

Questacon

The National Science and Technology Centre



Unlocking Australia's Potential **2011-2012**

Questacon – The National Science and Technology Centre

King Edward Terrace, Canberra ACT 2600, PO Box 5322.

Kingston ACT 2604. Australia

Telephone: +61 2 6270 2800 Fax: +61 2 6270 2808

www.questacon.edu.au

Front cover image: Projection artwork created by Julie Ryder developed for Enlighten 2012, with the support of The Electric Canvas. Photographer Adam McGrath.

Our vision

A better future for all Australians through engagement with science, technology and innovation.

“ *Science underpins the future prosperity of our nation. We need to teach our children to think through problems, combining facts with critical thought to understand the world. With these skills, our children will be set to not only become Australia’s future leaders in science, but take leadership in any walk of life.* ”

Professor Brian Schmidt

Nobel Laureate, 2011 Nobel Prize in Physics



Australian Government

Department of Industry, Innovation
Science, Research and Tertiary Education





Questacon 2011-12

- Delivers over **6 million** hours of inspiration annually
- **449 000 visitors** annually to Questacon – the National Science and Technology Centre.
- Impact on over **3 million** people across all programs

- Over **250 staff**, 75% directly engaging with visitors
- Over **100 volunteers** contributing over **10 000 hours**

- **\$33.3 million** annual turnover
- **Earns 44%** of operational income
- Generates approximately **\$9 million annually** for the Australian Capital Territory (ACT) economy

- **Active locally** – a multi-award winning tourist attraction located amongst national cultural institutions in Canberra's Parliamentary Zone.
- **Active nationally** – helping to build a scientifically engaged and aware Australia which embraces innovation.
- **Active internationally** – building relationships across the world to build the capability of the global science centre community.

Excitement

Engagement

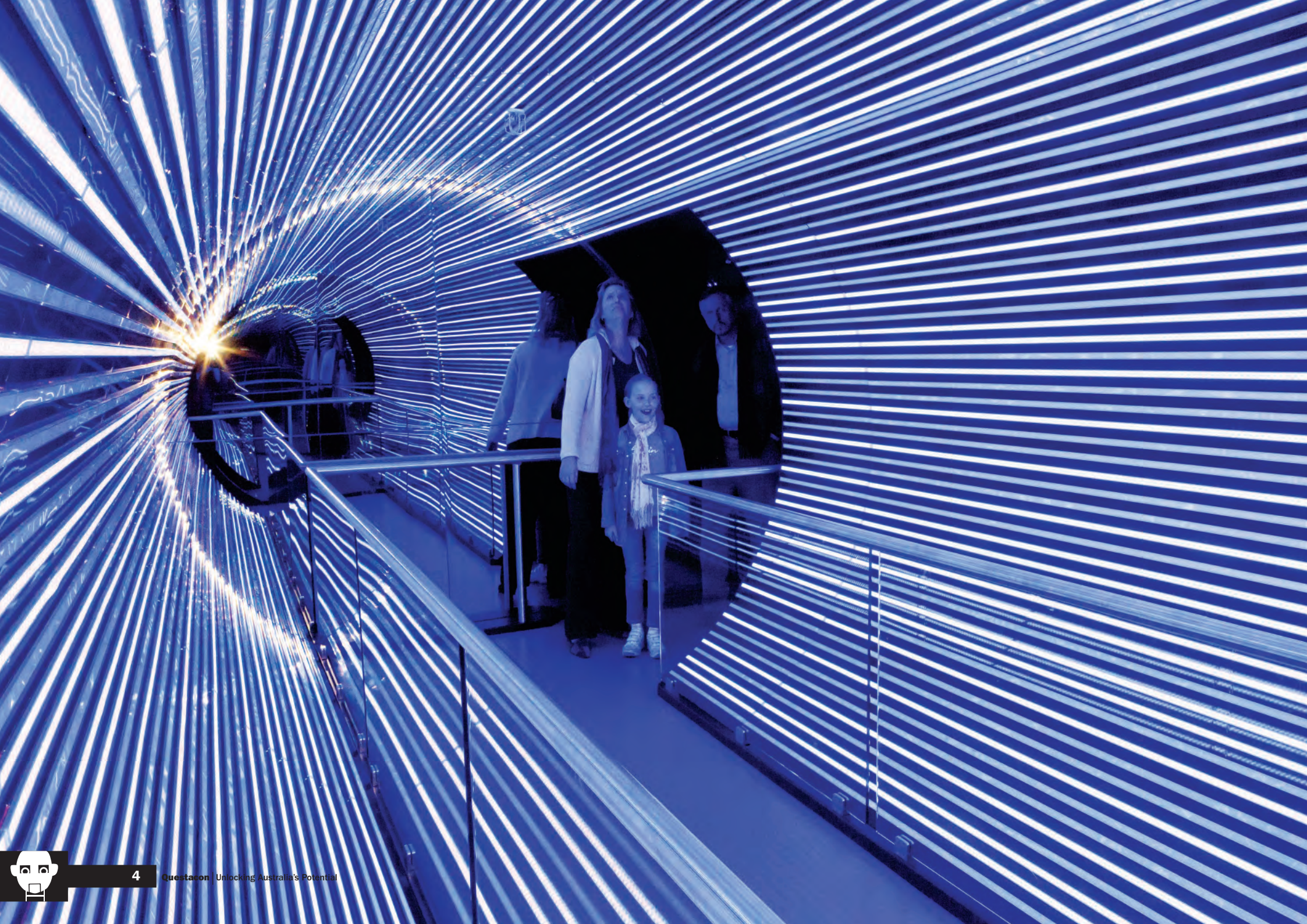
Inspiration

Motivation

Effort

Productivity





Contents

Minister's introduction	7
Chairman's message	8
Director's report	10
Highlights and achievements 2011-12	13
Questacon statistics	17
Questacon overview	19
Partnerships	25
Questacon gallery exhibitions	29
Visitor experience programs and events	33
Questacon building	35
Questacon outreach	37
Travelling exhibitions	43
Questacon digital communications	45
National reach	48
Inspiring Australia	51
Questacon international	55
Questacon history	59
Questacon – the year ahead	61





Minister's introduction

More than 25 million people have had a Questacon experience since the centre opened its doors in 1988.

Today, Questacon is one of our most visited educational institutions and a national icon in its own right.

The work Questacon does promoting science and engaging Australians right across the nation is invaluable.

As we strive to build a new economy and unlock the nation's full potential, we know that more Australians will need to be educated in science and maths. The jobs of tomorrow will be highly skilled and we need to ensure we have the brightest and best minds to take us forward.

Questacon's ability to share the vision of a better, more prosperous future through stronger engagement with science has never been more relevant.

It is vital that young Australians are exposed to the wonders of science from an early age. This is something Questacon does well—delivering fun and entertaining experiences that demonstrate science is not beyond their grasp. It shows young people how science is relevant to their own lives and inspires them to keep studying to find out more.

Over the years, Questacon has expanded its programs, strengthened partnerships and adopted new communication technologies in order to better reach students, teachers, families and communities across Australia.

In May 2012, after many years preparation and an intensive international process, Australia–New Zealand and South Africa were chosen to jointly host the world's biggest radio telescope, the Square Kilometre Array (SKA). Questacon supported the Australia–New Zealand hosting bid by coordinating the Discover SKA campaign to raise public awareness of the SKA. Between April–June 2011, thousands of Australians took part in events, increasing their understanding of what may prove to be the most significant science project of the 21st century.

During 2011-12, a new careers-focused initiative, *Beyond School – So What's Next?* was added to the *Shell Questacon Science Circus* outreach tours. This is providing secondary students in regional centres with the valuable opportunity to meet with local science and technology-focused tertiary education providers and employers.

Questacon has also continued its efforts to communicate the sciences to Australians through the Australian Government's \$21 million *Inspiring Australia* initiative. During the year, 63 successful applicants for the first *Unlocking Australia's Potential* grants round were announced. A total of \$5 million will fund projects aimed at developing greater interest in science, especially for those who might have missed out on the opportunity to engage with science before.

This year's *Annual Review* provides a snapshot of the many activities run by Questacon—from the long-running *Shell Questacon Science Circus* to the newly opened *Q Lab* and *Excite@Q* exhibitions.

I'm confident Questacon will continue to inspire tomorrow's scientists and foster a nationwide appreciation of the value and relevance of science and technology for many years to come.

I'd also like to take this opportunity to congratulate Questacon's Director, Professor Graham Durant, who was recognised in the 2012 Queen's Birthday Honours List for service to science education.



Senator the Hon Chris Evans

Minister for Tertiary Education, Skills, Science and Research





Chairman's message

Over the past 12 months, Questacon has firmly established itself as a leader among the 2500 science centres worldwide through its significant contribution to building capability of the science centre sector.

The development of science centres in Africa was a particular area of focus this year, galvanised at the 6th Science Centre World Congress in Cape Town in November 2011. Of 54 countries in Africa, only four have science centres, and these are not as advanced as elsewhere in the world.

As part of the World Congress, Questacon led a pre-conference capability development workshop and was a key contributor to the Cape Town Declaration, committing international support to the development of science centres in Africa. Questacon is now leading the development and delivery of a five-year strategic action plan to turn aspiration into action, and planning is underway for an international Science Circus safari in 2013 to southern Africa to promote these objectives.

In the next year, Questacon's capability building efforts will also encompass the Asia-Pacific region, with the commencement in November 2012 of a joint undertaking between Questacon, the Exploratorium (San Francisco, USA) and PP-IPTEK (Science and Technology Centre Indonesia) to support and further strengthen science centres and inquiry-based learning in Indonesia. This initiative will be conducted between 2012 and 2015 and aims to improve the standard of science education in Indonesian science centres and to promote the growth of the science communication sector in Indonesia.

In the months leading up to the United Nations Conference on Sustainable Development (Rio+20) in June 2012, Questacon worked closely with the Association for



Science-Technology Centres on several initiatives to position the science centre sector as an important conduit for the international scientific community and for organisations such as the United Nations to engage with the public. With a global reach of over 300 million people, science centres are 'safe' places where people can engage with and discuss important global issues with a scientific basis, such as the key themes of Rio+20. Questacon will continue to foster linkages with these international organisations and help to support their objectives.

Nationally, Questacon has continued to benefit from the strong relationships with our valued partners. I offer my thanks to Shell and the Australian National University for their renewed and continuing support for the *Shell Questacon Science Circus*, which has enabled its ongoing success and expansion this year. My thanks to Raytheon Australia for its support of the *Schmidt Digital Studio* and the increase of the digital outreach and videoconference programs. A special vote of thanks to the National Water Commission at the conclusion of our successful water education partnership. I also thank the Australian Museum for their support in co-developing the *Deep Oceans* exhibition, which Questacon will host from November 2012.

In 2012, Professor Brian Schmidt from the Research School of Astronomy and Astrophysics at the Australian National University and Australia's most recent Nobel Laureate joined the Questacon Advisory Council. Along with his inspirational scientific achievements, Professor Schmidt brings to the Council a personal passion for science education and empowering the next generation of Australian scientists, and I welcome him to the Council.

I would like to personally thank the entire Questacon Advisory Council for their continuing advocacy and support for Questacon throughout the year: Mr John Simpson (Deputy Chairman), Associate Professor Tracey Bunda, Dr Catherine Foley, Professor Denis Goodrum, Ms Lynley Marshall and Professor Brian Schmidt.

I express my profound thanks to former Minister for Innovation, Industry, Science and Research, Senator the Hon Kim Carr for his wise counsel and commitment to innovation and science in Australia and, in particular, for his hands-on support to Questacon.

I welcome and thank the current Minister for Tertiary Education, Skills, Science and Research, Senator the Hon Chris Evans for his support to date and look



Leon Kempler OAM at Questacon with best-selling Australian author Bryce Courtenay AM, who has agreed to be a Questacon ambassador.

forward to a productive relationship going forward. I also acknowledge the ongoing support from the Australian Government Department of Industry, Innovation, Science, Research and Tertiary Education that enables Questacon's continued success.

Questacon's Director, Professor Graham Durant, continues to drive Questacon's success, both as Australia's national science centre and as a world leader in the science centre community. I would like to thank Professor Durant for his strong leadership, passion and global vision throughout the year. My sincere thanks also to Questacon General Managers Lorraine Neish and Graham Smith whose contributions help turn the vision into reality.

Finally, I pay tribute to Questacon's enthusiastic and dedicated team of staff and volunteers. Their daily contribution enables Questacon to remain the inspiring and dynamic organisation it has been for over two decades.

A handwritten signature in black ink, reading "Leon Kempler".

Leon Kempler OAM

Questacon Advisory Council Chairman





Director's report

At the close of another successful year, it is timely to consider the topic of re-invention and the need to balance continuity and change. In this era of 24-hour news cycles, personal devices providing instant information, and with interaction via social media becoming the norm, the question of how science centres remain relevant and engaging is a critical one. In an environment where distractions are plentiful and yet there are important national and global issues to address, the need for science centres to continue to deliver inspiring experiences to foster the next generation of scientists and a scientifically engaged public is perhaps more important now than ever.

A greater awareness and understanding of science equips our community to adapt to a changing world, and helps us to capitalise on the immense benefits science offers to business and the broader community.

Questacon remains true to a core philosophy of hands-on exhibits and science demonstrations delivered by enthusiastic science communicators. However we are now able to use many more media to communicate science such as our enhanced videoconferencing capability that allows us to link with schools across Australia and scientists around the world. Our high-definition slow motion film making capability allows us to capture scientific phenomena and experiments in incredible detail allowing greater insight into processes.

