The forces changing how we work, think and live are massive and fastmoving. Robotics, big data, digital disruption, medical innovation and environmental discovery are making their impact on every part of our lives.

The challenge is in how to respond. Denial won’t help. Understanding what is happening is the first step to taking on the challenge so the forces of change become a tool for our advancement, rather than the tool of our defeat.

QUT’s Real World Futures program has been designed to help our community of students, staff and partners be confident in that first step.

Through 2015, it has involved a curated series of events designed to explore the future of working, thinking and living. They have ranged from half-day conferences involving up to 300 people to more focussed workshops of 60.

They have involved visiting experts from the United Kingdom, Germany, the United States and industry and academic experts from our own neighbourhood.

The overwhelming message most relevant to the university is about the changing nature of work, the jobs that will disappear and the new jobs that will be created and what this means to our teaching and research efforts.

But rays of hope shine through these ominous clouds – big data, robotics and innovation offer new ways of doing things, new paths to knowledge, new opportunities for employment and business sustainability and creation.

Some of these have become evident through the Real World Futures program. More will follow.
The jobs risk is big and real
Creativity matters
The workforce needs to be engaged

Algorithms are rising
The brain is plastic
Leadership counts
The mind needs to be digital

Emotions matter in the modern world
Data is the cure
Cars that drive themselves

The world in 10 years
The rise of entrepreneurs
The jobs risk is big & real

Smart robots fuelled by big data and ever faster processing power, will change the nature of work - not just on the factory floor or farm paddock of the future but in the offices occupied by accountants, lawyers and engineers.

Oxford’s Associate Professor Michael Osborne analysed the jobs threat at the opening event of the Real World Futures series. His research with colleague Professor Karl Frey identifies 47% of current jobs as being at risk, a figure since borne out by Australian research.

Routine processing tasks are most vulnerable but so are tasks that involve professionals using the same data sets to find solutions to client needs. Professor Osborne led a panel of industry and academic specialists to unravel the problem which will only accelerate as the capabilities of digital technology improve.

“Algorithms are increasingly a cheaper alternative to human work”
Associate Professor Michael Osborne, QUT’s Future of Work conference, March 2015

47% of jobs could be automated in the next decade

Job categories at most risk
1. Office and administration
2. Services
3. Sales

Algorithms are increasingly a cheaper alternative to human work

Associate Professor Michael Osborne, QUT’s Future of Work conference, March 2015
Michael Osborne’s analysis of the future jobs market is already alive in the very real marketplace of the commercial construction industry. Offices now being built in Brisbane are using steel framing, prefabricated by a mechanised production line and reducing the need for manual workers costing $145,000 year. The Master Builders Association Executive Director Grant Galvin explained that labour costs had reached a tipping point which encouraged technological innovations. And not just in big dollar projects but also in housing where a market was emerging for prewired, preplumbed kitchen and laundry modules built on a robotic production line in China and shipped to Australia ready to install. The key to this was better manufacturing processes coupled with better IT and digital technology which allowed consumers to faithfully individualise what they wanted.

**The Jobs Risk is Now**

Trends in building
1. Labour costs rising
2. Prefabrication better & cheaper
3. Tipping point near
4. Jobs will be replaced

**The Future?**

48%

Less manual labour within the construction industry due to prefabrication & process innovation
Algorithms are rising

Talent recruiter Andrea Tjoeng describes how our social media profile and the data that maps our lives and work performance will determine our career steps. Ms Tjoeng, CEO of Scout Recruitment, told the Future of Work conference major companies such as Xerox had analysed existing staff characteristics and were already making successful recruitment decisions based on e-portfolios. No interviews and lower turnover. Not only that but workplace algorithms are able to map performance, determine salary increases and bonuses or instigate discipline. And ticking in the background are proactive algorithms that can detect from an employees’ digital activity whether they are interested in shifting employers and even start a recruitment process. Working by numbers. It’s real and it’s here.

The recruitment dilemma

Vacant positions take 25 days to fill

46% of new hires are let go within 18 months

22% of new hires leave within 45 days

Employee turnover costs 30-150% of avg salary

www.qut.edu.au
Creativity matters

The great innovator Steve Jobs described creativity as “just connecting things”. The people who can make those connections will matter more in an increasingly digital and automated world. QUT’s Associate Professor Gene Moyle had a school audience up and dancing to demonstrate that everyone holds creative skills which, like any skill, can be developed. The key to this, says Professor Moyle head of dance at QUT and also a trained sports psychologist, is to understand that creativity is about unleashing the potential of the mind to conceive new ideas. And intrinsic to this is understanding that what looks like failure can be the seeds of success. “Creativity requires the courage to let go of certainty. You’re not always going to have the right answer,” she told the Future of Working conference.

