealth for Australia through the development of the Information Communications Technology (ICT) research industry.

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Built on a strong foundation spanning 150 years, Shelston IP's teams of highly qualified and commercially astute specialist patent attorneys, trademark attorneys and IP lawyers are finely attuned to the needs of modern business.

Delivering services that extend from patent, trademark and design registration to strategic portfolio management, due diligence, licensing and litigation, Shelston IP demonstrates a thorough commitment to our clients and their commercial goals, in Australia and beyond.

"Mind to market" reflects a crucial difference between Shelston IP and other firms. Our experience and knowledge of the processes involved in converting ideas and innovations into intellectual assets, and a deep appreciation of what it takes for our clients to successfully commercialise those assets, sets us apart.



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## 2009 INNOVATION HEROES AWARD

The annual Innovation Hero Awards, an initiative of The Warren Centre, recognise outstanding Australian innovations in engineering technology. They recognise people who bring great ideas to life and the role they play in driving economic and social progress. The awards are made to Australian-based people or teams that successfully develop a new technology into a commercial product or service and who create great benefit for Australia.

- 1. Dr Ben Greene** developed telescope and laser technologies, and, as a founder and Chief Executive of Electro Optic Systems, led the successful commercialisation of the technology in military and space systems.
- 2. Jens and Lars Rasmussen**, conceived, designed and developed a software mapping platform to facilitate web-based delivery of geospatial services. The brothers took it to the world and it is now the global phenomena known as Google Maps.
- 3. Gordon Kennett** founded Rosebank Engineering, and developed and commercialised a variety of high precision engineering techniques that meet the demanding requirements for component manufacture and maintenance of military aircraft.

# STATE SPONSORS



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**ECIC** | Entrepreneurship Commercialisation and Innovation Centre



**The Department of State and Regional Development (DSRD)** is the New South Wales Government's business development agency. DSRD delivers programs and services that support the NSW Government's commitment to winning new business activity for NSW, and developing the capacity and productivity of the State's economy. DSRD provides advice and assistance to help businesses of all sizes establish or expand in metropolitan and regional NSW. It works to attract significant investment projects to NSW as well as major events that have the potential to benefit the State's economy and promote Sydney and NSW nationally and internationally.

For more information, please visit [www.business.nsw.gov.au](http://www.business.nsw.gov.au)

**The University of Queensland** is a leader in research, teaching and technology transfer in a comprehensive range of disciplines. UQ encourages and develops innovative new technologies that will contribute to the future of engineering. The University's Sustainable Minerals Institute and the Faculty of Engineering, Physical Sciences and Architecture have established research activity in a diverse range of areas including social responsibility, safety, risk management, and sustainable water use, to complement long-standing expertise in the engineering aspects of mining and processing. This research is commercialised by JKTech Pty Ltd, which helps to bring new technologies to life. By combining modern infrastructure with a culture that champions research excellence, UQ and its diverse community of scientists and engineers will continue to provide the answers to our most important engineering questions.

**The Department of Further Education, Employment, Science and Technology** plays a pivotal role to the employment growth, wealth creation, innovation and economic development in South Australia by building the breadth and depth of workforce skills in the state. Through the Department's Ten Year Vision for Science, Technology and Innovation in South Australia (STI10), South Australia aims to build research and innovation capacity and infrastructure, encourage a strong culture of innovative collaboration and build people, skills and community across the state.

**The Department of Trade and Economic Development (DTED)** recognises the critical role of innovation in helping to secure the State's economic future.

Accordingly, we have collaborated with universities, industry groups and business to create the **Centre for Innovation (CFI)** to help businesses cross the innovation bridge. Today, the centre is leading the way in encouraging innovative practices throughout the business sector.

DTED is committed to encouraging breakthrough ideas that lead to new products or services. We also recognise the value of incremental ideas that improve the efficiency of existing processes or revamp and refresh the goods and services our State offers.

DTED and CFI offer programs and services to support all business activities – from small businesses through to billion-dollar projects and major investments.

