Welcome to the first Go8 newsletter of 2017.

As you can see, this is a very full newsletter, which sums up what is ahead for the Go8 in 2017.

With new Chair Professor Peter Høj, Vice Chancellor of the University of Queensland, the Go8 work-plan for 2017 focuses on finding a pathway to refresh a public higher education system that has basically stalled since the Dawkins reforms of some 30 years ago (something that also concerns former Federal Education Minister and Treasurer John Dawkins).

At the core of the Go8 work-plan is a defence that protects, encourages and grows basic research as so many other nations, including the United States, are doing for their own economic benefit. Australia cannot afford to keep falling behind our competitors. The case is well put for us in this issue by Dr Les Rymer. Dr Rymer has a PhD in botany/palaeoecology from Cambridge and senior career experience in the public and university sectors as an expert on research, science, innovation, industry and IP policy. He has worked in Australia, New Zealand and Korea. He, as you will see, has never lost his passion for arguing for basic research as a fundamental Australian national priority.

And what of our new Chair? He is well-known as an academic and VC; especially for his spirited defence of research and for his publicly stated views on the need to improve Australia’s demand-driven system of student entry is managed and funded. But who is he? What set him on an academic pathway, accident or design? and importantly what brought him to Australia? Why did he want to be a VC? We all know the ‘what’ of Professor Høj, so the ‘who’ of a person is always fascinating. We have interviewed Professor Høj and we hope you enjoy getting to know the person better.

And of course we never miss an opportunity to provide our readers with a snapshot of some examples of Go8 research such as the University of Sydney’s research on two over-the-counter natural products which could help prevent diabetes.

In news of what the Go8 has been doing since our last newsletter, it was really a summer without the word holiday tagged in the end. However, the positive results make the holiday omission very worthwhile. As just a few examples of a particularly active summer; in December the Go8 and Westpac launched a joint program where Westpac employs Go8 STEM PhD students part-time on a four-year rotation through its business units. This newsletter includes more on the worthwhile program. The first cohort of eight students began at Westpac on 20 February in what is planned to be the first of an annual intake.

In January, Go8 Chair Peter Høj and I travelled to the US at the invitation of Foreign Minister Julie Bishop to represent the sector at the US launch in Los Angeles of the Federal Government’s Global Alumni Strategy. This US visit also included a series of meetings in Washington, with the Australian Government and a number of relevant US agencies to advocate for the continued freedom of movement for academics and students; and for the continued ethos of research being collaborative and without borders in terms of funding for global benefit.

The Go8 also travelled to Canada for a meeting with Canadian and US University...
groups who, with the Go8, are members of the Global Network of Research Intensive Universities. The Go8 will host the annual meeting of the Network in Brisbane in November.

Meanwhile we are pleased and proud that we have a Go8 Board member as the new Chair of Universities Australia. A great appointment. Professor Margaret Gardner, AO, Vice Chancellor of the Go8’s Monash University is someone I have enormous respect for, and with whom I have worked closely for many years.

The sector will most definitely benefit from her outcomes focused persona, her policy negotiation skills and her commitment to Australia as a quality international student destination.

I hope you enjoy this first edition of 2017.

... in December the Go8 and Westpac launched a joint program where Westpac employs Go8 STEM PhD students part-time on a four-year rotation through its business units.
Our new Chair – Professor Peter Høj

Convincing Australia’s major parties that there has to be long-term and sustainable policy direction for Australia’s universities is Høj’s goal...

As Go8 Chair, Professor Høj is now charged with steering Australia’s leading group of research-intensive universities through an unifying policy mire that does not reflect well on a nation’s commitment to higher education.

Convincing Australia’s major parties that there has to be long-term and sustainable policy direction for Australia’s universities is Høj’s goal, and he knows he also has to convince them that “I am giving them honest policy advice, advice that is best for the country. I would never knowingly give advice that is contrary to a nation’s best interests”.

This time-consuming commitment comes on top of the 80+ hour week that Høj already commits to UQ. He does not find the prospect particularly daunting. Rather it’s another challenge that his driven personality appears to thrive upon.

He is frank that he is always ambitious to deliver results, and readily admits he rarely feels satisfied professionally. “In hindsight… probably; but on a daily basis I always reflect on what I have done and reflect a lot on what I could have done better.”