Creativity vs. Innovation

Creativity is problem solving with relevance and novelty -
It is not just about being different

- Creativity is about unleashing the potential of the mind
to conceive new ideas

- Innovation is the implementation or creation of something new that has realised value to others
The Workforce needs to be engaged

Some jobs are disappearing but the challenge of keeping good staff in changing environments is real and complex. Author and workforce planning specialist Mandy Johnson told a Real World Conversation that building “remarkable workplaces” was crucial to business outcomes. “It’s no longer a business diversion. It’s now the main game”, she said. Business leaders admitted recruiting the right people was one of their main concerns but few had tangible strategies to overcome it. “Competing for the right people is as important as competing for customers.” A key requirement was to make sure businesses had an empowered human resources champion at the “top table”, someone equal in authority to the other C-suite occupants, the CEO, COO, CIO and CFO. She outlined her six steps to a remarkable workplace, a strategy based on running more than 2000 business planning workshops around the world.

6 Steps to building a remarkable workplace

1. HR champion at the top table
2. One-On-Ones
3. Team size
4. Rewards & recognition
5. Team planning
6. Improving actual job roles

“The bottom line is driven by human endeavour and they embrace people practices as profit generating strategies”

Mandy Johnson, Managing The Future Workforce breakfast, May 2015
The brain is plastic

“The brain is, in fact, continually changing itself on the function of how it is engaged by you & the world”

Dr Mike Merzenich,
QUT’s Future Ways of Thinking conference,
July 2015

Brain training at any age improves...

Divided attention
Multi-tasking
Face recall
Visual tracking
Working memory

And can treat...

Schizophrenia
Bipolar disorder
Depression
Obsessive Compulsive Disorder
Post-Traumatic Stress Disorder

The human brain of 2015 is “pretty damned bizarre” by the standards of a century ago brain science pioneer Dr Mike Merzenich told the Future Ways of Thinking conference in July. It is geared to a whole range of different tasks but can adapt because of its plasticity. “Every action changes the physical and functional brain,” he said.

Why does this matter? It means a brain can be trained for higher performance or have its functions restored if they are damaged. His work is enhanced by digital gaming which gives mass reach at low cost. QUT’s Associate Professor Daniel Johnson cited competence, autonomy and relatedness as key human needs that could be served by gamification and used Dr Merzenich’s work as an example of how gamification could deliver real human needs and improve performance.
QUT’s Professor Selena Bartlett has worked extensively with Dr Merzenich on the use of brain training to correct addictive and recidivist behaviour. Professor Bartlett focussed on the part of emotions in decision-making, a point highlighted by an OECD report which cited our capacity to work with others and to manage our emotions as key skills in the modern economy. Managing the emotional part of the brain is key to training the thinking part of the brain to perform at a higher level, a process explained in a live demonstration by Professor Bartlett’s collaborator, Ms Cheryl Batchelor, who also introduced the audience to the value of a glitter-filled jar to manage emotions.
Leadership Counts

Organisations face a certain future - one of complexity, ambiguity, volatility and uncertainty. According to QUT’s Dr Geoff Abbott, that creates a challenge for leaders to shift from a feeling of drowning to surfing. And the key to that is coaching. Dr Abbott told the Future Ways of Thinking conference that leaders needed to coach and be coached to adapt to the pace of change they were managing. “The coach fires up the energy at the connection points of the system,” he said. QUT’s Professor Judith McLean coaches from a different perspective, applying performance skills to corporations, appealing to the emotional ahead of logical reasoning.

Solution-Focused Coaching

1. What am I noticing?
2. What patterns am I seeing?
3. What am I curious about?
4. What don’t I know?
5. Who do I need to talk to?
6. Who needs to talk to who?
7. Who has a different view?
8. What is working?
9. What resources do I have?
10. What is possible here?
The mind needs to be digital

The increased capacity of digital technology requires a new way of thinking. QUT’s Professor Michael Rosemann calls it a digital mindset. And achieving it requires us to disrupt our own thinking. Professor Rosemann told the Future Ways of Thinking conference how the case of driverless cars illustrated the difference between new and old ways of thinking. Old thinking sees use of digital technology while driving as a distraction; new thinking sees driving as a distraction from more productive or entertaining uses of time. He cited four examples of how the digital world changes thinking:

1. The Real World is distracting
2. We will move quickly from searching to finding
3. Bigger corporations get better because of the communities they build
4. Idle capacity becomes more valuable to everybody. But the benefits will only come to the nimble
Data can be a Cure

The growth of data has reached the level of an arms race and an important battle is being played out in the area that affects everybody, health care. The Data Cure Real World Conversation heard from QUT’s Professor Kerrie Mengersen that personally generated data alone would make enormous difference to future health care budgets but she warned that health data - like all data - needed to be of high quality if it was to achieve worthwhile outcomes. And key to that was the ability of users to extract what they needed from a “data lake” if they were to tackle big issues, such as Parkinson’s disease. Her QUT colleague, Professor Lisa Nissen, is already seeing evidence of patients turning up for treatment with massive amounts of data about themselves, collected through wearable devices. But, again, the challenge lay with what clinicians did with the data. Queensland Health’s Chief Health Information Officer Mal Thatcher described a different problem - the sheer scale of converting paper records to useable data.