[www.sacentreforinnovation.org.au](http://www.sacentreforinnovation.org.au)

**The University of Adelaide's Entrepreneurship, Commercialisation and Innovation Centre (ECIC)** exists to stimulate Australian innovation through entrepreneurship & commercialisation, research, education and training.

ECIC's academic leaders pursue cutting-edge research and provide further opportunities for PhD candidates. The Centre, with campuses in Adelaide and Sydney, offers a range of study programs - with awards to Masters level - in entrepreneurship, science & technology commercialisation and project management. In 2008, the ECIC launched a new Graduate Certificate in Social Entrepreneurship & Innovation and undergraduate programs in entrepreneurship, innovation, and creativity.

ECIC is the home of the University of Adelaide's e-challenge. This contest provides mentoring opportunities and support, including cash prizes, for young innovators to develop business plans that turn ideas into viable businesses.

ECIC also manages the Incubator, a purpose-built facility at the University's Research Park on its Thebarton Campus. The Incubator complements and supports participants in the University's Graduate Entrepreneurial Program and provides furnished offices for other early-stage innovative, knowledge-based businesses.

ECIC - putting brilliant ideas on the map.

The **Victorian Government** has long supported innovation and technology as a cornerstone to the development of a vibrant knowledge based economy. Since 1999, \$3.39 billion has been allocated to innovation related initiatives, the largest such commitment of any state government.

Victoria is a leader in innovation, transforming good ideas into thriving industries and rewarding jobs, lifting productivity and creating healthier and more sustainable communities.

This commitment and leadership has seen Victoria become home to some of the world's leading research facilities and led to the formation of major global partnerships in areas such as biomedicine and information and communications technology (ICT).

The Victorian ICT industry has particular strengths in skills and R&D. Victoria has one of the largest R&D clusters in the southern hemisphere including the NICTA Victoria Research Laboratory, which provides the state with world-leading commercially-focused research across a range of ICT sectors.

Over the last three years, the ICT industry in Victoria has experienced large levels of growth. The industry now generates around \$26.2 billion annually and exports of over \$2.4 billion of ICT equipment and services.

The Victorian Government is pleased to be supporting The Warren Centre Innovation Lecture 2009.

# PROLOGUE

Innovation and Innovators are the lifeblood of The Warren Centre for Advanced Engineering and a browse through our 25th Anniversary edition of *Pushing the Engineering Envelope* is testament to this claim. I encourage you to ask for your free personal copy or access it through our website [www.warren.usyd.edu.au](http://www.warren.usyd.edu.au) (or <http://tinyurl.com/4yv8gt>).

Our Innovation Lecturer Dr Lars Rasmussen and his brother Jens are superb innovators and worthy of their awards as *2009 Innovation Heroes*. Other Heroes this year are Gordon Kennett, who invented an algorithm which allows the F111 fighter bomber to safely use Terrain Following Radar for low altitude flying Gordon Established Australia's premier aero space precision manufacturing company - Rosebank Engineering Pty Ltd - which is producing parts for the new Joint Strike Fighter. Fellow *Innovation Hero* Dr Ben Greene's innovations span from laser guided weapons platforms to laser tracking of deep space - "The Final Frontier".

If Australia is to graduate from a resources based nation to a world class technology nation we need a steady supply of innovative, bright young engineering leaders to join our technology driven companies (or to start them) who can recognise opportunities and convert them into globally successful businesses.

## **Where will they come from?**

The Warren Centre feels that we cannot rely on natural selection alone and is setting up a two year intensive Master's Degree in Engineering Innovation aimed at attracting the smartest graduates from around Australia and teaching them the skills and providing them with the tools which will propel their careers towards leadership positions in Australian and multinational technology driven companies. Those graduates who rise to the challenge will be "Master of Engineering Innovation" in all aspects of the words.

The \$750,000 we have raised so far is just enough to get the show on the road and start the search for the Professor who will inspire and lead this program for a proposed start date of 2010/2011. If you or your company want to become a foundation innovator, then talk to me because we need to ultimately raise \$3.5 million for a self sustaining chair.