There is a restlessness reflected in how he talks about himself, and he admits he is a man who has never ever had a career plan. “I would never take a job because I need that job,” he explains, “but I do because it’s an organisation I want to work for. I then do the best I can. You can’t be relaxed and easy. It’s a lot of hours and a lot of energy to do the best you can possibly do. I then make an assessment of when I have done that, and when it’s best to leave.”

There is always that next challenge waiting and Høj is frank that as Vice Chancellor of one of the world’s top 100 universities, offers regularly come his way. At this stage he says “never say never” but the subtext is that, as long as he and others believe he is performing well, there is more to be done both for the Go8 and UQ. Unfinished business.

Being so driven goes back to his childhood in Denmark. Høj paid close attention when his father ingrained in him the value of an education. As a small businessman father (without the benefit of a high school or university education) who had lost his business and family home, and whom Høj says only managed to catch up because of when his parents worked double time, and UQ. Unfinished business.

Høj muses that he doesn’t know where competitiveness and ambition intersect and he sees neither as a negative. But he definitely does know, that what gets him up in the morning is his ambition to succeed. Outside of his office those who have seen him cycle, as one peer mentioned, “like a man possessed” or during an always-punishing gym work-out “as if his life depended on it” just shrug: “that’s Peter. He can’t help himself pushing and pushing to achieve”.

There is a restlessness reflected in how he talks about himself, and he admits he is a man who has never ever had a career plan. “I would never take a job because I need that job,” he explains, “but I do because it’s an organisation I want to work for. I then do the best I can. You can’t be relaxed and easy. It’s a lot of hours and a lot of energy to do the best you can possibly do. I then make an assessment of when I have done that, and when it’s best to leave.”

“Because of my childhood,” says Høj, “I would never violate the integrities and values that come from my upbringing, from my parents. I take those into every job.” Values and integrity are words that pepper a conversation with Høj as much about his private life as his career.

He met his Australian wife Robyn in Denmark where she was studying. After they had both received their PhDs by 1987 she had grown tired of Europe’s cold and wanted to return home. Høj agreed to move. He fell in love with Australia but there was to be no fairy-tale ending. While both their academic careers advanced successfully and their two small Danish-born children thrived (Torbjorn and Stine who were as academically gifted as their parents), Robyn died aged just 47 in 2003 after a battle with breast cancer.

Instead of taking the easy path and retreating to Denmark, Høj, then with a permanent residency and now with dual citizenship, remained in Australia, a single father as committed to his children’s future and to the value of their education as his parents had been to his. He channelled his drive into the tight family unit and to his career.

In 2017 he has two Australian-born grandchildren whom he says – with a softness not obvious discussing any other subject – are “a focus” of his future, plus a partner of 10 years Professor Mandy Thomas, an...
Executive Dean at Queensland University of Technology (QUT) whom he met while he was CEO of the Australian Research Council.

He says he owes Professor Thomas for leaving a pro-Vice Chancellor position at the Australian National University in Canberra to enable them to live together in Queensland. “It’s a balance really. It is very difficult to make career decisions at the expense of someone you love. She followed me and I owe her for that. Luckily she enjoys her new job tremendously.”

Despite peers suggesting to the contrary Høj denies he is unable to relax and switch off from work. “I am very satisfied in my home life. What do we do? There aren’t a lot of hours but we have deep discussions about world matters, long walks. We relax playing many board games we never ever win with the children, and there of course is our wine.”

Wine is a particular passion of Høj’s since he became foundation Professor of Viticulture at The University of Adelaide in 1995. It is only wine that the new Go8 Chair can discuss happily for longer than research!

Professor Peter Høj
MSc PhD DUniv (honoris causa), FTSE

Professor Peter Høj commenced as Vice Chancellor and President of The University of Queensland on 8 October 2012. Prior to this appointment Professor Høj was Vice-Chancellor and President of the University of South Australia from 1 June 2007. Before that, he was Chief Executive Officer of the Australian Research Council (2004–2007) and Managing Director of the Australian Wine Research Institute (1997–2004).

He was educated at the University of Copenhagen, majoring in biochemistry and chemistry, and has a Master of Science degree in biochemistry and genetics, a PhD in photosynthesis, an Honorary Doctorate from the University of Copenhagen and an Honorary Doctorate from the University of South Australia.