The value of hands-on science and experiential learning in an informal setting remains strong. The opportunity for families to learn and laugh together is a vital part of a Questacon experience.



High-value manufacturing will have a crucial role to play in the national economy of the future. However, despite being arguably the largest users of new technologies, young people are not taking up senior secondary and tertiary education in technology and related disciplines in sufficient numbers to supply the engineers and technologists the future will require. Acquiring the necessary skills requires commitment and effort. Effort comes from motivation which in turn comes from inspiration.

The Questacon Technology Learning Centre (QTLC), scheduled to open in 2013, will provide experiences to inspire interest in and awareness of the way things are made. Using inquiry-based learning and problem-solving activities, visitors will be encouraged to think about how innovative thinking can solve everyday problems. The QTLC will encourage people to develop the skills required in the manufacturing process by immersing them in ideas, tools and creativity. These activities and experiences, designed for secondary students, will focus on innovation and technology skills and raise awareness of Australia's high-end manufacturing. The QTLC will also offer a small public exhibition space that tells stories of the innovation and manufacturing process from concept to production. It is anticipated that QTLC will become a focus for national programs in support of technology education.

At Questacon, the gradual change of our core experiences is the key to a continual process of reinvention. We know that some things remain constant—simple phenomena delight visitors, good demonstrations have impact and family learning in a social setting will always be important—but we must be flexible and agile in order to remain relevant and to be able to respond to change.

In September 2011, *Q Lab* opened in the Centre, bringing a new approach to our gallery exhibitions. *Q Lab* has a dedicated programming team who deliver a dynamic array of exhibits, displays, demonstrations and activities that change frequently and often mark occasions of scientific significance. *Q Lab* aims to bring the science out of the laboratory and into the centre where the public can directly engage with visiting scientists and our own specialist science communicators. In *Q Lab* during the year we have uncovered the science of Antarctica to mark the 130th birthday of Sir Douglas Mawson, collaborated with astronomers from the Australian National University Mount Stromlo Observatory on a full-day program on the Transit of Venus and presented heart dissection demonstrations on Valentine's Day. Even the most regular visitors

to Questacon can always find something new in *Q Lab*. A second new gallery exhibition, *Excite@Q*, opened in March 2012. This exhibition offers visitors an immersive environment in which to test their reflexes, skills and perceptions.

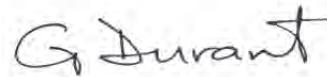
Questacon's prominence as a national tourist attraction was again recognised in November 2011 at the Canberra and Capital Region Tourism Awards, where the centre was awarded Best Tourist Attraction for 2011 for the seventh year in a row. Questacon continues to work with industry and regional tourism bodies to position Questacon and Canberra as a significant destination for tourists and schools alongside the other national institutions in the capital.

A large part of Questacon's ongoing success and excellent reputation is due to the dedication and commitment of our staff and volunteers and I thank them for their contribution throughout the year.

I acknowledge the support over many years of the former Minister for Innovation, Industry Science and Research, Senator the Hon Kim Carr. I also thank the current Minister for Tertiary Education, Skills, Science and Research, Senator the Hon Chris Evans, and staff from the Department of Industry, Innovation, Science, Research and Tertiary Education for their vital ongoing support.

My thanks also go to the Questacon Advisory Council for their advice and advocacy during the year, and to our many valued partners for their strong support that enables Questacon to continue to deliver inspiring experiences across the nation.

In 2013, Questacon will celebrate Canberra's Centenary and our own 25th Anniversary as Australia's National Science and Technology Centre. We look forward to building on the successes of 2011-12 and previous years to deliver an exciting program of events and activities in Canberra, around Australia and internationally.



Professor Graham Durant AM

Director





THE PRIME MINISTER'S PRIZES FOR SCIENCE



Australian Government



Highlights and achievements 2011–12



- Questacon was awarded the 2011 Canberra and Capital Region Tourism Awards winner for best tourist attraction in November for the seventh consecutive time, and the Bronze Award in the Tourist Attraction category at the 2011 Australian Tourism Awards, presented in March 2012.
- Shell announced continued and increased support of the *Shell Questacon Science Circus* in November 2011. This extension of funding will carry the *Science Circus* partnership with Shell through to 29 years by the end of 2013.
- Questacon played a key role at the 6th Science Centre World Congress in Cape Town in November 2011, which focused on developing more science centres in Africa. Questacon led a three-day pre-congress capability workshop for 90 delegates from 11 countries and contributed to the development of the Congress program. Questacon was also instrumental in the signing of the Cape Town Declaration that committed international support for science centres in Africa, and is currently developing activities to realise these aspirations.
- Nobel Laureate Professor Brian Schmidt visited Questacon in November 2011 to talk about his Nobel Prize-winning work on the accelerating expansion of the universe. This event reached over 230 students from schools across Australia.



Professor Brian Schmidt speaks at Questacon, November 2011

- During Professor Schmidt's visit to Questacon, the *Schmidt Digital Studio* was officially named in recognition of his achievements. Raytheon Australia also confirmed two years' support for the expansion of the interactive videoconferencing program, enabling greater access to a Questacon experience for schools around Australia.
- Student designs for a future expansion of the Questacon Centre were displayed in the foyer in December 2011. These designs, developed by University of Canberra third-year architecture students, were the culmination of a four-month partnership project that also involved the original building architect, Professor Lawrence Nield.



- As part of national activities for the *Inspiring Australia* Program, Questacon coordinated several key initiatives, including:
 - *National Science Week* in August 2011, attracting over 1.4 million participants of all ages to 1067 events across all Australian states and territories. Minister for Tertiary Education, Skills, Science and Research, Senator the Hon Chris Evans, visited Questacon in March to announce the 2012 recipients of *National Science Week* grant funding.
 - The 2011 *Prime Minister's Prizes for Science* were awarded at a ceremony held at Parliament House in October, recognising the achievements of Australia's leading scientists and science teachers.
 - Activities were held to mark the International Year of Chemistry in 2011. Questacon partnered with the Royal Australian Chemical Institute to commission national tours of four travelling exhibitions about chemistry, along with a collaborative artwork based around the periodic table of the elements. Questacon also hosted a videoconference and workshop event, 'Garlic, Vampires and Free Radicals' with the Australian Research Council Centre of Excellence for Free Radical Chemistry and Biotechnology.
- A videoconference link-up was conducted in January 2012 between a leading scientist from the European Organization for Nuclear Research facility (CERN) and high-achieving secondary students attending the National Youth Science Forum. This session focused on the Large Hadron Collider particle accelerator.
- Two new exhibitions opened during the year – *Q Lab* in September 2011 and *Excite@Q* in March 2012, offering a range of new exhibits and activities to engage visitors.
- Questacon was one of 11 major venues for the Enlighten Canberra Festival that was held over two weekends in March 2012. A special program of in-centre events targeted adult audiences and attracted over 1400 people. Attendees enjoyed special talks, theatre productions and late-night opening of the Centre's galleries for adults on two evenings.
- NASA Administrator Charles Bolden Jr presented an inspirational talk at Questacon in April 2012 to approximately 400 students. Mr Bolden highlighted NASA's future directions in innovation, exploration, science and discovery and the vital role that today's students will play. This event was also attended by United States Ambassador Mr Jeffrey Bleich.



NASA Administrator Charles Bolden Jr (far right) and United States Ambassador Jeffrey Bleich (far left) are welcomed to Questacon by Professor Graham Durant (centre) and *Excited Particles* astronauts.

- In May 2012, Questacon hosted a special families evening for the Canberra diplomatic community. The event was attended by 375 diplomatic staff and their families. They enjoyed *Spectacular Science Shows* and puppet shows, access to the galleries and other activities aligned with the evening's theme of sustainability, marking the United Nations International Year for Sustainable Energy for All and the Rio+20 United Nations Conference for Sustainable Development.
- The *Questacon ScienceLines* program presented a Reconciliation Week event in May 2012, to recognise Indigenous achievements in the fields of science, technology, engineering and maths.
- Questacon collaborated with the Australian National University Research School of Astronomy and Astrophysics to present special events at Questacon, the Mount Stromlo Observatory and Stromlo High School in June 2012 to mark the Transit of Venus. Events at Questacon included a special performance by the Canberra Youth Orchestra of Gustav Holst's *Venus*, live video streams of the transit in the *Japan Theatre* and *Q Lab*, and space and astronomy themed shows, demonstrations and busking.





The Canberra Youth Orchestra perform Venus from Holst's *The Planets Suite* as part of Questacon's celebration of the Transit of Venus in June 2012.

- Questacon's digital production capability was further expanded with the acquisition of two cameras during the year that represent cutting-edge technology in film production. Questacon's ultra-high-definition camera allows for the capture of very high resolution footage, and the high-definition, high-speed camera has enabled a library of super slow-motion footage of scientific phenomena to be collected.





Questacon statistics

Total visitors	1 237 797
Visitors to the Centre	449 366
School visitors	135 531 school children and teachers in 2313 school groups from across Australia visited Questacon
Q Club Membership	5069 memberships – a total of 17 744 members
Visitors to outreach programs	Presentations delivered to 118 546 visitors from 890 schools and other venues
Digital programs	2699 students and teachers attended 28 videoconference sessions. The internet simulcasts were also viewed at 239 additional locations.
Travelling exhibitions	666 947 visitors to travelling exhibitions – five exhibitions travelled to ten venues across Australia
Questacon websites	1 072 937 total visitor sessions to websites administered by Questacon
Visitor satisfaction	93 per cent of visitors surveyed responded positively
Staff	255 staff in full-time, part-time or casual positions employed by Questacon (170.92 average full-time equivalent)
Volunteers	10 095 hours contributed by 108 volunteers



“ *I hear and I forget
I see and I remember
I do and I understand
I create and my mind opens
I innovate and the world opens* **”**

**(Based on an ancient Chinese proverb and
modified by the Ontario Science Centre)**



Questacon overview

Questacon believes that harnessing the power and potential of science, technology and innovation is critical to Australia's ongoing prosperity. This is why Questacon is working to increase awareness of science in the Australian community by providing engaging and exciting experiences to inspire interest, highlight relevance and promote positive associations with science and technology.

Questacon ensures a broad audience reach by offering a diverse range of experiences, such as:

- The iconic Questacon centre, located beside Lake Burley Griffin in the Parliamentary Zone of Canberra, featuring eight galleries and over 200 interactive exhibits. The centre is open to the public from 9 am to 5 pm every day except Christmas Day.
- One of five Questacon travelling exhibitions at a museum or gallery in regional and metropolitan centres across Australia.
- In-school visits and public exhibitions in regional and remote Australia by one of eight touring outreach programs.
- Educational videoconferences and interactive website.
- *Inspiring Australia* or *National Science Week* community events.

Questacon's approach is based on the proven educational value of hands-on activities supported by face-to-face science demonstrations. Questacon's informal learning environment complements more structured learning in schools.

Questacon's programs and exhibitions are developed in response to the Australian Government's strategic

priorities. They aim to support Australia's current and future research efforts by nurturing and encouraging the next generation of Australian scientists and researchers, as well as engaging the broader community with science. Questacon is helping to tackle skill shortages in science and technology by engaging, inspiring and motivating students to study science, technology, engineering and maths, and highlighting the diversity of careers available in these fields.

Questacon is also active internationally, fostering the development of the science centre sector globally.

Questacon in Canberra

Questacon was originally founded in 1980 by the Australian National University as a small science centre at Ainslie Public School. It opened as Australia's National Science and Technology Centre in its current building in November 1988, a jointly funded Australia–Japan Bicentennial project.

Over the past quarter-century, Questacon has become a recognised world-leader in presenting innovative, interactive science exhibitions and programs and an award-winning Canberra tourist destination.

Questacon's exhibitions—both travelling and in-centre—are designed to present scientific concepts in an entertaining way and encourage visitors to engage and experiment. At the Centre, gallery staff and volunteer explainers are on hand to enhance visitor's enjoyment and the in-house performance troupe, the *Questacon Excited Particles*, provide further interpretation and exploration of the science behind the exhibits with daily science shows.





Questacon nationally

Questacon strives to provide access to its programs and exhibitions to all Australians, regardless of geography, background or socioeconomic status. Questacon is a recognised world leader in the delivery of science outreach programs. Each year Questacon takes its outreach programs to regional, remote and Indigenous communities across Australia, delivering engaging science shows and hands-on workshops in schools, and public exhibitions of portable science exhibits. In-school programs cater for students from pre-school through to senior secondary school and have been developed to support national education priorities in mathematics, innovation, early childhood and primary science. Web-based educational materials supplement exhibitions and programs.

Questacon complements face-to-face experiences with activities delivered online and through digital media technology. The *Questacon Digital Outreach* program provides schools with interactive workshops and programs. Questacon's videoconference program links students around the country with each other and with leading scientists from Australia and around the world. Questacon also offers access to our high-quality videoconferencing and video-recording facilities to other government agencies for meetings and event recording, providing a cost-effective alternative to travelling.

Questacon also tours interactive travelling exhibitions to a range of regional and metropolitan venues across Australia and internationally.

Partnerships

Questacon's partnerships are vital to the achievement of our strategic goals. Long-running partnerships with corporate Australia (including Shell and Raytheon Australia) enable Questacon to deliver science engagement experiences to Australians in even the

remotest parts of the country. Questacon also works closely with many other organisations, including government agencies such as the National Water Commission, state science centres, other science-based organisations and the business community.