Meanwhile our portfolio of current projects has a strong innovation flavour as you would expect. Since last year we have conducted the highly successful *National Energy*

*Essay Competition* which challenged 20-30 year olds to propose the optimum energy supply situation for 2050 and beyond. We are building on their ideas in a Warren Centre energy futures project. Also in the energy efficiency field we have recently received Federal Government funding for stage II of our *Low Energy High Rise* project which will move the project from theory to practice.

Our *Professional Performance, Innovation and Risk* project is rapidly approaching the conclusion of Phase 1, which is the development of a set of practical guidelines for performance which will encourage controlled innovation in engineering project execution, management of risk, and collaborative alliancing.

To encourage engineering as a profession we are soon launching our *Engineering Icons* interactive and challenging website which is aimed at schools and which explores the engineering heroes behind iconic projects such as the Sydney Harbour Bridge, the Wandoo Offshore Oil Platform and the Cochlear bionic ear implant. Also in the education space we are hoping to obtain Federal Government support for our *Education Project*, which will apply The Warren Centre approach to investment in education infrastructure from Kindergarten to Year 12, to obtain the "best bang for the Government buck".

Other projects are looking at unblocking the use of composite materials in construction, refurbishment of regional infrastructure, embedded (computer) systems, and a value proposition for vacation employment of undergraduates.

The Warren Centre is fully committed to Networking Innovation through our hundreds of volunteers and supporting firms - Why not get involved and become a member of this exciting family - Give us a call...



Professor Michael Dureau  
Chairman and Executive Director  
The Warren Centre for Advanced Engineering Limited



DELIVERED BY

## DR LARS RASMUSSEN

3

2009 Innovation Lecture

Exciting times, these.

I'm writing this a few days after revealing my current project, Google Wave, to some 4,000 software developers at San Francisco's Moscone Center. They liked it! Then the reviews started to come in. More kind words! My brother Jens and I have worked in stealth mode on Google Wave with our team of now 50 developers at Google's Sydney office since early 2007. Imagine the relief, after two and a half years of working in secrecy, of finally being able to talk about it.

This talk is a brief history of how Google Maps - my previous project - and Google Wave came about. It's a journey I've often likened to a roller coaster ride. Lots of ups; even more downs. But it's also a journey I have often - in particular when trying to recruit other developers - likened to that of an explorer attempting to cross uncharted territory. We had no map to follow (if you'll pardon the pun).

### THE STORY OF GOOGLE MAPS

Maps and Wave both began the same way: with Jens having a great idea.

It was early 2003. I had recently moved from San Francisco to live in Sydney with my then girlfriend, now wife. She's Cuban, and the U.S. was not exactly hospitable to Cubans back then. Jens lived in San Francisco, but on a work visa that was about to expire - the dot-com bubble had burst, and Jens and I had both been laid off from the Silicon Valley start-up we worked for. Painful as it was, being let go turned out to be a blessing in disguise.

Online mapping, Jens argued, left room for improvement. At the time, mapping sites were almost exclusively about driving directions. A few sites had store finders or similar functionality, but always with the maps secondary to textual information. The maps were small and often hard to read.

What if, Jens asked, we made the map big enough, attractive enough, and interactive enough, that it could serve as a platform for information rather than merely an illustration on the side? Could we get users a sense of going to, say, a movie cinema on the map and buying a ticket? And then search for pizza places on the map to see where they are relative to the cinema? Jens laid out the technology he thought could achieve such an experience; it was based on pre-rendered tiles of maps. He sent me gorgeous mock-ups of cinemas on a map with billboards 'hovering' above.

I was sold immediately. Jens insists it took him hours to persuade me. I like my version better.

Then started a game of musical continents. Jens's U.S. work visa expired and he moved back to our native Denmark. I, sporting a U.S. residency, returned to San Francisco and moved into Jens's apartment. My girlfriend, Yarima, stayed in Sydney.

Jens and I began prototyping in earnest. At this stage we weren't building a Web application. We figured the Web was not powerful enough for what we were trying to achieve, and built instead a traditional desktop application that users would download and install.