Professor Høj is the chair of the Board of Group of Eight (Go8) Universities in 2017, a member of the Medical Research Future Fund Advisory Board, a member of the STEM Males Champions of Change and in 2014 was appointed as a senior consultant to Hanban in the Oceania Region.

He served as Co-Deputy Chair of the Strengthened Export Controls Steering Group 2012–2016, a member of the edX University Advisory Board 2014–2017, the CSIRO Board 2011–2014 and was Deputy Chair of Universities Australia Board 2011–2013. He served as a private member of the Prime Minister’s Science Engineering and Innovation Council (PMSEIC) from 1999–2004, and as an ex-officio member from 2006–2007.

He is a Fellow of the Australian Academy of Technological Sciences and Engineering and a Foreign Member (Natural Sciences Class) of The Royal Danish Academy of Sciences and Letters.
GM foods: why presenting “just the facts” won’t work

When it comes to controversial science issues, scientists need to rethink their approach to engaging the public, according to the authors of a new study looking at women’s attitudes towards genetically modified (GM) foods.

The results of focus groups conducted by University of Adelaide researchers show that if scientists continue to present “just the facts”, most people won’t engage or modify their thinking – even if those people are highly educated.

The results have implications for public engagement across other controversial science issues, such as nuclear energy, climate change, vaccination and water fluoridation, the authors say.

“We were interested in previous surveys that showed women consistently were more opposed to GM foods than men...”

The focus groups included women from a range of educational backgrounds, including those involved in plant and agricultural science, and others in health science, as well as women with lower levels of education.

“All of the women with science backgrounds used evidence to support their stance, but the way they did so came as a surprise to us,” says co-author Dr Heather Bray, also from the University’s School of Humanities and Senior Research Associate in the Food Values Research Group.

“Women who had backgrounds in plant science said the lack of evidence of harm meant that GM food was safe to eat. But the women in health sciences said it was a lack of evidence of safety that made them cautious about consuming GM food. These perceptions are based on two very different concepts of risk, despite both groups being highly educated in science.

“For women without science backgrounds, GM food presented ‘unknown’ risks, and hence was to be avoided. There was a range of other issues apart from the science that arose in our study, a major one being a general lack of trust of science,” Dr Bray says.

“It’s important for scientists to realise that science has economic, social, and cultural impacts, and if people are presented with ‘just the facts’, the discussion leaves out critical topics and values,” Professor Ankeny says.

“People – including people highly educated in science – come to these issues with their own ideas, experiences, and values, and they are not necessarily going to endorse particular scientific theories or applications based simply on facts being provided to them.”

Dr Bray says: “Importantly, our work points to shared food values between those who eat and those who would not eat GM foods. Shared values are an important foundation for science communication, and we hope that our work can contribute to the development of better engagement strategies for both scientists and the public.”
Study to test diabetes natural medicines

A world-first study led by the University of Sydney will investigate whether two commonly used over-the-counter natural medicines can help prevent diabetes.

Researchers from the University of Sydney’s Charles Perkins Centre will conduct the trial over a period of twelve months to determine whether the dietary supplements provide any additional health benefits to a lifestyle program for the prevention of type 2 diabetes mellitus.

Participants will be given two supplements – Nuexa® with FBX™, a fibre derived from corn used in weight management; and GINST15™, an active ingredient in ginseng – in addition to routine clinical care for pre-diabetes management.

The study hopes to reveal whether these remedies promote extra health advantages on cholesterol levels and glycaemic control respectively, using a large sample size of 400 participants.

"Until now, most of the evidence surrounding over-the-counter products for the treatment of obesity and metabolic disease is backed by research that is short-term in small groups of people, and the findings emerge from poorly-designed studies," said lead researcher Dr Nick Fuller.

"Despite many traditional medicines being used for centuries, they are often backed by anecdotal or weak evidence supporting their effectiveness in treating various illnesses. If proven to be effective, these supplements will offer a low cost and safe option for the prevention of type 2 diabetes without having to intervene with pharmaceutical or traditional medicine. And most importantly, complementary medicine may offer a solution towards reducing the prevalence of type 2 diabetes in the first place."