Questacon internationally

Questacon plays a leading role in building the capability of the science centre sector globally, undertaking projects that share expertise and experience between established science centres and those under development.

Questacon continually monitors emerging global trends and maintains strong connections with international science centre networks. These networks allow Questacon to participate in the exchange of ideas and global projects, promote Australian science, education and innovation, and benchmark with the best in the world.

Questacon governance and financial management

Questacon is a division of the Department of Industry, Innovation, Science, Research and Tertiary Education (DIISRTE). Questacon has an Advisory Council, appointed by the Minister, comprising of representatives from the business, science and education sectors. The Advisory Council assists in setting Questacon's strategic direction by providing advice to the Director of Questacon and the Minister for Tertiary Education, Skills, Science and Research.

In 2011-12, Questacon's turnover was \$33.3 million, with operating revenue of \$22.8 million. Questacon received government funding of \$12.73 million in operational funding, \$5.85 million in capital funding, and \$4.79 million in funding through the *Inspiring Australia* program. In 2011-12, Questacon generated 44% of its operating revenue, earning revenue of \$10.09 million from Centre admissions, fees for programs, touring exhibitions and services, Q Shop sales, sponsorship, Q Club memberships and lease revenue.



Questacon Advisory Council



Mr Leon Kemppler OAM

(Chairman)

Australia-Israel Chamber of Commerce

Mr Kemppler is involved in various business activities. His honorary roles include National Chairman of the Australia-Israel Chamber of Commerce, Chairman of the Melbourne International Jazz Festival, Director General of the John Monash Foundation, and Director of the Royal Children's Hospital Foundation, Victoria.



Mr John Simpson

(Deputy Chairman)

Director, John P Simpson & Associates Pty Ltd

Mr Simpson has more than twenty-seven years experience in the global energy and financial sectors. He is a former Executive Director of Shell Australia and Shell Energy Holdings (Australia) Limited. Mr Simpson also held the position of Strategic Adviser – Office of the CEO National Australia Bank for several years. Mr Simpson is also currently a Director of Scotch College (Melbourne) and the food distribution charity - SecondBite. He is a Trustee of the H V McKay Charitable Trust which provides financial support for many organisations in rural & regional Australia.



Associate Professor Tracey Bunda

Yunggoendi First National Centre for Education and Research, Flinders University

Associate Professor Bunda is a Ngugil/Wakka Wakka woman—a Goori woman from Queensland. Tracey has had a long and distinguished career in Aboriginal and Torres Strait Islander higher education which commenced in 1986 at the Koori Program at the Gippsland Institute in Victoria. Since that time, Associate Professor Bunda has been the Convenor of the Weemala Centre-Australian Catholic University, the Director of the Wollotuka Centre at Newcastle University, the Director of Aboriginal and Torres Strait Islander Higher Education at the Nggunawal Centre-University of Canberra and was the Director of Yunggoendi First Nations Centre at Flinders University from 2005-07. Her research interests include Aboriginal knowledge traditions, Aboriginal peoples' relationships with white institutions and Aboriginal education.



Dr Catherine Foley

Chief, CSIRO Materials Science and Engineering

Dr Foley is the Chief of CSIRO Materials Science and Engineering. Previous to her current appointment, Cathy was involved in CSIRO's Superconducting Devices and Applications Project developing superconducting systems for mineral exploration, detection of metal for quality assurance in manufacturing, terahertz imaging and UXO detection. Dr Foley is a member of the Prime Minister's Science and Engineering Innovation Council (PMSEIC) and Fellow of the Academy of Technological Sciences and Engineering (ASTE).



Professor Denis Goodrum

Executive Director, Science by Doing, Australian Academy of Science

Professor Goodrum is an Emeritus Professor and former Dean of Education of the University of Canberra. He has been involved in many national and international projects in science education including development of the Australian Science Curriculum.



Ms Lynley Marshall *(Council member to November 2011)*

CEO, ABC International

Lynley Marshall was appointed as the CEO of ABC International in June 2012, after seven years as head of ABC Commercial, where she was responsible for the ABC's first broadband and mobile services and the establishment of ABC2. In her new role, Ms Marshall sits on the ABC executive and is responsible for Radio Australia and the Australia Network which broadcast into 20 countries in our region.



Professor Brian Schmidt *(Council member from January 2012)*

Research School of Astronomy and Astrophysics, Australian National University

Professor Schmidt is a Distinguished Professor, Australian Research Council Laureate Fellow and astrophysicist at the Australian National University Mount Stromlo Observatory. He was jointly awarded the 2011 Nobel Prize in Physics (with Riess and Perlmutter) for their discovery of the accelerating universe.



Ms Patricia Kelly

Deputy Secretary, Department of Industry, Innovation, Science, Research and Tertiary Education

Patricia has had an extensive career in the Australian Public Service working in a range of agencies with social and economic policy responsibilities. Patricia is currently Deputy Secretary of the Department of Innovation, Industry Science, Research and Tertiary Education, responsible for the department's science and research group, which includes the Research and Science and Infrastructure Divisions in addition to Questacon (the National Science and Technology Centre), the National Measurement Institute and the Australian Astronomical Observatory.



Professor Graham Durant

Director, Questacon

As the Director of Questacon, Professor Durant is also an ex officio Advisory Council member. He has been the Director since 2003.





“ Staff are friendly and helpful and well versed in the principles being demonstrated. They helped children pause long enough (in a highly stimulating environment) to take in the science. Well done staff. ”

Questacon visitor feedback.

Questacon people

Questacon employs 145 staff in full time or part-time positions, with another 110 staff employed on a casual basis.

The Questacon workforce is both culturally and professionally diverse, with wide-ranging expertise in science, customer service, design, construction, acting, education, facilities management, marketing, communication, finance, planning, information technology, public administration, occupational health and safety, retail and electronics.

Questacon contributes to the professional development of science communicators in Australia, providing entry-level opportunities for a significant number of tertiary students and recent graduates, who are employed as science explainers at the Centre and as presenters for Questacon's Outreach programs.

Questacon also has a dedicated team of 108 volunteers, who in 2011-12 contributed a total of 10 095 hours. Together with gallery staff, volunteers work in the galleries providing science explanations and demonstrations to visitors and operate Discovery Trolleys (portable science exhibits) and Curiosity Corner (a hands-on science experiment station).

The staff and volunteers working throughout the public spaces at Questacon are expert at welcoming visitors and safely guiding and assisting them throughout the galleries while taking every opportunity to communicate science.

Questacon also provides training in science communication, presenting skills, teamwork and customer service to secondary students through the schools' training program. In 2011-12, 33 students from nine Canberra schools participated in the program, earning credit for their Year 12 certificates.



Partnerships

Partnerships are critical to Questacon's ongoing success and we work with our partners in a variety of ways

- *Enabling partnerships* directly support the development and delivery of Questacon's exhibitions and programs.
- *Knowledge partnerships* ensure Questacon's exhibitions and programs are informed by up to date scientific content from leading subject matter experts.
- *Strategic partnerships* foster a culture of collaboration and support activities that capitalise on the complementary skills and expertise of each organisation to maximise impact.

Questacon partners with a range of organisations, such as universities and other government departments and agencies. Through these partnerships, Questacon can provide more Australians in metropolitan, regional and remote Australia with the opportunity to engage with science, innovation and technology in a positive and enjoyable way.

Key partnerships in 2011-12 include:

Shell – The Shell Questacon Science Circus

The *Shell Questacon Science Circus* was established over 27 years ago in partnership with Shell, The Australian National University and Questacon. In 2011, Shell renewed and extended their support of the program through to the end of 2013. This continued support enabled expansion of the program, including the introduction of the *Beyond School – So, what's next?* initiative that delivers events in major regional centres to showcase education options, careers and accomplishments in science and technology specific to the region it visits. These events are delivered in conjunction with the *Science Circus* tours and target secondary students and their parents. The expanded *Science Circus* aims to engage people of all ages in regional areas to create a greater awareness and appreciation of how science is used within their local community.

Australian National University

The Australian National University (ANU) is a founding partner of the *Shell Questacon Science Circus*. Each year, the *Science Circus* team is comprised of 16 Masters of Science Communication students who undertake their studies at the ANU Centre for Public Awareness of Science (CPAS). Questacon also partners with CPAS on a variety of science communication projects, including international capability development initiatives. Scientists and experts from the ANU also contribute regularly to Questacon's visitor programs, such as lectures and demonstrations.



The Science Circus display at the 20th World Petroleum Congress in Doha, Qatar, December 2011. (L-R) James Shaw (Manager, Community Relations, CCS Corporation Canada) Ben Scott (Communications Manager, Shell in Australia); Angie Good (Questacon) and Yousef Mohammed Y.A. Murad (Deputy Head of Social Responsibility, 20th World Petroleum Congress).



Raytheon – the Schmidt Digital Studio

Raytheon Australia has provided support for two years for the *Schmidt Digital Studio*, which was officially named in 2011 in honour of Professor Brian Schmidt, Australia's first Nobel Prize winner in Physics for almost a century. The *Schmidt Studio* uses interactive videoconferencing to extend the Questacon experience by delivering innovative science, technology, engineering and maths programs directly into secondary schools across the nation. As more schools are connected by a growing broadband capability, this conversation with young Australians will grow through new links between schools and scientists. The *Schmidt Studio* also supports stronger international links by making it possible for students to experience special scientific events from around the globe.

The National Water Commission – water education program

Questacon's partnership with the National Water Commission was established in 2008 to develop a national, integrated water education and awareness program. This program comprised development and delivery of three elements:

- The H_2O —*Soak Up the Science* exhibition at Questacon, which opened in December 2010, explores how water shapes our world, supports our climate and influences our society
- A two-year in-school program for secondary school students on water innovation and careers, which was delivered by the *Questacon Smart Moves* outreach program to over 90 000 secondary school students
- A two-year Australia-wide tour of the *Our Water* travelling exhibition to 14 venues, including science centres, cultural and other community venues. This tour is currently underway and will conclude in August 2012.

Together the three components encourage visitors to think and question their use of water and their impact on ecosystems. By teaming up to present this program, Questacon and the National Water Commission are building awareness in our society of the importance of science, innovation and technology to solving water-related issues and keeping the Australian economy and environment healthy.

The Australian Museum – Deep Oceans exhibition

In June 2012, Questacon and the Australian Museum launched *Deep Oceans*, a new exhibition that answers two intriguing questions: what's down there and why should we care? The exhibition uses an innovative combination of interactive exhibits, objects and specimens to showcase this fascinating environment and the weird and wonderful creatures that make their homes within.

Deep Oceans explores the deep marine environment of Australia and the Pacific region. The exhibition highlights the region's ecology, biology, chemistry, physics, geodynamics and oceanography, and the technology required to explore the oceans below 200 metres. The exhibition partnership commenced in June 2011 and brings together the two organisations' skills and expertise in the development of world-class science exhibitions. *Deep Oceans* will spend five months at the Australian Museum, before making its voyage to Questacon where it will open in November 2012.

University of Canberra – student projects

During the year Questacon partnered with the University of Canberra (UC) on a number of projects to provide students with professional-level experiences to supplement their studies in architecture, tourism and design. Projects have included developing designs for a potential expansion of the Questacon Centre, pitching advertising campaigns aligned with the Rio+20 United Nations Conference on Sustainable Development and assisting with the development of Questacon's successful 2012 Canberra and Capital Region Tourism Awards submission.

Tourism partners

Questacon continues to work collaboratively with industry and regional tourism bodies to position Questacon and Canberra as a significant tourist destination. In particular, Questacon is represented on the Executive Committee of the National Capital Attractions Association (NCAA), the Stakeholder Council of the National Capital Educational Tourism Project (NCETP) and the ACT Branch of the Australian Tourism Export Council. Questacon actively supports these bodies' work to encourage collaboration between attractions and promote the National Capital's attractions, including Questacon, to tourists and schools.



Questacon's contribution to tourism in the ACT was recognised in November at the 2011 Canberra and Capital Region Tourism Awards, where Questacon was awarded Best Tourist Attraction for the eighth time and seventh consecutive year. In March 2012, Questacon received the Bronze Award in the Tourist Attraction category at the Australian Tourism Awards.

National Science Week partners

Through the *Inspiring Australia* Program, Questacon partners with CSIRO to help local, state and territory coordinating committees build collaborations and partnerships with local organisations and businesses. These partnerships facilitate communities in metropolitan, regional and remote communities in each state and territory to engage in activities during *National Science Week*.

A school and community resource is developed annually through the Australian Science Teachers Association (ASTA) to support those in and out of classrooms to become involved in *National Science Week*. With *Inspiring Australia* funding, ASTA also administers a small grants program to assist schools to engage their students and communities in *National Science Week*.

Another major *National Science Week* partner is the Australian Broadcasting Corporation (ABC). The ABC conducts national citizen science projects involving Australian communities in science research, and an integrated program of ABC television, radio and online programming and promotional activities. This gives Australians of all ages across the length and breadth of the country an opportunity to participate in the nationwide celebration of science.