Our application - "Expedition" we called it - relied heavily on the Internet: it received tiles of pre-rendered maps on the fly, resolved address queries on a server, and so on.

Some months into the effort, I crashed a Carnegie Mellon alumni event about entrepreneurship. Frank Marshall, a prolific investor and board member of our former employer, was speaking and I wanted to interest him in our project. It worked. Frank opened doors for us at five venture firms on famous Sand Hill Road.

This led to five one-hour meetings, each with two partners, at separate investment firms. They said they would call us back if they were interested. Few did; none were interested. Did I mention riding a roller coaster? We'd tried in vain to involve friends in the effort, but conventional wisdom held that you couldn't make money from online maps, and we found no takers. Giving up was tempting.

And I missed my girlfriend.

I trekked back to Sydney with a last-ditch hope. My dear friend and former colleague Noel Gordon had expressed some interest in our maps. A top-notch software developer, Noel was now working in his father-in-law's clothes cutting factory in Newtown. He liked our demo, and roped in his friend Stephen Ma, a rockstar programmer who was at the time tending to a gas station. (The tech-wreck had seriously ruined the job market down here.)

Noel and Stephen quit their jobs and suddenly there were four of us. Jens flew down (how did we find the money!?) and we set up shop in Noel's spare bedroom. We assembled our own computers from dirt-cheap components, and set them up on the clothes cutting factory's workbenches. Noel's father-in-law thought we were crazy and wasn't shy in letting us know.

More prototyping. We added the notion of 'mapplets': website-like services that we hoped others would build and install into Expedition. We made examples with movie cinemas, business directories, and Google's "local search" which launched and caused much discussion in our little team in late 2003.

In October that year, Yarima's Australian visa ran out, and we got married overlooking Sydney's stunning harbour just three days before she had to return to Cuba. We saw each other only twice before she returned to Sydney in December 2004. I know few matters more frustrating than finding funding for a start-up. Immigration tops the list.

By December, Expedition made for a good demo and we re-played our game of musical continents. Back in San Francisco, Frank opened more doors for us, this time at some of the Valley's biggest venture firms, including Sequoia Capital - one of Google's original backers. Like so many techies, we were huge fans of Google.

And what do you know, Sequoia called us back! They were interested, and we showed our demo in five separate meetings to their 12 partners. They moved fast with a verbal offer to invest. We hired an attorney on contingency fees and negotiated a term sheet. We were in seventh heaven.

Alas, the morning of the day we were to sign the term sheet, Yahoo! launched a major overhaul of their mapping site. We thought it minor compared to our technology, but it was enough that Sequoia concluded that our window of opportunity would close. Again Sequoia moved fast, but this time in retracting their offer. Did I mention riding that roller coaster?

I should pause and praise the good folks at Sequoia. Painful as it was, I think they did the right thing. And they were always straight with us in saying that only seven out of every 10 entrepreneurs that sign term sheets with them actually get an investment. The other three fail during due diligence precisely because larger, more established companies are working on similar technology. And Sequoia's decision turned out also to be a blessing in disguise.

At the time though, it was tough to see that. Three days of soul searching after our knock-back from Sequoia, we placed phone calls to our three strongest supporters. Frank Marshall of course; the keenest of Sequoia's partners; and one Ram Shriram. Ram is a famous angel investor and a founding board member at Google. Sequoia had introduced us to him, and at the time Sequoia was keen Ram was going to co-invest in our company, sit on our board, and work part-time on the business side.

Ram advised us to try to sell to Google, and offered an introduction to Google co-founder Larry Page. The exact reason Sequoia had declined to invest would make Google interested in buying our technology, he argued. A week later we met Ram and Larry at the famed Googleplex in Mountain View. Larry liked our maps-as-a-platform thinking, and thought our technology impressive. He brought in some corporate development folks to take a closer look, and we repeated the demo to them. In a pattern that was growing familiar, Google would call us back if interested.

Larry's parting words, though, were that Google was really a Web company. Could we not do something in the Web browser instead of a desktop application, he asked?