In recruiting participants with high body mass index and elevated blood glucose levels, the researchers also hope to raise awareness of the silent condition pre-diabetes. Currently one in six Australian adults aged over 25-years-old suffer from pre-diabetes, an asymptomatic condition linked to metabolic syndrome which puts individuals at high risk of developing type 2 diabetes and an increased risk of cardiovascular disease.

"Aside from high blood sugar levels, pre-diabetes is a condition with no other symptoms. Studies such as these are critical in order to increase awareness of the risks of pre-diabetes, which if left untreated will result in type 2 diabetes and complications such as blindness and amputations," said co-lead researcher Associate Professor Tania Markovic, from the University of Sydney’s Boden Institute of Obesity, Nutrition, Exercise & Eating Disorders.

Throughout the trial, participants will receive free dietary supplements and weight loss advice from a team of dietitians and exercise physiologists. They will also undergo regular medical monitoring including blood tests and full body composition scans to measure the amount of muscle and fat in the body, as well as cognitive function testing and grocery vouchers towards the purchase of foods.

Study recruitment is currently underway, with 130 people already signed on to participate. Results of the trial are expected by 2018.
**RESEARCH**

**Why helping at home is good for kids**

Andrew Trounson, University of Melbourne

There’s strong evidence that feeling useful builds resilience in children, but how much and what sort of work are modern parents asking kids to do?

Next time your child complains about chores, tell them it’s for their own good.

Giving children meaningful household tasks and the autonomy to complete them may be key to making them more resilient and capable in later life. But are we giving them enough opportunities to feel useful or are we leaving them on the shelf, wrapped in cotton wool?

In what promises to be the biggest online survey of what Australian kids are actually doing to help their families, University of Melbourne researchers have teamed up with the ABC’s Behind the News program to ask the children themselves what chores they do and how they feel about helping out.

The survey will ask children how they really feel about household chores and will be based on an expanded version of the program’s 2015 Happiness Survey that attracted almost 20,000 respondents. The results could lead to new recommendations on how parents, teachers and community services can better engage with children in building personal resilience given evidence that “required helpfulness” can foster self-esteem.

“We want to find out whether having jobs to do around the house and family helps children build their self-esteem and resilience by asking the kids what they do, how they feel about doing jobs, whether the chores are directed or self-driven, and what sort of satisfaction they experience from contributing,” says Associate Professor Lisa Gibbs, Director of the University’s Jack Brockhoff Child Health and Wellbeing Program within the Melbourne School of Population and Global Health.

“By asking the children themselves we can not only find out what is going on in families, but we can also uncover alternative possibilities based on what children say.”

Professor Gibbs, who has received crucial grant support from the Myer Foundation, says the project could also provide insight into family resilience.

“There is emerging evidence of the contribution children can make to preparedness and recovery in areas affected by disaster. Given the opportunity, children can make a meaningful contribution to family and community resilience.”

The idea that it is important to foster a child’s capacity to help others goes back to groundbreaking research published in the 1970s on the impact of the Great Depression on US families that suggested many kids thrive when the going gets tough.

By analysing longitudinal survey data, US sociologist Glen Elder discovered that among families hit by poverty during the Great Depression, people who were infants at the time, and so wholly dependent on adults, struggled throughout their later lives to overcome their circumstances. But he found that those children who were aged 9–10 when the Depression hit and threw their families into poverty tended to instead do much better later in life. Importantly, they outperformed their peers whose families had been unscathed by the Depression. Professor Elder theorised that these children benefited from increased self-esteem by having to roll up their sleeves and help out.

During the Great Depression in the US, children had to help their families out.

US psychologist Emmy Werner’s groundbreaking longitudinal study of 698 infants born in 1955 went further. She tracked her participants through to the age of 40 and found that those who proved to be resilient in the face of hardships in their early lives also tended to be those who has been actively involved in “required helpfulness” during their middle childhood and adolescence.

But if required helpfulness helps build self-esteem and resilience, what then is happening with children now when most enjoy a standard of living that the Depression kids could only have dreamed of? Do we need to be providing more opportunities for children to feel useful and worthwhile? How much responsibility is too much?

Child welfare expert and honorary professorial fellow in social work at the University of Melbourne, Professor Dorothy Scott, worries that modern Australian children may be missing out on the self-worth that comes from doing meaningful help for others. She notes that in the past the family was an economic unit in which everyone needed to work and contribute to keep food on the table.