Questacon gallery exhibitions

Exhibition highlights

Questacon created two exciting new exhibitions in the Centre this year:

- *Q Lab* opened in September 2011 and presents a new dynamic and experimental environment to inspire our visitors' inner scientist. Featuring a constantly evolving array of programs, demonstrations and exhibits, *Q Lab* targets pre-teens to adults, encouraging them to ask questions and find their own answers. Visitors to *Q Lab* can also interact with Questacon science communicators and visiting scientists who bring their science in from the lab or the field to showcase it to the public.
- After over 10 years as our most popular exhibition, *Sideshow* closed in early 2012 to make way for the new *Excite@Q* exhibition, which opened in March 2012. *Excite@Q* is designed to bend both mind and muscle, providing visitors with a complete hands-on, minds-on experience, allowing them to test their reflexes, skills and perceptions.

Questacon displays more than 200 exhibits in eight galleries at any one time. The galleries are staffed by Questacon science communicators and volunteers who assist visitors to explore and experience science through the interactive exhibits.

Exhibitions

Exhibitions on display at Questacon during 2011-12 include:

- *Imagination Factory* – presents new ways to think about the mechanical world around us.

- *Going Places* – a travelling exhibition from Scitech Science Centre (Perth) that explores different forms of travel.
- *Wonderworks* – highlights the beauty of science phenomena and their power to stimulate the imagination.
- *Awesome Earth* – engages visitors with the forces that shape the earth through cyclones, earthquakes, volcanoes, tsunamis, thunder and lightning.
- *Mini Q—fun for 0–6 year olds* – encourages younger visitors, along with their parents and carers, to explore science through play. The *Mini Q* exhibition was refreshed during the year to ensure an ongoing high-quality experience for our visitors.
- *H₂O—Soak up the Science* – explores how water behaves, how it shapes our world and how we use this precious resource.
- *Sideshow* – explored the physics, physiology and psychology of sideshow alley rides and activities. This exhibition closed at the end of the January 2012 school holidays to make way for *Excite@Q*.
- *Q Lab* – offers an ever-changing program of activities and exhibits. Visitors can look at the world differently with microscopes and high-definition slow-motion footage. They can also enjoy live scientific demonstrations performed by Questacon's science communicators and visiting scientists.
- *Excite@Q* – Questacon's newest exhibition is a complete hands-on, minds-on experience, featuring exhibits to get the adrenalin pumping.



“ Science is not dry facts and endless rote learning. It's doing things, it's problem solving and it's learning how to think in ways that go far beyond application in science itself. It gives you the tools that are so useful for so many things as well as opening up wonderful worlds of inquiry. ”

Professor Elizabeth Blackburn

Winner of the 2009 Nobel Prize in Physiology or Medicine



Ramp displays

The walls of the ramp leading to the galleries include a frequently changing display area for science-based art and photographic works. Exhibitions displayed during the year included:

- *Japanese Illusions* – 10 visual perception illusions developed by Professor Kitaoka, Kyoto, Japan.
- *Incredible Inner Space* – an exhibition of 28 microscopy images produced by the Australian Microscopy and Microanalysis Facility.
- *Focus on Antarctica* – a photography exhibition featuring images from the Australian Antarctic Division archives, together with the personal collections of Dr Andrew Dowdy and Questacon Volunteer Mr Geoff Duggan.
- *Hyabusa Asteroid Explorer* and *Itokawa Asteroid* – scaled models of the Japanese Aerospace Exploration Agency's (JAXA) unmanned spacecraft and the near-earth asteroid it sampled in 2005. These models were presented by JAXA to Questacon in 2010 to mark the return to Earth of Hyabusa, which landed in Woomera, South Australia, with the assistance of the Australian Government.

Science Garden external exhibits

The *Science Garden* offers visitors an outdoor setting in which to explore and discover aspects of science, mathematics, engineering and the environment.

The *Science Garden* features exhibits inspired by the natural elements of sun, wind, water and rock, including:

- *Flickering Leaves* – designed and built by world-renowned artist Ned Kahn. This large exhibit's surface is covered in small stainless steel discs that ripple in the wind, echoing the effect of leaves.
- *Möbius* – one of the classic forms in both sculpture and mathematics.
- *Rock Xylophone* – constructed of natural stone, the xylophone is tuned to the chromatic (12-pitch) musical scale. Visitors can play a tune and appreciate the unique timbre of the stone bars.
- *Sound Pillar* – a highly polished, flawless column of rock that emits sound when tapped.
- *Szilassi Polyhedron* – this geometric form was discovered in 1977 by L Szilassi, and is recognised as being the shape with the greatest number of sides (seven) that has every side touching all other sides.

“ Makes a 60 year old feel like a 6 year old – fantastic! ”

Questacon visitor feedback





Gravitram

R&B

DISNEY MOUSE

Queensland
Picked Poles

Spectacular
Science



Visitor experience programs and events

Questacon presents a range of dynamic and engaging in-centre programs, activities and events 364 days a year. Visitors to Questacon have an abundance of opportunity to engage with science, including hands-on exhibits, daily *Spectacular Science Shows*, school holiday puppet shows, interactive educational presentations and impromptu science busking. Dedicated staff and volunteers are on hand in the galleries to assist visitors to get the most from their time at Questacon.

Our youngest visitors and their carers can supplement their visit to the *Mini Q* exhibition with a *Science Time* session, designed to inspire future scientists aged between 2 and 6 years old. The *Science Time* program offers learning experiences on a range of science and nature themes that change every three weeks. In order to meet continuing high demand, each *Science Time* theme has been extended from two weeks' duration to three, adding an extra twelve sessions to each theme. In-centre sessions are also complemented by video episodes available on the Questacon website.

School and community groups can enjoy an exclusive experience of Questacon after hours with the *Q By Night* program. Alternatively, for those schools and community groups in the Canberra region the *Q2U* program brings a variety of interactive science shows to them.

Questacon also presents special events, science lectures and science cafes throughout the year featuring leading Australian and international scientists and experts in a variety of fields. These special events often tie in with major public festivals in Canberra and exhibitions in our neighbouring cultural institutions.

In 2011-12, Questacon delivered a range of experiences for audiences attending festivals and events in the Canberra region such as Enlighten (part of the Canberra Festival), the Floriade flower festival, the Canberra Balloon Festival, National Science Week, Smith Family Government House Open Day, Tidbinbilla Open Day, the Australian Nuclear Science and Technology Organisation (ANSTO) Australia Day Extravaganza and the National Heritage Festival.

Questacon's *Q Club* membership program continued to be a popular option for visitors during the year. Over 17 000 active members enjoyed unlimited access to Questacon and privileges such as exclusive entry to the *Q Club* Members' Lounge, discounts on merchandise and scientific toys from the *Q Shop* and member-only discounts at the *Mega Bites Café*. Members also receive reciprocal entry to science centres and museums throughout Australia and internationally. *Q Club* members are kept up to date with Questacon's programs, exhibitions and events through a quarterly electronic newsletter. A members' night was held in December 2011 to celebrate and thank *Q Club* members for their continued patronage throughout the year.

Spectacular Science Shows delivered in 2011-12 included:

Tasty Science	Spiders
Balloonatic	Parasites Lost
Boom Crash Boing – The Collision Show	Snakes
Move It – The Engineering Show	Insects
Rocket Science #101	Shocking Science – The Story of Nikola Tesla
Perception Deception	The Science of Mummification
Testing the Waters	Dino Science
Instrumental as Anything – The Music Show	Rip Slash Go Game Show
Invasion from the Planet FWAH – The BOC Liquid Nitrogen Show	Dinos Evolution
The Natural Disaster Show	Colour & Light
Side Show Science Spectacular	Extreme Environments
Bright Sparks – The Electricity show	Moon Landing
The Science of Flight	Square Kilometre Array Show
Explodaganza	Science of Endurance
Guide to the Galaxy	Mega Predators





Visitor experience highlights

- The *Questacon Excited Particles* performed 3055 shows, talks, puppet shows and *Q2U* visits to 195 007 people. The *Q Club* had 5069 memberships, comprising 17 744 individuals, including many interstate residents. Approximately 850 attended the *Q Club* members' night in December 2011.
- In September 2011, Questacon participated in Canberra's annual Floriade flower festival. To match the Floriade theme of food and flavours, Questacon developed the interactive *Tasty Science* show that delved into the science behind our sense of taste. The *Questacon Excited Particles* presented 32 shows over 16 days to more than 2500 people.
- In February 2012, Questacon presented the *Art and Science* lecture series with a nod to the National Gallery of Australia's summer blockbuster exhibition *Renaissance*. This four-part lecture series, held in-centre, saw experts from the Australian War Memorial, the Australian National University and the Italian Ministry of Foreign Affairs presenting to 400 people over eight days.
- Over four magical nights in March 2012, Questacon was presented in a whole new light as part of the Canberra Enlighten Festival. The outside of the Centre was illuminated with scientific-themed projections, Questacon opened up its foyer and theatre to a hive of activity. An adults-only evening provided the opportunity for a more mature audience to explore the galleries and exhibits, and over 1400 people attended several special talks and presentations. Popular DJ Tom Piper explored the latest in music technology by delivering a production master class and those attending the *Red, White and Ale* event discovered the science behind artisan beer and wine-making and taste tested products from leading local producers. Questacon also hosted the Perth Theatre Company's production *The Adventures of Alvin Sputnik: Deep Sea Explorer*, which engaged and entertained over 500 visitors with a mix of puppetry, storytelling, mime and multimedia.

The *Questacon Excited Particles* presented the *Tasty Science Show* at the 2011 Floriade flower festival.



Questacon building

Questacon is a purpose-built science centre and an iconic national institution located within Canberra's Parliamentary Zone. It has been operating for 24 years during which time visitation has more than doubled to over 430 000 people annually.

The upkeep of this award-winning tourist destination requires continued high performance in environmental management, workplace health and safety, security, cleaning, maintenance and capital works.

Achievements during the 2011-12 financial year include:

- Capital works, including refurbishment of Galleries 4, 6 and 7, upgrade to the roof, and security and safety improvements to the building's services, structure and envelope.
- Re-certification of the Environmental Management System until December 2014.
- A successful transition to new safety arrangements to comply with the Work Health and Safety Act 2011. Questacon's incident numbers and incident severity continue to be relatively stable even in an environment of expanding activities.
- Very high levels of cleanliness continue with positive visitor comments received about the cleaning contractors and building appearance.
- Maintenance works completed with minimal disruption to centre operations and audit findings that all maintenance key performance indicators were achieved.

The building's level of visitor amenity and asset quality is measured by the Building Condition Index (BCI), which compares current condition against that of an as-new building. Since 2000 it has been shown that the BCI is directly related to ongoing capital funding. After completion of works valued at \$15 million over the five years to June 2011 the BCI reached 88 per cent. This year after works valued at \$0.8 million the BCI is 87 per cent. There will be an ongoing focus on achieving and maintaining an appropriate BCI level.

Questacon also leases premises in Fyshwick, Canberra, which accommodates Questacon's outreach and exhibition design and manufacturing areas. Questacon's *Science Play* and *Science Squad* operate out of offices at the Sydney Technology Park.



The Questacon building in a whole new light for the Enlighten Festival, March 2012.



“You should be very proud of the dedication and energy of the Shell Questacon Science Circus team. I went along to the session at Cranleigh School [in Canberra]. I loved how the presenters threw themselves into it, sought guidance from all the carers to make sure they hit the mark with what would have been a challenging audience, and engaged so well with the kids.”

Government Relations Manager,
Shell



Questacon outreach

An awareness and understanding of why science and research are critical to our lives is essential for developing and sustaining an innovation culture. Questacon offers eight different outreach programs designed to make science and technology accessible to communities in regional and remote areas throughout Australia. Each program has a specific target audience and supports national education priorities such as Indigenous education, mathematics, early childhood and primary science. Outreach programs are supported by partnerships with corporate Australia (including with Shell), enabling Questacon to reach communities all over Australia.

To increase community access to outreach programs and supplement travelling programs, Questacon offers a digital outreach program to schools using interactive videoconference technology.

During 2011-12, Questacon outreach programs reached an audience of 118 546 people and visited 890 schools and other venues across Australia. Questacon outreach programs often tour and work closely together to create quality experiences for our audiences. In some instances, programs share the role of host and co-present shows, workshops and events. Program totals in the table below reflect the number of visitors and venues seen by each program, including co-presented sessions.

Visitors to Questacon outreach programs in 2011-12

Outreach program	Number of visitors	Number of schools and venues visited
Shell Questacon Science Circus	60 067	340
Questacon Maths Squad	1304	8
Questacon Science Squad	23 141	149
Questacon Smart Moves	23 931	120
Questacon Science Play	3406	99
Questacon Science Lines	2539	59
Questacon Digital Outreach	4824	118

Shell Questacon Science Circus

Each year the *Shell Questacon Science Circus* completes two to four tours, travelling for up to 16 weeks annually. The *Science Circus*, through shows and a portable exhibition, aims to inspire young people to engage with science and technology. A teacher support program is also a feature of the program.

The program is a major component of an Australian National University Masters in Science Communication (Outreach) for 16 science graduates each year.

This year a new initiative called *Beyond School – So, What's Next?* was introduced to the *Science Circus* program. In 2012, the first of these innovative trade fair-style events was delivered in the Newcastle region, showcasing local science education options, careers and accomplishments in science and technology. *Beyond School* provides senior secondary students with an opportunity to interact with local organisations to find out what they do, learn about pathways to career opportunities and hear their success stories through trade fair displays, panel discussions and personal interactions. Further events are scheduled for the second half of 2012.

Questacon acknowledges and greatly values the ongoing partnership with Shell and The Australian National University in support of the delivery of the *Shell Questacon Science Circus* program.

