PROSTHETIC LEG CHALLENGE

[QUT's Engineers Without Borders](#) and Fellowship of Medical Engineers present a workshop like no other. You will work with a team of 3 to design and construct a prosthetic leg of the future using only recycled materials.

Each workshop will end with a very leggy showcase to judge the legs' aesthetic and design, and a race to test its durability. Participants will be encouraged to think outside the box when brainstorming what they want their leg to look like, and why.

WEARABLE TECH WORKSHOP

Let your imagination run wild and make your own wearable "Robocuff"! Learn how to create a circuit using conductive thread and LEDs. QUT Student Ambassadors will be on hand to help kids craft their own felt cuff which lights up with an LED and battery pack.

* Ages 8-12 are welcome but will require parental supervision and assistance

# MULTIDIRECTIONAL BOWLING WITH SPHERO'S SPRK

Break the rules of learning and try out the new product from Sphero: the SPRK Edition. In this workshop you can go bowling with the Sphero's new SPRK! Learn how to use basic coding apps to remotely control the SPRK in a game of multi-directional bowling. Fine tune your skills in groups of two, then challenge the rest of the Sphero coders in a free-for-all bowling match.

Programming isn't easy, but you don't need to be a rocket scientist to give kids a strong foundation. All you need is SPRK!

Watch video

# MAZE MAYHEM WITH SPHERO'S SPRK
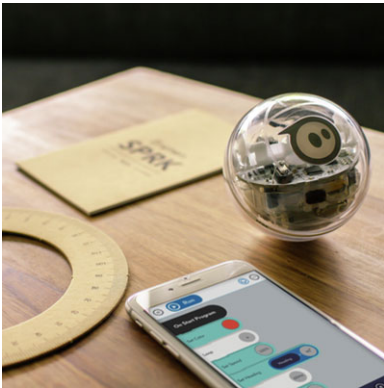
Break the rules of learning and try out the new product from Sphero: the SPRK Edition! Practice using Sphero's coding apps to navigate your way through a maze in groups of two. After determining the best route, challenge your fellow coders in a maze run.

Play is a powerful teacher. Sphero create connected toys – but that's not all. By fusing technology with robotics, their toys are teaching and inspiring tomorrow's inventors and innovators. Programming isn't easy, but you don't need to be a rocket scientist to give kids a strong foundation. All you need is a SPRK!

Watch video

CARS OF THE FUTURE
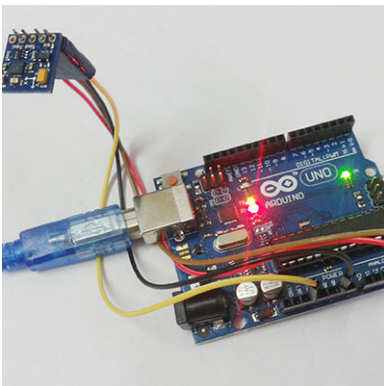
In this workshop you will program a 'driverless' car using an open source electronics platform called Arduino. Using basic code, you will learn how to modify the car's settings to create a vehicle that can safely navigate a track. Your goal is to program your car to 'race' around a track to see who can create the fastest yet safest autonomous vehicle.

ROBOGALS
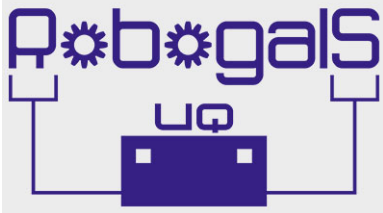
Experience engineering and get a taste for programming with Robogals. Robogals is student-run, international not-for-profit aimed at getting more girls interested in careers in STEM-related fields and decreasing gender bias within the industry.

Robogals' UQ chapter works towards this goal by delivering fun and engaging workshops at schools, libraries and other venues. These workshops require participants to employ a range of technical skills to solve engineering challenges, whilst also developing soft skills such as communication and teamwork among the small groups they work in.
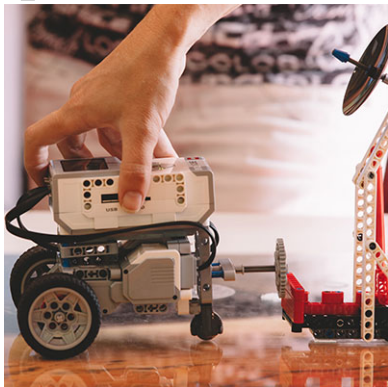
LEGO® EDUCATION LEARNING PROGRAM: GREEN CITY CHALLENGE

Using LEGO® NXT MINDSTORMS robots, kids will work on fun and collaborative engineering challenges and design robotic solutions for real-life scientific problems based on the Green City Challenge.