But in the wake of the technological and digital revolutions, she argues that families are now units of “passive consumption”. She suggests modern children may be at risk of losing some of the resilience that appears to come from being useful and helping others.

In our consumer society, children are at risk of losing resilience.

“The historical shift in families is very clear. When the family was an economic unit, children were an important part of it. But now in our consumer society, children have only a minor role to play in terms of contributing to the household,” says Professor Scott, a former Foundation Chair in Child Protection and the Director of the Australian Centre for Child Protection at the University of South Australia.

“Positive psychology talks of resilience being related to factors like being part of something larger than yourself as an antidote to the passiveness that comes from a consumer society. The
In what promises to be the biggest online survey of what Australian kids are actually doing to help their families, University of Melbourne researchers have teamed with the ABC’s Behind the News program to ask the children themselves what chores they do and how they feel about helping out.

hypothesis is that by promoting required helpfulness and contributing to the wellbeing of others we might be able to help children build their own identity.

“That is why we need some contemporary research like this to ask children what they are doing in their daily lives. At the moment we don’t know how contemporary families work in this respect.”

Professor Scott says it would be interesting, for example, to know whether children are commonly receiving pocket money for doing jobs around the house and whether such pocket money is motivating them, or whether they are deriving satisfaction from simply helping.

The idea for Behind the News to survey children on their happiness was initially a one-off initiative in 2015 that stemmed from Mental Health Week occurring during the October school holidays when the program wasn’t on air. Rather than just ignore it, the program decided to leverage the online interactivity of its audience to survey them and report on the results. They were inundated.

“The idea was to make mental health a positive thing for the kids to talk about because ordinarily mental health is a fairly difficult subject,” says Behind the News host Nathan Bazley. “We’d hoped to get maybe 8000 responses, but we received more than double that and I think that is because the kids were just really excited about giving feedback.”
Go8 PhD students score a first for Australia

“This is a unique opportunity to develop early career researchers from our top universities as well as to deliver innovative solutions to the challenges we face in the commercial sector.”

It is the first such program in Australia.

Partnering with the Go8, Westpac has offered Go8 STEM PhD students the opportunity, while studying, to enter into paid part-time employment on a four-year rotation through selected business units.

The joint program seeking candidates was announced to Go8 Universities mid-2016, and competition for the first eight placements was intense. The successful PhD students for the 2017 pilot were informed in November 2016, and began at Westpac in Sydney on 20 February.

The students have each been matched with a Westpac mentor and will also participate in a professional development program that has been tailored to their skills and the development areas that they nominate.

The program is under the governance of a joint Go8/ Westpac steering committee, and Go8 Chief Executive Vicki Thomson is confident that feedback from Westpac, the Go8, and the students themselves, will lead to the program being expanded and embedded within Westpac. “In fact, ideally the Go8 would be keen to see more Australian companies follow the Westpac lead,” she says. “Our PhD students have comprehensive skills to offer industry and business and the Go8 is working extremely hard to have this better understood. Westpac decided to host Australia’s first PhD flexible work program is a welcome development.”

Westpac Group General Manager for Enterprise HR Strategy & Services, Shenaz Khan, says there are huge gains to be made by connecting some of Australia’s best academic minds with Australian businesses. “This is a unique opportunity to develop early career researchers from our top universities as well as to deliver innovative solutions to the challenges we face in the commercial sector.”

A key requirement for the success of this program is a flexible working environment, where students can work on a part-time basis and balance their commitments between Westpac and their university. Westpac has recognised the value of being able to utilise data across a wide range of business units not traditionally seen as being in the STEM portfolio.

In taking this view Westpac has chosen as one of its students the University of Sydney’s Katrina Mak who is a registered psychologist with a Masters in Organisational Psychology. Westpac is keen to harness Mak’s assessment methodologies utilising psychometric testing and bespoke assessments.
Go8’s Monash VC to lead peak group – an inspired choice: a leader for the times

The appointment of Monash University Vice Chancellor and Go8 Board member Professor Margaret Gardner as Chair of Universities Australia is an inspired choice of leader – a leader for the times.