“ I enjoyed talking about the career I would like in the future, especially finding someone in the field I want to work in. They gave me the confidence to chase my dreams in what I want to do, no matter what anyone says! ”

Year 9 secondary school student,
Glendale Technology High (Questacon Beyond School)



Questacon Maths Squad

The *Questacon Maths Squad* aims to increase numeracy by positively influencing attitudes to maths and highlighting the broad application and relevance of maths in everyday life. Maths is critically important to students' choice of careers in areas such as scientific research, industry and innovation.

In 2011-12 the *Maths Squad* program focused on delivering videoconference workshops to schools and guest lecturing at universities and conferences for pre-service teachers, aiming to build confidence in teaching and understanding mathematics.

“ You certainly gave everyone an absorbing and educative insight into how the Questacon maths team gets teachers' attention and makes the subject come alive and effectively “sells” it to students – definitely getting concept to the customer! ”

Publishing Manager – Secondary, Cengage Learning Australia
(*Questacon Maths Squad* conference presentation)

Questacon Digital Outreach

Questacon's *Digital Outreach* program delivers a wide range of workshops to school students via videoconference. The workshops include demonstrations and interactions that encourage students to explore phenomena through first-hand experiences and develop their understanding of the world around them. Students from schools across Australia participate in workshops and share their science learning with each other as part of the experience. The quality of the workshops has received consistently positive feedback from teachers.

Questacon Smart Moves

Smart Moves focuses on secondary students, showcasing science and innovation and stimulating students to consider new ideas and entrepreneurship in science, engineering and technology. *Smart Moves* uses a combination of multimedia-based, in-school presentations and workshops, an interactive website and the *Questacon Smart Moves Invention Convention*.

New in 2011-12, the *Questacon Smart Moves* in-school workshops provide students with the opportunity to explore the innovation process in further depth.

Questacon Smart Moves Invention Convention

The *Questacon Smart Moves Invention Convention* inspires young Australians to examine and explore the innovation process. Delivered in a new format from 2012, the *Invention Convention* is a dynamic three-day workshop style program where students explore creative thinking strategies to develop ideas.

Questacon ScienceLines

Questacon ScienceLines delivers engaging science programs for Indigenous students, teachers and community members around Australia. Emphasis is placed on ensuring the cultural relevance of the program content. To ensure this, *Questacon ScienceLines* endeavours to build and maintain strong linkages with participating communities.

ScienceLines also assists with developing Indigenous content across other Outreach programs including the *Shell Questacon Science Circus* and *Questacon Smart Moves* programs.

This year the *ScienceLines* team has worked with external partners such as the ACT Department of Education and Training to deliver workshops to local Indigenous students that encourage them to recognise achievements of Indigenous people. *ScienceLines* also worked with students from the Canberra Institute of Technology to produce videos that showcase personal stories of Indigenous achievement in science and technology. These aim to inspire young Indigenous audiences to consider careers in these areas.



“ Thank you so much! Last week was fantastic, the students had a brilliant time and everyone is looking forward to the next steps. ”

ACT Education Department Representative
(Questacon ScienceLines workshop)

Questacon Science Squad

The Questacon Science Squad presents science shows and workshops for schools, primarily in the Sydney metropolitan area. The Science Squad program provides students and teachers with a positive science experience and aims to support classroom science teaching by delivering curriculum-linked performances that are both educational and entertaining. Science Squad shows are supported by teacher resources, quarterly newsletters and a large collection of hands-on science activities, videos and information on a dedicated website. The Science Squad also delivers high-quality performances for public audiences at science festivals, community events, libraries, holiday programs, museums and school holiday entertainment in shopping centres. The Science Squad launched their latest show in March 2012—Deep Ocean Discovery—which was developed as an adjunct to the Deep Oceans exhibition co-developed by Questacon and the Australian Museum.

“ A great way to reinvigorate my teaching and gets me to try something different. ”

Teacher at a Science Circus professional development workshop,
Tennant Creek, Northern Territory.





“ Keep doing exactly what you are doing because the children just loved every part of it as they were totally mesmerised by the presentation. ”

Teacher feedback

(Questacon Science Play)

Questacon Science Play

Questacon Science Play is a unique program that recognises the value of informal education in early childhood learning. The program travels to metropolitan, regional and remote Australia presenting engaging, hands-on science experiences for pre-school children as well as providing professional development for early childhood educators. *Science Play* aims to engage young children and their parents, carers and educators in scientific discovery through play and encouraging natural curiosity.

Science Play tours are supplemented with an activity booklet, a DVD of science episodes, a dedicated website and professional development workshops for early childhood educators.

During 2011-12 the *Science Play* program travelled to Darwin, the Gippsland region of Victoria, Central Coast NSW and metropolitan Sydney. *Science Play* also presented a session at CONASTA (the annual Conference of the Australian Science Teachers Association) in Darwin in July 2011.

Questacon StarLabs

StarLabs are portable, inflatable planetaria, which bring the wonder of astronomy to thousands of students in their own schools and communities. Questacon has cooperative arrangements with CSIRO Education and the Queensland Museum to deliver *Questacon StarLab* programs.

Outreach highlights

- The new *Science Circus* initiative *Beyond School* engaged 464 students in schools and a further 665 students and 52 exhibitors/volunteers at the initiative's first careers expo event in Newcastle in March 2012. Questacon partnered with high-profile organisations on this event, including Xstrata Coal, CSIRO, Newcastle University, and Engineers Australia, who took the opportunity to showcase science, technology, engineering and mathematics achievements and opportunities in the region.
- In June 2012, *ScienceLines* toured to eight towns along the Murray River, presenting in-school shows and workshops that included stories of Indigenous achievements in science and technology and Indigenous knowledge. The sessions explored the issues of water quality and quantity and students undertook problem-solving using hands-on water models.
- *Science Squad* highlights included participating in the Ultimo Science Festival, Science in the City at the Australian Museum, a special science show performance for an audience of child actors from the Sydney production of the musical *Mary Poppins*, and delivering the Christmas Science Show at hospital schools, schools for special purposes, and at the Redfern Community Centre Christmas party.



CAN YOU MAKE UP A MEMORY?

Two people should use this exhibit

PERSON A should:

Read a list of words out loud **ONCE** to memorise them.
Then, Person A covers the list and tells Person B the words they can remember.



PERSON B should:

Slide (reset) all the beads across to the left hand side.

If Person A remembers a word on the list, Person B 'keeps score' and slides a bead over any remembered words.



WARNING SCIENCE AHEAD

People often insist that they remember 'needle' or 'sleep' being on the list, even though they're not! This is because their brain created a 'false memory', which is how a healthy memory system copes with lots of information.

Ideas and memories can be lodged in our mind by suggestion or inference. Marketers will sometimes avoid saying outright that their product is the best, but they imply their product is superior so they can persuade consumers to buy their 'better quality' product.

ASK A FRIEND TO STAND ON THE OPPOSITE SIDE

THEY WILL BE ABLE TO SEE THE WORDS ON THE LIST

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Travelling exhibitions

Questacon provides travelling exhibitions that tour to a range of regional and metropolitan venues across Australia and internationally. These exhibitions are developed in-house by Questacon and provide high-quality interactive, innovative and educational exhibitions for the engagement of all Australians.

During 2011-12 the Questacon Travelling Exhibitions team toured five exhibitions to ten Australian venues reaching 666 947 visitors.

The travelling exhibition program included:

- *Science on the Move* – a portable exhibition that explores simple scientific principles relevant to everyday life. This exhibition is at the Museum of Tropical Queensland, Townsville, between July 2011 and July 2012.
- *Our Water* – delves into the different ways of using and preserving the precious resource of water. The development and two-year touring program of this exhibition is supported through a partnership with the National Water Commission. This year *Our Water* toured to seven venues including:
 - Scitech, Perth, Western Australia
 - McCormick Centre for the Environment, Renmark, South Australia
 - Portland Art Centre, Portland, Victoria
 - Imaginarium Science Centre, Devonport, Tasmania
 - Scienceworks, Melbourne, Victoria

- Discovery Science and Technology Centre, Bendigo, Victoria
- National Wool Museum, Geelong, Victoria.
- *Sea Chest Secret* – an Australian maritime mystery exhibition which explores maritime history and environmental science through a voyage of discovery about an intriguing diary found washed ashore in a sea chest. *Sea Chest Secret* was at the South Australian Maritime Museum, Port Adelaide between February 2011 and May 2012.
- *Perception Deception* – explores perception and the senses with interactive exhibits, multimedia activities, visual illusions and perception tests. *Perception Deception* was at Scienceworks (Melbourne) between August 2011 and February 2012, and then Scitech (Perth) from February to June 2012.
- *Eaten Alive – the World of Predators* – four exhibits from this exhibition are on display at the Queen Victoria Museum and Gallery in Launceston, Tasmania from February 2011 through to April 2013.

“Excellent way to excite kids into science. I learnt a lot too.”

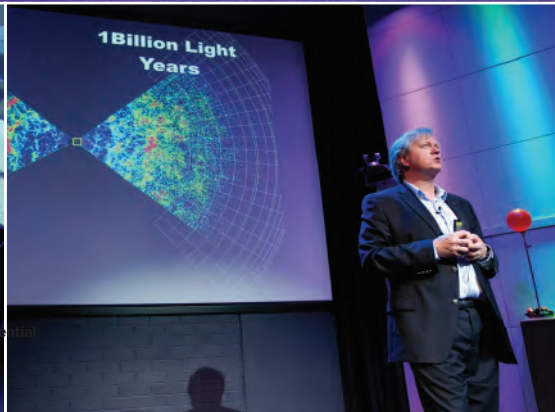
Questacon visitor feedback

The *Perception Deception* travelling exhibition is unpacked at Scienceworks in Melbourne.



“ You are the future.
Dream-dream big and then
go make it happen. ”

NASA Administrator Charles Bolden,
speaking to students at Questacon



Questacon digital communications

Questacon continues to engage an increasing number of visitors with its multi-disciplinary capability in digital communication. Interactive sessions delivered by videoconferencing, multimedia and other internet technologies are becoming new pathways in science communication.

Questacon's digital communications capability is growing and Questacon will be seeking partnerships in this emerging sector.

Videoconferencing

With the roll-out of the National Broadband Network, videoconferencing technologies allow Questacon to engage with audiences in their classrooms, offices and, in future, in their homes. Questacon's repertoire of videoconference sessions continues to expand, drawing on our pool of science communicators and proven approaches to developing program content.

Questacon videoconference streams include:

- regular workshops for primary school students and teacher professional development
- cooperative delivery of science content to schools, with strategic partners such as CSIRO
- special events where live and videoconference audiences engage in conversations with experts across the science, technology and innovation fields.

Videoconference event highlights for 2011-12 include:

- Dr Susan Hayes from the University of Western Australia demonstrated her skills as a forensic and archaeological facial reconstruction artist and scientist to a live audience in August 2011. West Australian secondary students also presented their anatomical facial drawings via videoconference link-up.
- In October 2011 Dr Sam Griffiths from Geoscience Australia shared with secondary school students his experiences working as a geodesist in Antarctica and his journey to become a scientist.

- Primary and high school students chatted with Professor Brian Schmidt from the Australian National University and Mt Stromlo Observatory in November 2011 about his Nobel Prize winning work on the accelerating expansion of the universe.
- NASA Administrator Charles Bolden Jr presented an inspirational talk in April 2012 to a national live and videoconference audience about NASA's future directions in innovation, exploration, science and discovery and the vital role that today's students will play.
- In partnership with Science Centre Singapore and Guangdong Science Centre in China, students from all three countries discussed and explored local and global water issues via a series of videoconferences held between November 2011 and June 2012. This event was part of the international *Science Centers Engagement and the Rio Summit (SCEnaRioS)* project.
- In June, Questacon presented 'The Transit of Venus – a tale of discovery and science' focusing on the Transit's relevance to Australian history and Captain James Cook's first voyage upon the HMB Endeavour. This videoconference involved experts from The National Library of Australia, The National Museum of Australia, The Mitchell Library (State Library of NSW), Te Papa Tongarewa (New Zealand), The Sydney Observatory and The Australian National Maritime Museum.
- Also in June, 2012 Young Australian of the Year, Marita Cheng, spoke to students about Robogals, the international, student-run organisation she founded that mentors and engages young women in engineering and technology.



ROBO Q

ROBOTHESPIAN™

S Head Mounted Camera

This is how RoboThesplan™ sees the world. He is able to respond to what he sees, such as people moving around or the colour of your shirt.

A Robo Cheeks

Expressive lights in RoboThesplan's™ cheeks indicate when he is angry, happy or embarrassed. Because RoboThesplan™ is so adorable and cute, these cheeks have been made out of a hardened pinch proof material.

C Brain #1

Controllers receive signals from the various sensors and process them into output signals. Similar to the way your own brain works but it is much less squishy. RoboThesplan™ has two brains, this main brain is located not in his head, but in his back.

Skeleton

RoboThesplan's™ skeleton is made from 6061 grade aluminium, welded together to create a lean, mean, performing machine.

Foot Pads

These don't do anything but look cool. RoboThesplan™ would look pretty weird without feet don't you think?

Servo Axis Motor (Mouth)

A specialised high speed servo that controls RoboThesplan's™ mouth movements. While RoboThesplan's™ mouth does move, no sound is coming from his mouth. RoboThesplan's™ voice actually comes from the speaker located in his chest.

Tendons

Actuators receive the output signals from RoboThesplan's™ brain to move his hands and legs.