The next weeks were among the most productive of our lives. We *scrambled* to be prepared to impress Larry if Google called back. Noel and Stephen undertook turning Expedition into a browser plug-in that would make it run inside the browser much like a flash movie or video does. Jens and I rewrote the application from scratch using a mix of HTML and JavaScript that would later become known as AJAX. We were frankly amazed with the result, which we had spent more than a year arguing was impossible!

It took the Google people more than three weeks to call us back, but they did. They had assembled some 25 Googlers to see our demo, and I dare say they were impressed with our turn-around from desktop to Web browser. We left on a high. After that however, Google continued to move slowly. In part this was because we were now well into 2004, the year Google conducted its spectacular first public offering. That multi-billion dollar affair, for some reason, got more of their attention than our little four-person start-up.

Nerve-wrecking months went by with intermittent communications from Google still insisting there was interest. Given the Sequoia experience, we expected every day a call from Google letting us know they had changed their minds. Meanwhile, we were running out of money *fast*.

## THE GOOGLE WAVE IDEA

All this left time for reflection. Selling that early to Google was not exactly what we had in mind, and in part we felt we had failed at building our own company. In a phone call, Ram argued we would benefit greatly from being inside Google: we would make many valuable contacts, learn many valuable lessons, and perhaps even make names for ourselves with a successful Google product. If we played our cards right, we would be in a position to dictate our own terms for our next project, he counselled.

But what would our next project be? As always, Jens delivered the answer: communication. Email, he argued in a series of, well, emails, was born in the Internet's infancy and left room for improvement. Ditto IM. Email mimics snail mail, and IM mimics phone calls, he wrote. Instead of mimicking existing means, one could construct new forms of communication, making the best of computers' abilities. So many different forms of communication have been invented since email, Jens pointed out. And computers and networks have dramatically improved since the first emails were sent in the mid 1960s.

Jens argued that what he called "hosted conversations" was the way to go, and he listed an impressive array of improvements over message-passing systems like email and IM - starting with the fact that both types of conversations could now be contained in a single model rather than needing separate tools.

I was sold immediately. Jens insists it took him hours to persuade me. I like my version better.

## BUT BACK TO MAPS

Google didn't change its mind. By June, we had verbally locked in the terms of acquisition, and Google offered to employ us from that point forward. That way, we could get in before the IPO, which would give us better employment terms. Our attorney loudly objected to the idea of employment before signing the deal, but we accepted nevertheless. Good choice: Google greatly values its reputation as a trustworthy company and bent over backwards to fully live up to our verbal agreement, and then some.

In fact, Google is different in more ways than one. Of all the investors and companies we had talked to, Google was the only place seemingly disinterested in how to make money from our maps. At the time it cared solely about making users happy, and argued that business models were much better determined *after* a product had become successful with users.

One of the special requests we had of Google was to set up shop down under again. Noel, Stephen and I rented a broom closet-sized office next to Google's then six-person sales team in Sydney. It took Google's top VP of engineering about 30 seconds to agree to what became the seed of Google's now 100-person+ engineering centre in Pyrmont.

Time for musical continents in reverse: Jens moved back to California, and I swung by Havana to pick up Yarima and return to Sydney. Happy times!

Google added two stellar, California-based engineers, Bret Taylor and Jim Norris, to the team and by February 2005 the six of us finally launched Google Maps. The team grew and merged with Google's existing Local Search team as well as the outstanding engineers from the Google Earth team (which had come to Google through a separate acquisition).

I have often been diagnosed with pathological optimism, yet we were frankly blown away by the success of Google Maps. The site has today tens of millions of users in pretty much every country in the world and powers maps on more than 150,000 different Web sites.

## FAST FORWARD

Having had the time of our lives working with some of the world's best engineers on the Google Maps team, we decided in late 2006 to leave the team and pick up on Jens's "hosted conversation" idea.

We decided to test Ram's theory by asking Google's founders and CEO if we could build a start-up-like team in Sydney around Jens's ideas. Ram was right! Based on our success with maps and virtually no information about our new project, they agreed that we could recruit a small team in Sydney to build a prototype.