“As Australia’s university sector faces a difficult and complex time, beset with Government policy inertia, Professor Gardner’s well-recognised abilities for finding successful negotiation pathways and delivering results is exactly what the sector needs at its helm,” says Vicki Thomson Go8 Chief Executive.

“Professor Gardner who has been Vice Chancellor at Go8 member Monash University since 2014, and who was previously Vice Chancellor of RMIT, has never shied away from hard decisions for the long-term strategic benefit of the institutions she has so successfully led,” said Ms Thomson.

“In addition, Professor Gardner’s knowledge and focus on the international student market – currently a $22 billion export earner for Australia – will benefit policy direction significantly as the sector seeks to capitalise on international issues such as Brexit, and encourage more international students to see Australia as a safe and welcoming quality destination.”

Ms Thomson said the sector would benefit enormously from Professor Gardner’s capabilities and determination. “As CE of the Go8, I know I, my team, and our Board, look forward to continuing to work with her as one of our Board members and now also as Chair of Universities Australia.”

Professor Margaret Gardner is President and Vice-Chancellor of Monash University.

Prior to joining Monash, Professor Gardner was Vice-Chancellor and President of RMIT. She has extensive academic experience, having held various leadership positions in Australian universities throughout her career, including at the University of Queensland and Griffith University.

With a first class honours degree in Economics and a PhD from the University of Sydney, she was a Fulbright Postdoctoral Fellow spending time at the Massachusetts Institute of Technology, Cornell University, and the University of California, Berkeley.

She is also a Director of Infrastructure Victoria and the Australia and New Zealand School of Government (ANZSOG), and was recently made a member of the Prime Minister and Cabinet Inclusion and Diversity Committee.

In 2007, Professor Gardner was made an Officer of the Order of Australia in recognition of service to tertiary education, particularly in the areas of university governance and gender equity, and to industrial relations in Queensland.

As Australia’s university sector faces a difficult and complex time...
Professor Gardner’s well-recognised abilities for finding successful negotiation pathways and delivering results is exactly what the sector needs at its helm...
An unfortunate and enduring trend in Australia’s research system has been a continuing fall in the proportion of national research expenditure going into basic research. There has also been a substantial fall in the proportion of Australia’s university research classified as basic, from 77% in 1968 to 43% in 2014.

Why is basic research so important? Some idea comes from the other terms that people use to refer to this kind of research: curiosity-motivated, transformative, blue sky, not yet applied, pure, fundamental, and so on. While each of these terms supports slightly different concepts, they all have in common an implicit notion of open-endedness.

Basic research produces new knowledge and improved understanding; it is more about discovery and less about invention.

There is no agreed end point towards which it is necessary to direct the research. And this being the case, there is no need to tailor the research to the known capabilities and needs of a specific client. By contrast, applied research has a specific practical aim or objective. It aims not to advance understanding but to make a specific change to the world.

While it may develop new knowledge, it will generally build on existing knowledge to produce incremental rather than revolutionary advances. While cost effective and short-term, this limits potential outcomes compared to the possibilities of major, albeit unanticipated and unpredictable advances from basic research.

A look at what has happened with research expenditure in Australia since 1968–69 paints a grim picture for basic research. Then Australia’s total expenditure on research and development was 1.3% of GDP. Government research agencies were responsible for some 55% of the overall national research effort, while business accounted for 25.9%; and the higher education sector accounted for almost 30% of all national research activity — a rise of some 10%.

Research performed in different sectors has a different purpose, uses different management processes, involves different kinds of expenditure and deploys researchers in different ways. A reallocation of effort between sectors will always affect the balance of research activity.

Therefore, an increase in the proportion of the national research effort performed by business will always increase the proportion of research at the applied and experimental development end of the spectrum and decrease the proportion of basic research. (In 2013–14 only 1% of business research was pure basic.) This is not surprising and is not controversial. Business operates in highly competitive environments that demand short term results.

What is unexpected, however, has been that the substantial fall in the proportion of university research classified as basic. This seems counterintuitive. The need for universities to perform applied research was presumably greater when business lacked its own research capabilities. Moreover, as business research has expanded and the number of businesses performing research has increased, the ability of business to use basic research outputs from universities should have improved.

This decreased emphasis on basic research within universities suggests that universities are changing their role within the innovation system — and the question has to be whether this is deliberate, the intended outcome of explicit policies or strategies; whether it is an unintended and unanticipated outcome of policies and programs aiming to achieve some other end result; or whether it results from classification drift.