A Servo Motors

These are motors that power RoboThesplan's™ joints using negative feedback. Servo motors make adjustments to RoboThesplan's™ body by comparing where his body is actually positioned to where it is supposed to be.

A Vocal Amplifier

A giant speaker that allows you to hear RoboThesplan's™ voice.

Brain #2

RoboThesplan™ actually has two brains! This is the smaller one and consists of a computer that controls RoboThesplan's™ head mounted camera, eyes and speech.

A LCD Ocular Replicas (Eyes)

RoboThesplan™ actually 'sees' using a camera mounted into his head. LCD screens represent his eyes and show you where he is looking. They also show how he is feeling and make him look pretty cute.

PET Body Shell

Vacuum formed plastic creates RoboThesplan's™ armour that protects him during his gladiatorial combats.

A Air Cylinder Axis

Actuators receive the output signals to move RoboThesplan's™ hands and arms.

Robo Thumb

RoboThesplan™ has specially designed thumbs that can light up. So when he breaks out from Questacon and wants to hitchhike up the Federal Highway, his thumb will be visible to drivers at night.

Robots are programmable computers designed to perform a variety of tasks.

RoboThesplan™ is an adaptive robot that receives input from sensors to perform physical movements or produce vocal responses.

RoboThesplan's™ parts can be classified as either:

- S Sensors
- C Controllers
- A Actuators.

Robots are programmable computers designed to perform a variety of tasks.

RoboThesplan™ is an adaptive robot that receives input from sensors to perform physical movements or produce vocal responses.

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- S Sensors
- C Controllers
- A Actuators.



Video production

The *Schmidt Digital Studio* is used for filming and producing high-definition and slow motion footage used in Questacon's programs and exhibitions. The skills of the production staff and capability of the studio are in high demand both internally and by other broadcast and science communication organisations.

Recent productions include:

- Short videos shown at the Planet Under Pressure and Rio+20 global conferences, to highlight the role of science centres in engaging the public with critical issues of global sustainability as discussed at these conferences.
- Interview footage of previous graduates for inclusion in the Department of Industry, Innovation, Science, Research and Tertiary Education's Graduate Application (Grad App). The Grad App is a tablet application promoting the department's graduate program to potential graduates for the 2013 intake.
- Time lapse footage of the changeover of the *Sideshow* exhibition to the *Excite@Q* exhibition at Questacon.
- Production of an instructional video for the Freefall exhibit within the *Excite@Q* exhibition.

Online media

A total of 1 072 937 website visitors from across Australia and around the world engaged with Questacon online in 2011-12. Questacon's website provides supplementary content and activities linked to exhibitions and programs as well as online-only content, providing access to new and global audiences who may not have the opportunity for an in-person Questacon experience.

The *Live@Q* web portal was launched in early 2012 to promote Questacon's videoconference activities. It includes a calendar of videoconference events, options for involvement and a video log of past events and presentations. Also new to the website in 2011-12 is an interactive sneak peek of what visitors can experience at the new *Excite@Q* exhibition.

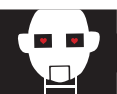
Over the 12 months from May 2011, Questacon's mobile device-optimised website saw a 133 per cent increase in traffic. Questacon continues to expand the content available from this site. Visitors can access the *Spectacular Science Show* schedule for the week and other important pre-visit information.

Questacon is committed to compliance with the mandated Web Content Accessibility Guidelines 2.0 (WCAG 2.0) by late 2012. WCAG 2.0 was developed by the World Wide Web Consortium and defines how to make online content more accessible to people with a wide range of disabilities.



National reach

Shell Questacon Science Circus Alcoota Alice Springs Ampilatwatja Apungalindum Arlparra Barunga Batchelor Berry Springs Bulla Camp Bulman Darwin Haasts Bluff (Ikuntji) Harts Range (Atitjere) Hermannsburg (Ntaria) Humpty Doo Irrultja Jilkminggan Katherine Laramba Mataranka Mulga Bore (Akaye) Ngukurr Ntaria Papunya Pine Creek Soapy Bore Tennant Creek Timber Creek Urapunga Yarralin (Walangeri) Bairnsdale Cann River Drouin Foster Inverloch Lakes Entrance Leongatha Lindenow Maffra Mirboo North Morwell	Orbost Pakenham Rosedale Sale Seaspray Toora Trafalgar Traralgon Warragul Wonthaggi Yarram Belmont Calwell Canberra Cessnock Gosford Kurri Kurri Lochinvar Maitland Muswellbrook Newcastle Queanbeyan Scone Singleton Sutton Terrigal The Entrance Tuggerah Wyong Questacon Smart Moves Ayr Bowen Cairns Charters Towers Clermont Cloncurry Emerald Gladstone Hughenden Ingham Innisfail Mackay Mount Isa Richmond	Rockhampton Townsville Winton Bundaberg Bundamba Caboolture Caloundra Childers Chinchilla Gin Gin Goomeri Gympie Ipswich Kalkie Murgon Nambour Noosa Oakey Peregian Springs Roma Rothwell St George Toowoomba Woodford Batemans Bay Bega Bomaderry Broulee Cooma Eden Goulburn Moruya Moss Vale Narooma Nowra Pambula Picton Port Kembla Shoalhaven/Milton Wollongong Burnie Devonport Hobart Latrobe Launceston Penguin Ulverstone	Questacon Maths Squad Abermain Adelaide Alice Springs Armidale Belford Bolwarra Branxton Brisbane Broke Canberra Cessnock Coorangbong Ellalong Gosford Greenland Hinton Hobart Kitchener Maitland Melbourne Millfield Morpeth Muswellbrook Newcastle Oribah Paxton Raymond Terrace Rutherford Scone Singleton Sydney Wollombi Airly Bairnsdale Briagalong Cann River Churchill Glengarry Lakes Entrance Lindenow Maffra Morwell Newborough Newmerella Nicholson	Orbost Sale Toorloo Traralgon Yarram Yinnar Alfredton Allansford Ararat Ballarat Bunaree Colac Dennington Horsham Mount Clear Portland Sebastopol Warrnambool Balaklava Bute Clare Cowell Crystall Brook Georgetown Karcultaby Minlaton Minnipa Moonta Orroroo Peterborough Poonindie Port Lincoln Port Pirie Roxby Downs Stansbury Walleraro Wangary Whyalla Bakers Creek Bluff Comet Farleigh Mackay Richmond Walkerston	Questacon Science Play Berrimah Brinkin Casuarina Darwin Durack Humpty Doo Karama Leanyer Nightcliff Palmerston Parap Tiwi Virginia Woodroffe Drouin Foster Glengarry Heyfield Korumburra Leongatha Longford Longwarry Maffra Neerim South Newborough Sale Stratford Traralgon Bateau Bay Berkeley Vale Erina Fountaindale Lake Haven Narara Niagara Park Ourimbah Pretty Beach Tuggerawong West Gosford Woy Woy Wyoming Wyong Acacia Gardens Belmore Blacktown	Casula Glenwood Green Valley Hassall Grove Huntingwood Kellyville Kings Langley Lindfield Liverpool Marayong Minchinbury Moorebank Mt Druitt Old Guildford Parklea Penrith Picnic Point Plumpton Quakers Hill Rooty Hill Rose Bay Rouse Hill Seven Hills Strathfield Sydney Villawood Wahroonga West Pennant Hills Questacon Science Squad Alexandria Allambie Heights Annandale Arncliffe Ashbury Auburn Austral Balgowlah Balmain Bankstown Belrose Bexley Blacktown	Bondi Junction Bonnyrigg Bossley Park Bowral Burwood Cabramatta Campbelltown Campbelltown South Camperdown Canley Heights Canley Vale Caringbah Casula Chatswood Chester Hill Chippendale Constitution Hill Cranbrook Croydon Dover Heights Dulwich Hill Emu Plains Enfield Engadine Ermington Erskine Park Fairfield Five Dock Forest Lodge Frenchs Forest Girraween Glenwood Gordon Granville Green Valley Greenacre Greenwich Guildford Gymea Haberfield Harbord Hornsby Hoxton Park Ingleburn Kenthurst Kingsgrove Kogarah Kurrajong East Lalor Park	Lane Cove Leppington Liverpool Malabar Maroubra Maroubra Junction Matraville Merrylands Moorebank Mosman Mt Pritchard Mulgoa Muswellbrook Narellan Vale North Curl Curl North Rocks North Strathfield North Sydney Oatlands Oatley Old Guildford Orchid Hills Oxley Park Paddington Padstow Panania Penshurst Picton Plumpton Prestons Pymble Randwick Redfern Regents Park Richmond Riverwood Rockdale Ropes Crossing Rose Bay Rosebery Rosemeadow Rydalmere Sans Souci Seven Hills South Coogee South Penrith St Ives Stanhope Gardens Sutherland	Sydney Toongabbie Ultimo Waitara Warriewood West Pymble Westmead Whalan Willoughby Winston Hills Woollahra Questacon ScienceLines Balranald Barham Canberra Dareton Deniliquin Finley Hay Mildura Robinvale South Coast NSW Q2U Sydney Warrangamba Canberra Questacon Digital Outreach Alstonville Amaroo Ashtonfield Balranald Bankstown Bathurst Beaumont Hills Sydney Berkeley Bilgola Plateau Biraban Bolwarra Boronia Park Bulli Buronga
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Burwood
Calare
Cambelltown
Cambridge Gardens
Canobolas
Canterbury, Sydney
Carinda
Caringbah
Carrathool
Cartwright
Castle Hill
Chittaway Bay
Corrimal
Cowra
Falls Creek
Faulconbridge
Frenchs Forest
Glen Alice
Glen William
Glenfield
Goulburn
Gresford
Hampton
Holbrook
Holsworthy
Hunters Hill
Ilford
Ivanhoe
Jannali
Jesmond
Kings Langley
Kurri Kurri
Lane Cove
Lansvale
Lennox Heads
Lightning Ridge
Llandilo
Macquarie Fields
Maitland
Mallawa
Mortdale
Nemingha
Newbridge Heights
Orange
Pelaw
Pendle Hill
Petersham
Richmond North
Rose Bay

Singleton
South Grafton
Speers Point
Sydney
Tamworth
Thornton
Ulladulla
Undercliffe
Vineyard
Waratah, Newcastle
White Cliffs
William Rose
Willoughby
Windsor
Wollondilly
Wooli

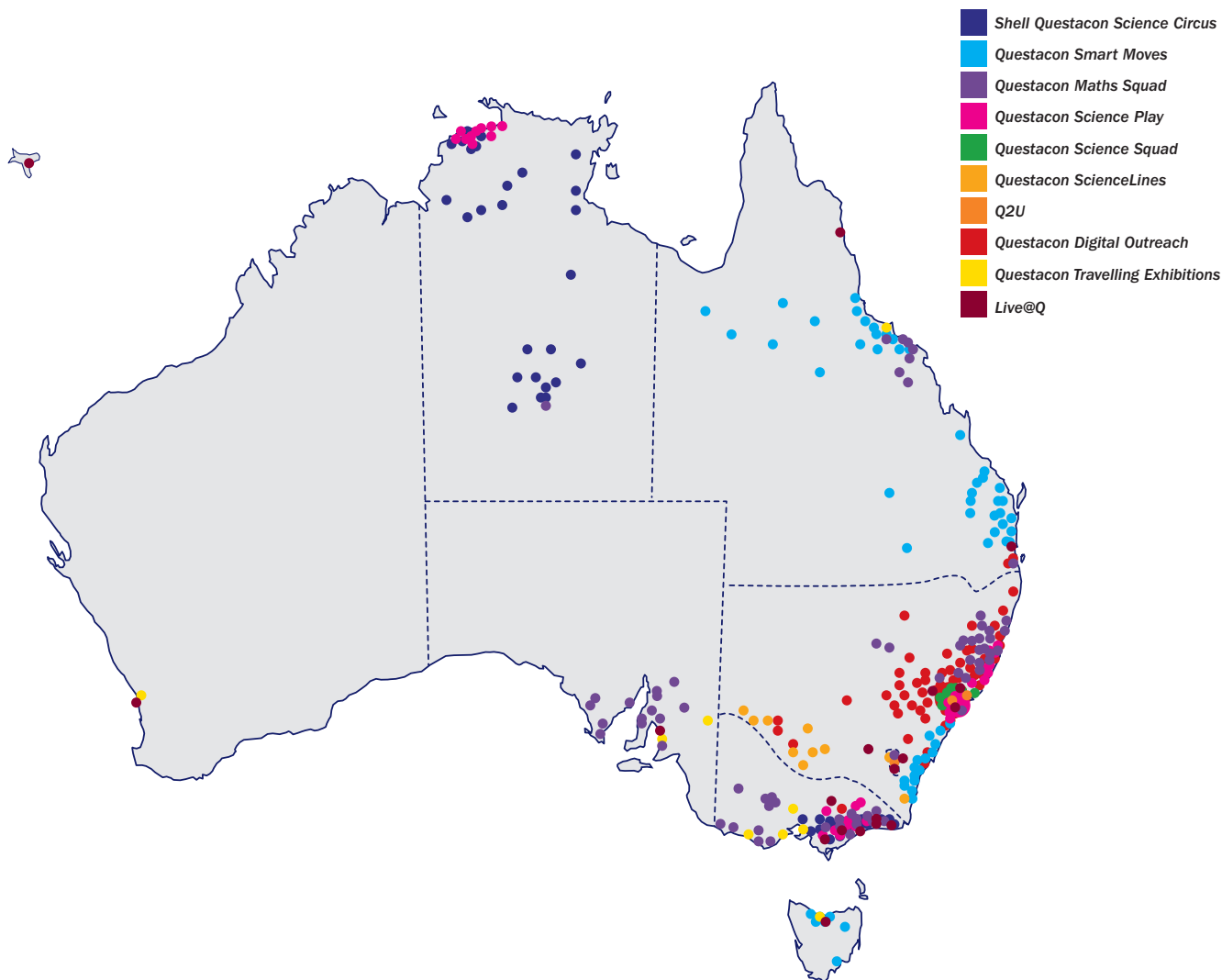
**Qesatcon
Travelling
Exhibitions**

Bendigo
Devonport
Geelong
Launceston
Melbourne
Perth
Port Adelaide
Portland
Renmark
Townsville

Live@Q

Tokyo
Christmas Island
Canterbury, NZ
Singapore
Guandong, China
Geneva,
Seoul, Korea
Adelaide
Bacchus Marsh
Ballarat
Beaufort
Brisbane
Burrumbuttock
Cairns
Canberra
Cann River

Canonwindra
Corryong
Grampians
Hobart
Ipswich
Leongatha
Melbourne
Melton
Narrabeen Lakes
Orbost
Peak Hill
Perth
Queanbeyan
Richmond North
Smithton
Sydney
Townsville
Trangie
Wagga Wagga
Warners Bay
Wodonga





Inspiring Australia



As a division of the Department of Industry, Innovation, Science, Research, and Tertiary Education, Questacon is leading the *Inspiring Australia* initiative.