Workshop presented by QUT The Cube

LEGO® EDUCATION LEARNING PROGRAM: DESIGN ENGINEERING (ROBOTS IN SPACE)

This imaginative and fun workshop takes robotics to the next level. Using the EV3 MINDSTORMS robots, kids will collaboratively design and program their robots to complete space missions. Their challenge: to make the LEGO® Space City thrive! Participants will work through challenges and learn how to program their robot and develop skills to control additional motors.
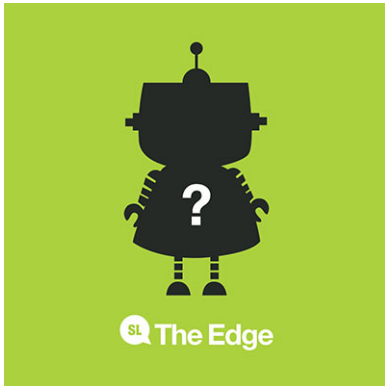
Workshop presented by QUT The Cube

MEET BRETT
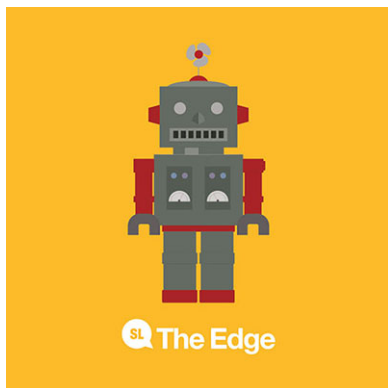
Brett is The Edge's ever-ready, DIY robot made from gears, springs, glue and stickers!

In this workshop you'll learn basic mechanics, and build your very own wind-up automata to take home. No batteries required!

MEET BECK

Join Beck, The Edge's latest and greatest Arduino-based robot, as she makes her workshop debut. The design is top-secret, but rest assured, it will be complete with new accessories, motors and flashing lights! Some soldering required.

ROBOT SUMO WARS
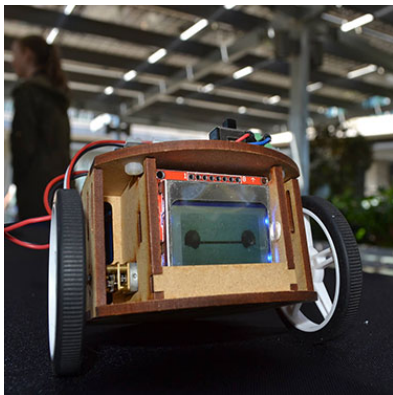
QUT's Electrical Engineering Student Society and QUT Robotics Club will be running robot sumo tournaments on the hour from 10am – 4pm. Come and learn how to drive sumo robots designed and built by QUT students, test your skills and battle up against others. You can also check out the club's 3D printer, interactive electronics exhibits and even try your hand at a 3D-printed crane.

UNMANNED FLIGHT SIMULATOR

Experience what flying a radio controlled plane is really like. Stations with controllers will be set up and participants can come and select an aircraft, flight area and mission to experience for 15 minutes. Instructors will be on hand to offer assistance. If you are part of a group, the simulators can be connected so you can fly as a group or compete against each other.

Brought to you by QUT's Aerospace Society

MINI QUADCOPTER OBSTACLE COURSE

With all the same characteristics and controls as their full-sized counterparts, these mini quadcopters are the perfect way to try your hand at controlling this interesting aircraft. Come along for your chance to pilot a mini quadcopter and navigate an obstacle course. Pilots will be given a 5 minute briefing and training before flying the course for 5 minutes.

Brought to you by QUT's Aerospace Society

SPHERO OBSTACLE COURSE
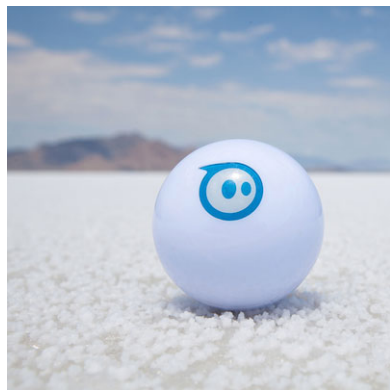
Sphero is an intelligent robotic ball that connects wirelessly to the virtual world with mobile apps, enabling new types of game play that meld the virtual and real worlds. Come along to put these little round robots through their paces in a fun obstacle course.