Market Forecast
$50 Billion in 2017

Big Data

Data Growth
42 ZB of data by 2020

Trained IT professionals to manage and analyse Big Data
Cars that drive themselves

The marriage of data, digital and robotic technology will give us more time in the not-too-distant future. How? Through freeing us from the task of driving. The Future of Driving Real Work conversation led by BMW’s head of innovation Volker Richter spelt out the rapid changes coming for the auto industry and its consumers. Technology is not the barrier to the driverless car. User acceptance will be and Queensland Transport’s Dr Graham Fraine explained how a real world trial will soon be in place in Queensland. But there’s another attitude to confront - the reality that many people enjoy the control of driving their own car, enunciated by the Royal Automobile Club of Queensland’s Paul Turner. Is it worth it? On safety grounds alone, it surely is according to the QUT-based CARRs-Q’s Dr Andry Rakotonirainy.

by 2025

1.24 million traffic fatalities every year worldwide

90% of all accidents are due to driver error

The efficiency increase of computers and sensors
The young don’t have a monopoly on the future but they have a mortgage on it - and a strong sense of what it holds. The technology, the opportunities and, particularly, the ethics of some future technology dominated a lively discussion of 200 high school students and two future-focused speakers at The Next 10 Years, a Real World Conversation that was part of the QUT Vice-Chancellor’s STEM Camp. The speakers were QUT’s Dean of Science and Engineering, Professor Gordon Wyeth, and the Head of Innovation for HP Australia, Roger Lawrence. So what themes stood out? The continued growth of portable digital technology was at the heart of the discussion but so were the issues of how it would marry with more data, artificial intelligence and augmented reality. And what that would mean for sustainability, privacy and how decisions would be made. Concerns about employment were minor - the optimism of the young shone through and the students saw the opportunities of this new world, one they will guide. It’s in good hands.
The Rise of Entrepreneurs

In an age of digital transformation and increased mechanisation, nothing can replace the human capacity to imaginatively solve problems. This is most manifest through the behaviour of entrepreneurs, the class through history that has identified a need and set out to imaginatively and profitably fill it. “It is indeed the age of the entrepreneur,” the Director of the Australian Centre for Entrepreneurship Research, Professor Per Daviddson told the final Real World Futures event of the year. Indeed it is. The changing workplace, new communications, the ability to tap new forms of capital and to more easily reach customers have made entrepreneurialism a more popular course to follow. The Real World Futures Conversation included four speakers: StartsAt60’s Rebecca Wilson, Haystack’s Ran Heimann, E3Style’s Vanessa Garrard and CapitalPitch’s Jeremy Liddle. They each outlined the challenges and the opportunities for older, immigrant, female and youth entrepreneurs. Their common theme: the value of human resilience that a machine can never match.

55-64 yr old Australians represent the fastest growing entrepreneurial segment

41% of new jobs created from small or medium enterprises less than three years old

Australia is the only developed economy with gender equality in entrepreneurial endeavours
Future Working  
24 March

Two half-day conferences on how digital transformation (particularly robotics) will change the nature of work and the job market.

Speakers
A/Prof Michael Osborne  
Andrea Tjeong  
Grant Galvin  
Prof Michael Rosemann  
Prof Jonathan Roberts  
Prof Tristan Perez  
Ross Patane  
Gene Moyle  
Martin Evans

Managing The Future Workforce  
5 May

Real World Conversation on how to manage a workforce going through disruption.

Speakers
Prof Paul Thompson  
Prof Rowena Barrett  
David Fagan  
Mandy Johnson

The Data Cure  
17 May

Real World Conversation on how big data can reduce costs in the medical system and give patients better outcomes.

Speakers
Prof Kerrie Mengersen  
A/Prof Adrian Barnett  
Prof Lisa Nissen  
Mal Thatcher  
Kara Burns  
Dr Geoff Abbott  
Prof Peter Bruza  
Dr Abigail Allwood  
Prof Michael Rosemann

Future Ways of Thinking  
29 July

Two half-day conferences on the science of thinking as a buttress for the individual against disruption.

Speakers
Dr Mike Merzenich  
Prof Selena Bartlett  
Sheryl Batchelor  
Prof Judith McLean  
A/Prof Daniel Johnson

Future Driving  
4 September

Real World Conversation on the future of driving. Will cars be driverless or will drivers be carless?

Speakers
Volker Richter  
Paul Turner  
Dr Graham Fraine  
Prof Andry Rakotonirainy

The Next 10 Years  
28 September

Real World Conversation as part of VC’s STEM camp engaging year 10 and 11 students and interested business executives and academics in how the next decade will

Speakers
Roger Lawrence  
Prof Gordon Wyeth

The Age of Entrepreneurship  
17 November

Real World Conversation, in association with Australian Centre for Entrepreneurial Research, on the issues and opportunities for entrepreneurs at a time of great change.

Speakers
A/Prof Paul Steffens  
Ran Heimann  
Vanessa Garrard  
Rebecca Wilson  
Jeremy Liddle  
Prof Paul Davidsson