Following the 8 February 2010 release of the report *Inspiring Australia: A National Strategy for Engagement with the Sciences*, the Australian Government's May 2011 budget provided a total of \$21 million for three years (July 2011 to June 2014) towards the implementation of the report's recommendations.

Achievements during the *Inspiring Australia* Program's first year include:

- Establishing new and renewing existing partnerships with state and territory governments and local organisations to support *Inspiring Australia* officers in each state and territory. These officers provide a local hub for science engagement, connecting people, partners and ideas.
- Commissioning Expert Working Groups to identify further opportunities to:
 - engage communities in the desert regions and tropical regions of Australia
 - engage Indigenous Australians in urban, regional and remote locations
 - build collaboration across science and science communication organisations to tell the story of Australia's capability in marine science.
- Conducting a \$5 million competitive grant round to further unlock Australia's potential through 63 science engagement projects with a variety of delivery approaches, target audiences, geographic locations and science topics. These projects target people who may not have had interest in or access to science engagement activities in the past.

- Organising the 2011 *Prime Minister's Prizes for Science*, the nation's pre-eminent awards for excellence in science and science teaching. The Prizes were awarded at Parliament House on 12 October 2011. The Prime Minister, the Hon Julia Gillard MP, presented the Prizes along with the then Minister for Innovation, Industry, Science and Research, Senator the Hon Kim Carr.
- Staging a nationwide celebration of science with *National Science Week* during from 13 to 21 August 2011, attracting over 1.4 million participants of all ages to 1067 events across all Australian states and territories. Highlights included:
 - A national tour by three high-profile guest speakers, including burns specialist Dr Fiona Wood, Australian Sports Drug Testing Laboratory manager Dr Catrin Goebel, and obesity and diabetes expert Professor Michael Cowley. Around 4000 people attended 37 national tour events.
 - Approximately 4000 people participated in a national project 'The Multitasking Test' by completing an online test to investigate their multi-tasking habits and skills, actively contributing to a science research project. The project was conducted by ABC Science in collaboration with scientists from the University of Queensland.
- Establishing a number of projects to follow-up recommendations of two Expert Working Group reports released in March 2011, *Developing an evidence base for science engagement* and *Science and the media: From ideas to action*.





Prime Minister's Prizes for Science – 2011 Recipients

- **Prime Minister's Prize for Science – Professors Ezio Rizzardo (CSIRO) and David Solomon (The University of Melbourne)**

The \$300 000 prize recognised their work in reinventing polymer science by devising a means of custom building plastics and other polymers for plastic solar cells, drug delivery, paints, adhesives, lubricants and everything in between.

- **Science Minister's Prize for Life Scientist of the Year – Associate Professor Min Chen (University of Sydney)**

Professor Chen discovered a new form of chlorophyll, the molecule central to photosynthesis. Her discovery has implications for solar energy and agriculture.

- **Malcolm McIntosh Prize for Physical Scientist of the Year – Professor Stuart Wyithe (The University of Melbourne)**

This young theoretical physicist is writing the history of the early universe and defining the questions to be researched using the next generation of telescopes.

- **Prime Minister's Prize for Excellence in Science Teaching in Primary Schools – Mrs Brooke Topelberg (Westminster Primary School, Perth)**

Using puppets, a garden, boundless enthusiasm and an initial science budget of just \$1,500 a year, Mrs Topelberg bypassed language barriers, bringing science to migrant students and turning her school into Western Australia's Science School of the Year in 2008.

- **Prime Minister's Prize for Excellence in Science Teaching in Secondary Schools – Dr Jane Wright (Loreto College, Adelaide)**

Awarded for Dr Wright's leadership in science education in her school and among her peers.





Questacon international

There are approximately 2500 science centres worldwide, which receive over 310 million visitors annually. As a leader in the international science centre community, Questacon makes a significant contribution to the global development of this sector. Whether it is by serving in executive positions of science centre associations and networks, implementing partnership projects and collaborations, hosting delegations at our Centre in Canberra, or helping to build capability in countries with emerging fields of science communication, Questacon is increasing participation in science engagement activities around the planet, to help people appreciate the context of scientific advances and understand how science affects their lives.

Building international capability

In November 2011, the 6th Science Centre World Congress was held in Cape Town, South Africa, bringing together 500 delegates from 54 countries to discuss science centres in an African context. Questacon played a key role in the development of the Congress program, and led a three-day pre-conference capability-building workshop for 90 delegates from 11 countries. The workshop was organised in response to a keynote speech made at the previous World Congress in 2008 by Mohamed Hassan, former head of the Academy of Sciences for the Developing World. Dr Hassan called for the establishment of science centres in every African country, especially those lacking scientific capacity, and linking them with academic institutions.

The 2011 Congress also saw the signing of the Cape Town Declaration, committing international support to the development of science centres in Africa. A five-year

strategic action plan is now being developed that will help raise funds and garner support to realise Dr Mohamed Hassan's aspirations. Questacon is playing a key role in developing this strategy. It has commenced planning for an International Science Circus Safari to four countries in southern Africa in 2013 to raise awareness of the Declaration's objectives and help build capability in these countries.

Building international networks

Questacon contributes to other science centre networks through executive roles and active participation. Questacon's Director, Graham Durant, is a member of the Board of Directors of the Association of ScienceTechnology Centres (ASTC), the peak body of the science centre sector. Lorraine Neish, General Manager – Operations, is Vice-President (Australia) for the Australasian Science and Technology Exhibitors Network (ASTEN). Questacon is also an active member of the Asia Pacific Network of Science and Technology Centres (ASPAC), and also regularly links with ECSITE, the European Network of Science Centres and Museums. These linkages assist to develop best practice within the sector, foster partnerships for sector development and generate opportunities for collaborative projects.

During 2011-12, Questacon welcomed to the centre over a dozen international delegations from Botswana, China, India, Indonesia, Japan and the United States. The wide-ranging groups—ambassadors, teachers, museum association representatives, government officials, science centre staff and university professors—visited Questacon to learn about its programs and operations.

Questacon hosted a Diplomatic Families night in May attended by 375 diplomatic staff and their families, representing 41 countries.



In the past year, several Questacon staff have participated in exchange programs with overseas partners. In September 2011, Questacon hosted Megumi Murashima, a performer from the Miraikan Science Centre in Japan, as part of a professional development exchange with Questacon's *Excited Particles*. In May and June 2012, Questacon's Visitor Programs Manager spent a fortnight at the Smithsonian Museum in Washington, as part of a National Attractions Exchange Program. The exchange provided experiences that will be invaluable for Questacon's ongoing goal of developing world-class education and public programs.

In June 2012, Questacon outreach staff visited several venues in California to canvass ideas to help shape the development of the Questacon Technology Learning Centre (QTLC), which will be opened in 2013. Their tour included the 2012 Bay Area Maker Faire and its associated educators' events, the Exploratorium Tinkering Space and Teacher Institute, the Brightworks School, and The Big Lab at the California Science Centre. These experiences are assisting with program development currently underway for the new QTLC.

Questacon staff also participated in international conferences, including the the International Association of Museum Facilities Administrators (IAMFA) conference in New Zealand in November 2011, the ASPAC conference in Singapore in April 2012, and the ECSITE conference in June 2012.

Participation in these conferences provides opportunities for Questacon to showcase our approaches and successes, to exchange ideas, to learn from others and to keep abreast of trends in the science centre sector.

Throughout 2011-12, Questacon delivered one of six pilot projects as part of the *SCEnaRioS (Science Centre Engagement and the Rio Summit)* initiative, coordinated by the ASTC. *SCEnaRioS* aimed to highlight the global science centre network as a platform for engaging the public, including young people, in discussion and dialogue about important global issues such as those discussed at the United Nations Conference on Sustainable Development (also known as Rio+20). Questacon, in partnership with Science Centre Singapore and Guangdong Science Centre in China, delivered the *SCEnaRioS: Water and Life* project, which brought together secondary school students from each country to discuss and explore global and local water issues via a series of videoconferences, research projects and student-developed resources.

The project culminated in a Rio+20 side event where students shared their work, future visions and experiences in learning from each other to develop a shared understanding about critical global sustainability issues.

International Highlights

At the 2012 ASPAC conference in April, Questacon's Brenton Honeyman was announced as recipient of the inaugural President's Award for his contribution to the development of the ASPAC network in his role as Executive Director from 2007 and 2011 and as Secretary and Treasurer from 1998.

In December 2011 the *Shell Questacon Science Circus* made a special appearance at the 20th World Petroleum Congress Social Responsibility Global Village in Doha, Qatar. With Shell's support, the *Science Circus* was one of 12 programs showcased at the Congress highlighting the partnership contributions of Non-Government Organisations, communities and the petroleum industry in advancing human development at the local level. The *Shell Questacon Science Circus* Manager attended the Congress, staffing the *Science Circus* exhibit and giving a public presentation to congress delegates and visitors on the success of the partnership with Shell and the program.

In July 2011 Questacon hosted a virtual birthday party to congratulate Miraikan Science Centre in Tokyo, Japan on their 10th Anniversary. Via videoconference link-up, Questacon presented Miraikan with a birthday gift of an emu illusion (pictured right), an exploding birthday cake and congratulatory wishes.

In May 2012, Questacon hosted a Diplomatic Families night for 375 diplomatic staff and their families from 41 countries. These events are designed to strengthen the relationship between Questacon and the local and wider international community. This year's event was themed around the United Nations International Year of Sustainable Energy for All and featured sustainability-themed shows and activities, as well as presentations by representatives from the United Nations Information Centre for Australia, New Zealand and the South Pacific, and the international Planet Under Pressure conference, a major scientific precursor conference to Rio+20.



“ How can I possibly express my heartfelt thanks...for the thoughtful time and effort you invested in celebrating Miraikan's 10th anniversary? It was not only fun, but as per usual, you took an innovative, delightful approach to celebrating the birthday of a friend... Thank you for the Questacon Emu illusion. It will always be in a place of honour here at Miraikan.

We are very fortunate to have you and Questacon as collaborators in the quest to bringing science to people. You have been with us from the beginning...to our continued friendship! ”

Mamoru Mohri

Chief Executive Director

National Museum of Emerging Science and Innovation (Miraikan), Tokyo, Japan



The staff of Miraikan science centre, Japan, with the 10th birthday gift from Questacon – an emu illusion picture.





Questacon history

The Ainslie years (1975–1986)

Dr Mike Gore from the Australian National University physics department visits the Exploratorium in San Francisco and is inspired to develop a similar interactive science centre in Canberra. Questacon first opens its doors in 1980 at Ainslie Public School with 15 exhibits. The Centre quickly grows in popularity with over 13 600 school children visiting in 1983, with 30 per cent from interstate.

The Australian Bicentennial Authority proposes that a national science centre be established as a lasting memorial to the 1988 Australian Bicentenary.

In 1985, the *Shell Questacon Science Circus*, Australia's first science outreach program, starts its inaugural tour to Goulburn, attracting 1500 visitors over one weekend. Shell sponsors the *Science Circus* allowing for longer tours.

Questacon in the Parliamentary Zone – the first decade (1986–1997)

In 1986, Prime Minister Bob Hawke turns the first sod on the construction site of the National Science and Technology Centre in the Parliamentary Zone. On 23 November 1988, Questacon officially opens in its new building as a joint Australia–Japan Bicentennial Project. Dr Mike Gore is Questacon's first Director.

Questacon is awarded the 1992 Eureka Prize for the Promotion of Science, and by 1994, Questacon has received two million visitors. During the first 10 years, Questacon begins its travelling exhibitions program with *Dinosaurs Alive*, establishes additional outreach programs and becomes one of the first science centres in the world to offer interactive activities online via a new Questacon website.

Questacon – travelling towards twenty (1998–2007)

In 1998, Questacon celebrates its 10th anniversary as a national centre.

After more than 20 years as Questacon's Director, we farewell Dr Mike Gore in 2000 and welcome Dr Annie Ghisalberti as the new Director.