This poses the question, does a fall in basic research matter — and if so, why? Some countries, especially in Asia, are deliberately increasing their investments in basic research to improve their competitiveness and international reputation for high quality research. Korea provides one prominent example with a target to raise its national research and development expenditure from 4% GDP in 2011 to 5% by 2017 and to increase the proportion of this expenditure going to basic research.
research from 35.2% to 40% over the same period. (Australia currently spends around 20% of its total research budget on basic research.)

The US provides another example, with Congress repeatedly arguing the need to direct federal funding into basic research and away from applied — even in government agencies. For example, the House Budget Committee resolution report approving the fiscal year 2017 congressional budget stated:

“The resolution’s [funding] levels support preserving the Federal scientific community’s original role as a venue for ground-breaking discoveries and a driver of innovation and economic growth. It responsibly pares back applied basic research provides the knowledge capital on which other forms of research and application draw. This is what enables us to do completely new things. As inventors and as society as a whole draw down on this capital, it becomes necessary to replenish it.

There are many clever things one can do using an abacus, or with water, animal and steam power — but electricity opened up a whole new world, one whose implications Gilbert working on magnetism in Elizabethan England, or even Faraday at the Royal Institution in the nineteenth century, could never have imagined. But without their fundamental discoveries, life as we know it today would be impossible.

“Although basic science can have colossal economic rewards, they are totally unpredictable. And therefore the rewards cannot be judged by immediate results. Nevertheless, the value of Michael Faraday’s work today must be higher than the capitalisation of all shares on the stock exchange”.

Investing in the advancement of knowledge for its own sake with no predictable, practical outcomes might seem extravagant at time of political and financial uncertainty, when the world is changing rapidly and when everyone seems to be seeking immediate results that are tangible, measurable and produce a significant financial return relative to their cost. And yet … consider this.

It is not feasible to predict the outcomes of basic research. On being asked by Gladstone about the practical value of electricity, Michael Faraday purportedly replied ‘Why, sir, there is every probability that you will soon be able to tax it’. Contrast this with the observation made by UK Prime Minister Margaret Thatcher, over one hundred years later:

Einstein’s 1917 paper on the quantum theory of radiation provided a seed that eventually made the retail and wholesale sectors more efficient, improved supply chain operations and produced major and disruptive innovation in surgery, entertainment, defence, and manufacturing. This revolution took over 60 years but Einstein’s work provided a necessary foundation for the development of lasers.
A sense of wonder, insatiable curiosity and the need to understand – these all contribute to the advance of knowledge and to our ability to manipulate the world, to make it more comfortable, more accessible.

The GPS satellites on which we depend need to take into account relativistic effects on time because of their speed and altitude. (As an aside, the high precision and accuracy provided by the GPS system means that farmers using precision agriculture have to make corrections that feed in from a different kind of basic science – that of plate tectonics.) And do not forget that $E=mc^2$ provides the potential for nuclear energy.

There are many intangible but important benefits of basic research that are not always easy to quantify. For example, with the Laser Interferometer Gravitational-Wave Observatory (LIGO) came the ability to detect gravitational waves. Scientists were able to detect gravitational waves for the first time – an achievement which several Australian universities helped make possible. While LIGO was not only a tremendous intellectual achievement, it was also an outstanding technological success with the Laser Interferometer Gravitational-Wave Observatory (LIGO) needing to detect changes that were as small as one thousandth the diameter of a proton (a fact as mind-boggling as the collision of black holes that caused the detected waves). This brings out an important point.

Basic research creates new and currently unimaginable opportunities for making the world a different and better place by developing concepts, understanding and broader intellectual horizons. At least in the STEM areas, basic research can also require equipment of a sophistication and precision that does not already exist. The researchers, usually operating in large, international collaborations, provide a group of highly demanding, technically well-informed, leading edge customers. Working with industry to build new and world leading telescopes, sensors, data-handling systems, and other scientific hardware and software, they create benefits more immediate than those arising from the application of new knowledge.

Business develops new skills in building technologies that have specifications exceeding their own current needs and once these technologies exist, other users start to find applications. A synchrotron is essential for much basic research but once available provides opportunities for users from businesses to art historians and the forensic units of police forces.