We codenamed the project "Walkabout" and disappeared into a windowless conference room to start the work in earnest in January of 2007. By September, our now five-person strong team emerged with a prototype. We had added important things to the model, including transmitting individual characters live on the wire and letting users edit each other's messages. We called the hosted conversations "waves" and believed that many different kinds of communication could be done with them. And we could pull off a solid 45-minute demo!

The demo did its job: Larry, Sergey and Eric let us pitch the now 50 engineers in Sydney to join the team, and around half of them did. The arrangement we came to with Google's leadership was spectacular: we got to simulate as much as possible being a start-up rather than a team inside the now 15,000-person strong company. We worked with almost limitless autonomy yet without that constant fear of running out of payroll that normally comes with entrepreneurship.

Fast forward almost a year-and-a-half - the team has almost 60 members and the prototype has become a product nearly ready to launch. As I mentioned at the beginning, we showed it to the world for the first time on June 18 in San Francisco, and have started letting early testers into a special "sandboxed" build. The reception has been overwhelming and these are, indeed, exciting times for us!

## SO HAVE I LEARNED ANY LESSONS?

**Absolutely.**

**Never give up!** Running out of money and into walls, we were often tempted to simply give up and get a job. In hindsight, our finest work came exactly when we resisted that urge: recruiting Noel and Stephen, turning Sequoia's rejection into Google's offer, and so on.

**You can do more than you think.** Innovation happens outside your comfort zone. Jens and I spend much of our time pushing, prodding, and cajoling our team to reach further than they feel comfortable.

**No, you don't need a map.** Explorers share a willingness to embark on a journey without knowing exactly how they'll reach their destination. On occasion, people have turned down joining our team exactly because we refuse to present a master plan. But you cannot cross uncharted territory if you insist on following a map.

People on my team have been known to quote me as saying: "If you can sleep calmly at night, then you could be more ambitious." I have said no such thing! Might still be some truth to it, though...

## Disclaimer

The ideas and assertions put forward in this handbook are from the presentation of the 2009 Warren Centre Innovation Lecture, a Warren Centre event held at:

- the Long Room, Customs House in Brisbane on 30 June 2009
- the Powerhouse Museum in Sydney on 2 July 2009
- the Ernst & Young Building in Melbourne on 8 July 2009 and
- the Ernst & Young Building in Adelaide on 9 July 2009.

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## The Warren Centre for Advanced Engineering Ltd

The Warren Centre for Advanced Engineering Ltd is the leading Australian forum for advanced engineering issues, recognised for its inclusive, forward-looking approach and the wide impact of its many achievements.

The Centre is a self-funding, independent, not-for-profit company operating within the Faculty of Engineering at the University of Sydney, controlled by representatives from industry appointed by the University's Senate.

It has three principal objectives:

- to stimulate the application and further development of new engineering technology.
- to encourage the integration of innovation and engineering technology into the development of Australia's public policy and wealth creation.
- to provide independent comment and advice to government and industry on these and related issues.

The Warren Centre:

- identifies and supports major projects that bring together people at the leading edge in selected fields of engineering technology to develop new technical insights and knowledge in those technologies and accelerate their application in Australian industry.
- holds industry forums for companies in specific industry segments to explore opportunities of common or joint interest that will accelerate the development and/or exploitation of technology.
- organises events such as seminars, lectures and conferences that explore contemporary technology issues and disseminates the results of the Centre's activities.
- produces electronic and printed material to promote discussion and build awareness of contemporary, advanced engineering issues.
- recognises people and projects that make a unique contribution to encouraging excellence and innovation in all fields of advanced engineering.

Since opening in 1983, the Centre has gained wide recognition for its unique approach and its achievements in diverse fields of engineering technology and industry development.

The Warren Centre Innovation Lecture is an activity of The Warren Centre's Events Committee, aiming to highlight role models to promote understanding of new technologies and innovation and to encourage their use among Australian businesses.

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