During this second decade, Questacon establishes a base in Sydney and introduces new outreach programs – Sydney-based *Questacon Science Squad* and national programs *Questacon Smart Moves* and the *Tenix Questacon Maths Squad* – taking the Questacon experience to more schools around Australia. Questacon also hosts the first week-long *Questacon Smart Moves Invention Convention* for Australia's most promising young science innovators.

Blockbuster exhibitions *SideShow—The Science Behind the Fun* and *Spiders! Alive* attract record numbers of visitors. *Eaten Alive—the World of Predators* fascinates visitors with giant animatronics and a 3D simulated shark cage dive. *Mini Q—fun for 0–6 year olds* quickly becomes a firm favourite with Questacon's youngest visitors and their carers.

In 2003, Questacon farewells Dr Annie Ghisalberti and welcomes Professor Graham Durant as Director.

Questacon, the Australian National University and Shell win a 2006 Prime Minister's Award for Excellence in Community Business Partnership.



Questacon – here and now (2008–2012)

Questacon celebrates its 20th anniversary as a national centre in 2008 with a year long program of events, including joint programs with Japan. Questacon's digital media studio opens in 2009, enabling Questacon to engage with wider audiences across Australia and globally using new media capabilities, including high-definition videoconferencing. The Australian Government's Science Connections Program becomes part of Questacon's national programs.

A year with many anniversaries, 2010 sees the Questacon Volunteer program celebrating its 30th anniversary and the *Shell Questacon Science Circus* celebrates 25 years of engaging Australia with science. The *Questacon Excited Particles* also celebrate 10 years of science performances.

H₂O—Soak Up the Science supported by the National Water Commission is launched by Susie O'Neill in December 2010.

In 2011 RoboThespian takes up residence in the Questacon foyer, greeting and interacting with visitors, and in December 2011 travelling to Brisbane for the Questacon exhibit at the 'Innovation in Australia: People Making the Difference' showcase.

The *Questacon Science Garden* is established in 2011 with the first five outdoor exhibits installed, including *Flickering Leaves*, *Möbius*, *Rock Xylophone*, *Sound Pillar* and *Szilassi Polyhedron*.

Questacon is awarded the 2011 Canberra and Capital Region Tourism Award for Best Tourist Attraction. This is the eighth time Questacon has received this award, firmly establishing the centre as a 'must-see' for visitors to Canberra.

In 2012, two new galleries open at Questacon. *Q Lab*'s ever-changing displays and live demonstrations encourage visitors to inspire their inner scientist by asking questions and testing their ideas. After more than 10 years as Questacon's most popular exhibition, *SideShow* makes way for the neon-coloured

Excite@Q which opens in March 2012. The Freefall slide remains in the gallery, alongside a variety of exciting new exhibits to bend the mind and body, such as the 360° *Swing*, guaranteed to get the adrenalin pumping.

New additions are made in 2012 to Questacon's outreach program, including *Beyond School – So, What's Next?* which adds a careers-focused element to the *Shell Questacon Science Circus* tours. The *Questacon Smart Moves Invention Convention* also hits the road with a new format of three-day workshops delivered in regional centres.



National Science and Technology Centre Phase 2 concept sketch by original Questacon architect Lawrence Nield, 2012



Questacon – the year ahead

Centenary of Canberra and Questacon's 25th anniversary

Throughout 2013, Questacon will be part of the Centenary of Canberra celebrations. Under the 'Innovation and Discovery' stream of Centenary events, Questacon will collaborate with other Canberra scientific institutions to deliver an exciting array of special events that showcase the contribution of science and technology to Canberra's past and future. Questacon will reveal the stories behind scientific namesakes of Canberra suburbs, showcase the work of 100 scientists linked to Canberra, and present lectures, @Questacon days and *SciNights* aligned with the Centenary's major themes. The *Shell Questacon Science Circus* national touring program will carry Centenary branding and *National Science Week* will extend into a month-long opportunity for the community to celebrate the scientific achievements of the national capital.

In the second half of 2012, two new Questacon outdoor exhibits are scheduled for installation in the *Science Garden*. *Nkrypt* is a set of sculptural pieces with numbers, letters, patterns and perforations that contain a series of encrypted messages. This exhibit will also contain a coded section related to the Centenary of Canberra, with a public challenge to break the code during the Centenary year. The second exhibit is *Fundial* – four separate elements situated in a defined area which cast shadows indicating the time of day as the sun moves across the sky.

The Canberra Centenary celebrations will transition into Questacon's 25th birthday, celebrating the opening of the Lawrence Nield-designed Centre in Parkes in 1988, and the organisation's relationship with its founding partner Japan. A year-long celebration will begin in November 2013 and include an exhibition tour and events in tsunami-affected areas of Japan, to take place in 2014 in collaboration with Japanese science centres. Over the next twelve months and beyond, Questacon will further expand its offerings and continue to reach new audiences.

Questacon Technology Learning Centre

The Questacon Technology Learning Centre (QTLC) will open in the former Royal Australian Mint Administration building in Deakin, Canberra in early 2013. This new facility will deliver technology-based educational programs showcasing Australian technology, design and manufacturing. The QTLC programs will increase Questacon's ability to engage secondary students with in-depth experiences that foster a positive and informed appreciation of how they can use and improve the products, technologies and systems around them. The QTLC will offer a public exhibition space, hands-on workshops, behind the scenes tours, special events and a dedicated web presence. Questacon will also work with regional partners to extend the QTLC programs and activities to students and teachers across Australia.

From November 2012 the QTLC will also provide accommodation for Questacon's outreach programs and exhibition design and production facilities, replacing the current facilities at Fyshwick. This will provide a customised space for these business areas and ensure the ongoing quality of Questacon's in-house exhibition production. The fit-out project involves conversion of the building from office-style accommodation to a mix of gallery, activity, workshop and staff spaces. The design process has successfully drawn on the organisation's own creativity to deliver a range of innovative public areas and work space solutions.





National programs

Nationally, Questacon will continue to expand its reach through increased digital outreach and deliver more in-depth experiences for regional communities via outreach programs. From mid-2012, the *Science Circus* will expand current activities to engage elderly Australians through interactive sessions delivered to community groups and venues along national touring routes.

Questacon will continue to administer the *Inspiring Australia* initiative, implementing programs to deliver on expert working group recommendations to strengthen science coverage in the media and to develop the evidence base for science engagement. Recommendation reports from further expert working groups on engaging the desert, tropical and Indigenous communities of Australia and highlighting Australia's marine science will be finalised early in 2012-13. Delivery of projects funded under the *Unlocking Australia's Potential* grants will also begin in 2012-13.

International activities

Internationally, Questacon will continue to contribute to a strong global science communication sector through active participation in international networks, building relationships and collaborative potential, and fostering professional development opportunities. Key activities will include a Questacon travelling exhibition tour to Vietnam in February 2013 to mark the 40th anniversary of diplomatic relations with Australia, and commencement of a series of workshops supporting science centre

development in Indonesia, delivered in collaboration with the Exploratorium (San Francisco, USA) and PP-IPTEK (Science and Technology Centre Indonesia, located in Jakarta). Questacon will also continue planning for a *Science Circus* tour to southern Africa in the second half of 2013 to draw attention to the need for developing the science centre sector in that region.

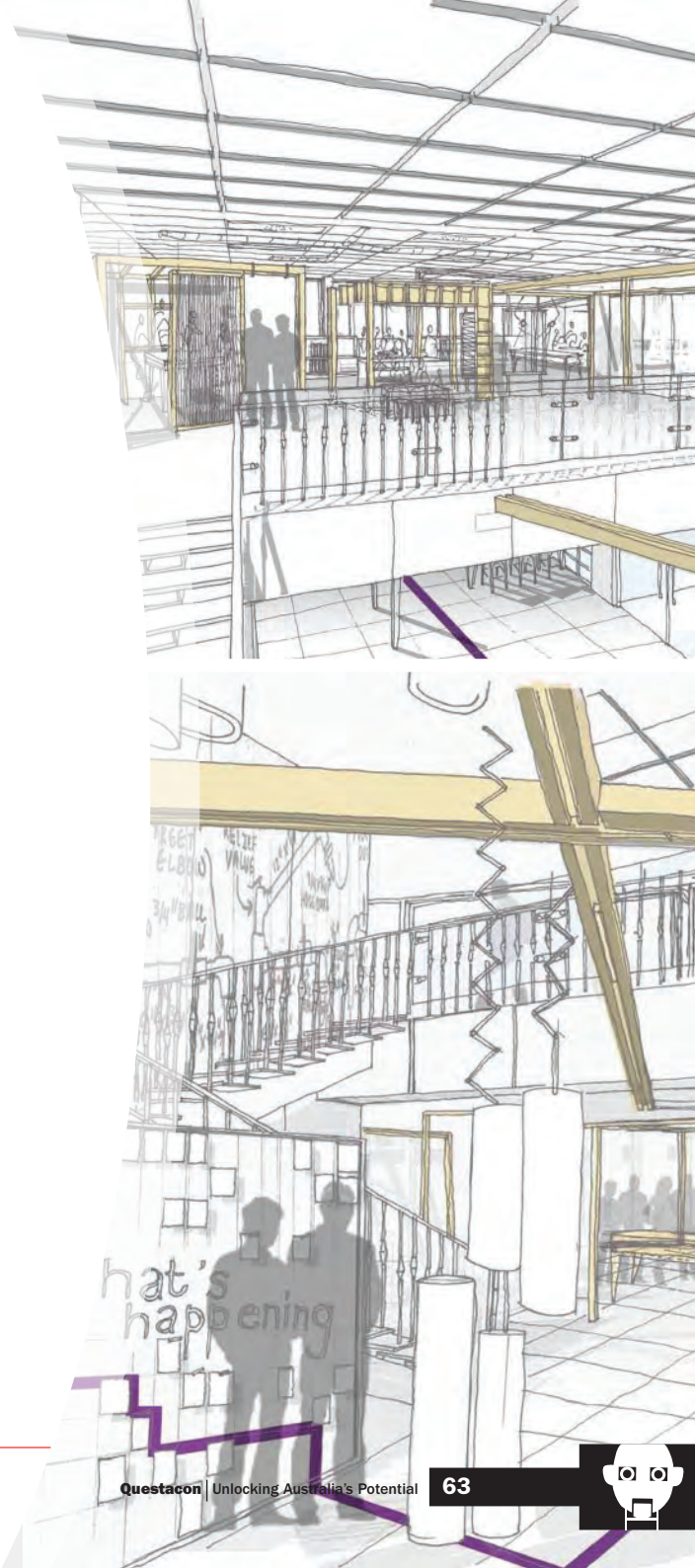
Business focus

The vision for an expanded Questacon Centre in Parkes remains strong and work will continue to build the supporting concepts and functional documentation to underpin the project. We are pleased that the original Questacon building architect, Professor Lawrence Nield, is working with Questacon on the development of the expansion concept.

Questacon needs to continue to build partnerships to enable the ongoing delivery of vital program activity. We will be actively seeking support for programs delivered by the QTLC, as well as maths and indigenous programs.

As part of ensuring Questacon remains efficient and relevant, e-business solutions will be developed to support commercial business delivery.

Concept sketches of the Questacon Technology Learning Centre.



Questacon partners

Major Partners



Other Partners



With special thanks:

3Infun
ABC3
ACT Government
ACT Tourism
Antarctic Tasmania
Asia Pacific Network of Science & Technology Centres
Association of Science-Technology Centers Incorporated
AusAid Leadership Program, Phillipines
Australasian Science and Technology Exhibitors Network
Australian Academy of Science
Australian Antarctic Division
Australian Botanic Gardens
Australian Capital Tourism
Australian Government Bureau of Meteorology
Australian National Maritime Museum
Australian Nuclear Science & Technology Organisation
Australian Tourism Export Council
Australian National Centre for the Public Awareness of Science (CPAS)
Balloon Aloft
Brumbies Rugby
Canberra Convention Bureau
Canberra Deep Space Communication Complex, NASA
Charles Darwin University
DART Connections, NSW Department of Education and Communities
Embassy of Japan in Australia
Engineers Australia
Geoscience Australia
Green Cross Australia
Heritage ACT
Inspiring Australia State and Territory Contact Officers
Inspiring Australia Expert Working Groups
Lawrence Nield, Architect
Mt Stromlo Observatory
Museum of New Zealand Te Papa Tongarewa
National Capital Attraction Authority
National Capital Education Tourism Project

National Gallery of Australia
National Library of Australia
National Museum of Australia
National Youth Science Forum
National Science Week State and Territory Coordinating Committees
Northern Territory Department of Business and Employment
NSW Department of Trade and Investment
Office of the Chief Scientist for Australia
Office of the Queensland Chief Scientist
Plant Energy Biology ARC Centre for Excellence
PRIME7
Prime Minister's Prizes for Science: Committee for Science Prizes
Prime Minister's Prizes for Science: Committee for Science Teaching Prizes
Queensland Department of Science, Information Technology, Innovation and the Arts
Queensland Museum
Robogals
Rodney Moss, Cox Architects
Royal Australian Chemical Institute
Royal Institution of Australia
Smith Family
South Australian Department of Further Education, Employment, Science and Technology
Sunrise
Sydney Observatory
Tasmanian Department of Economic Development, Tourism and the Arts
The Centre for Excellence for Vision Science
The Embassy of the United States of America
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Victorian Department of Innovation, Industry and Regional Development Victorian
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