The defence of basic research often uses narratives that link tangible, visible and measurable economic, environmental or social outcomes to basic research. This is necessary because research (whether in the sciences, social sciences or humanities) is usually less visible than the technology or policy which draws on the knowledge that research creates. However, it is also important to acknowledge the many intangible but pervasive outcomes that exist. The development of skills and national capabilities, international reputation and the intellectual resources needed to respond to unexpected events, are not trivial matters.

While proprietary restrictions can restrict applied research, basic research extends beyond the boundaries of organisations, needs or even disciplines. Basic research works through sharing, connecting and interacting, building up complex networks of formal and informal collaboration, domestic and international. Entry to such networks is not free and requires a continuing process of producing high quality work. Supporting first rate researchers who publish internationally their excellent, exciting and breakthrough research adds to Australia’s international reputation and provides access to people, ideas and infrastructure in other countries. These networks form an important and essential component of a nation’s infrastructure and help make it possible to play an active role in the international consideration of global problems, whether these relate to pandemics or climate change, terrorism or financial crises.

A sometimes forgotten aspect of developing this broad capability of researchers and research facilities is that basic...
research provides a window on overseas research, societies and developments. Because of its expansive rather than narrow perspective, this research is an essential feedstock for teaching, providing an ongoing ability to identify and provide advanced warning of technological and other trends across many fields that might have impact on Australia, its industries and society. This broad capability provides a kind of national insurance, a safeguard providing the assurance that we have access domestically to any expertise that we need to respond to whatever events might occur.

While it is true that basic research can and does have all kinds of directly measurable economic and physical benefits and that this provides a reason for investing in basic research, these arguments miss the point. Perhaps the most fundamental reason for supporting basic research is that wanting to know, and striving to know more, are both part of what it means to be human. From gossip to research, people want to satisfy their inquisitiveness. A sense of wonder, insatiable curiosity and the need to understand — these all contribute to the advance of knowledge and to our ability to manipulate the world, to make it more comfortable, more accessible. Progress begins with questions and inquiry is the driver of both intellectual and technological advance.

Knowing that the earth orbits around the sun; that our solar system is at the edge of our galaxy which is one of many billions of similar galaxies; that the universe is expanding, at an ever increasing rate and was formed 18.4 billion years ago; that the materials of which we are made come from exploding stars; — none of these finding may be of immediate practical value or measurable in financial terms but they are all fundamental to what it means to be human and to appreciating and celebrating what we are and what we can achieve.

Dr Les Rymer has a PhD in botany/palaeoecology from Cambridge and senior career experience in the public and university sector as an expert on research, science, innovation, industry and IP policy. He has worked in Australia, New Zealand and Korea.

Perhaps the most fundamental reason for supporting basic research is that wanting to know, and striving to know more, are both part of what it means to be human.
realistic political policies, Professor Ian Young

choice are at risk funding, results, our future ability so than at a time when Go8 as an enormous

if they can be, and the future, because to fight to ensure they

heart of who we are

To our group of – each one reliant

life. Ensuring every

and success than

that currently delivers backgrounds with the

As Chair I am also

cannot be allowed to

Go8 is certain of is

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come from dedication

Yet teaching is only

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of their choice

– understanding of

too little community –

Sadly there remains

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and research,

one of excellence quality higher

2015 is therefore a

two generations.

CEO last month.

Go8 newsletter of

Peter Høj

level of research

for its first session

University – but our

Prize winner educated

Universities have

deliver a viable future.

alone can never

quest is to be sure we can continue to do so.

Michael Spence

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much to do to better

For a nation of just

better understood.

global

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cannot stop what we

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we have a fight ahead

determination, bluntly,

Peter Høj

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the politicians and

it will be how much

During the next year,

can continue to do so.

University – but our

educated every Nobel

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Macca the big pig.

much thanks to

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Hygiene – washing

you can often see

Group of Universities

Outreach in living in

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by legislation from

pay for a UQ education

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attract more full-fee

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number of full-fee

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university they had

other as little as 8%.”

Paul Johnson

Inadequate the income

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ours is the tax increases

informed each month

I will keep you

do our politicians.

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how to repair it.

numbers – there is no

we have a fight ahead

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