Watch the video

AQUABOT ENVIRONMENTAL CHALLENGE
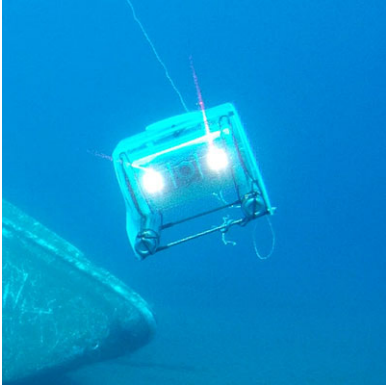
Try your hand at piloting a small Remotely Operated Vehicle (ROV), or underwater robot, to complete an environmental challenge. Litter and marine pests pose a great risk to our oceans and their complex ecosystems. In this challenge you'll get the chance to control the ROV to perform an underwater cleanup operation.

Learn more about robotic boat research at QUT and see underwater and surface robots on display at the P Block Pool.

READY TO BEAT THE MACHINE?

How good a navigator are you? Go up against QUT's state of the art robot navigation algorithms (developed in collaboration with Harvard University) in this interactive game that tests your ability to work out where you are in the world.

BIG DIPPER BY MICHAEL CANDY
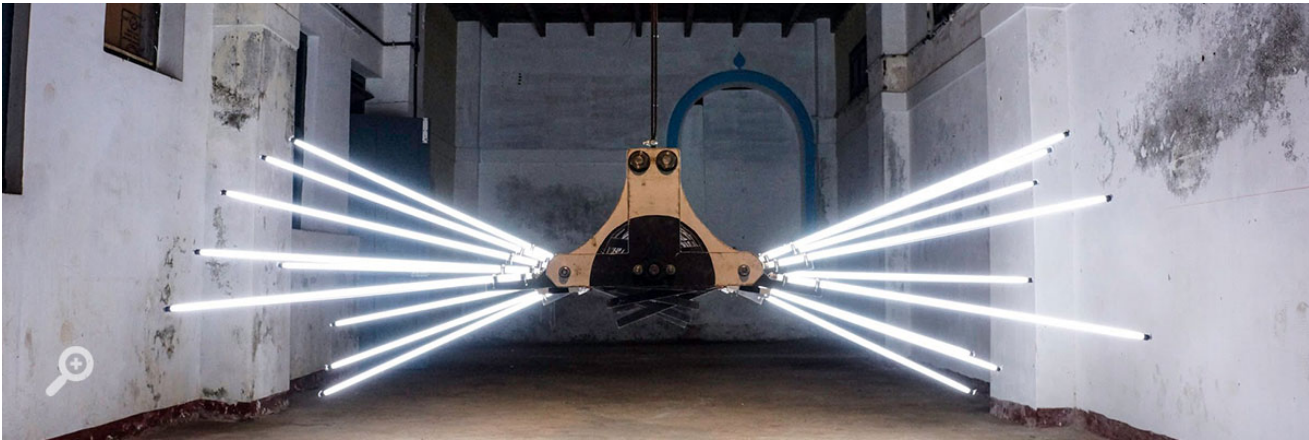
Michael Candy's *Big Dipper* is a kinetic light sculpture combining symbolic elements of biology and physics. The sculpture mesmerizes in a wave of bright white lights, its movements reminiscent of a helix and waveform.

Big Dipper is named after the constellation as the sculpture alludes to the primordial origins of life in the kilns of the universe, where all matter is made. Prototyped in India and recreated in Australia, Big Dipper was the winner of the Polish Biennial 2015.

Find out more at michaelcandy.com

Michael Candy (AU) is a kinetic, new media artist and a graduate of Fine Arts & Industrial Design from QUT. Through the deconstruction and analysis of everyday devices, Michael Candy has developed a unique rationale of 'instinctive engineering', which he uses to investigate interaction technologies. These ideas are manifested in the construction of physical installations or electromechanical objects that often exist on the verge of what is socially or ethically legal, from devices that use IED cell phone detonation technologies or public installations disguised as council property, to synthesizers controlled by an active volcano.

Michael has been involved in residencies and projects across the country and Internationally, most notably: First Draft (Sydney), Next Wave (Melbourne), The Instrument Builders Project and Hackteria Lab (Yogyakarta). In 2010 he was a finalist for the Stan and Maureen Duke Gold Coast Art Prize. He has collaborated with established artists such as Anthony Lister and Keith Armstrong, and has been mentored by several artists including Craig Walsh & Wade Marynowsky.

THE ABOVEMARINE BY ADAM BEN-DROR
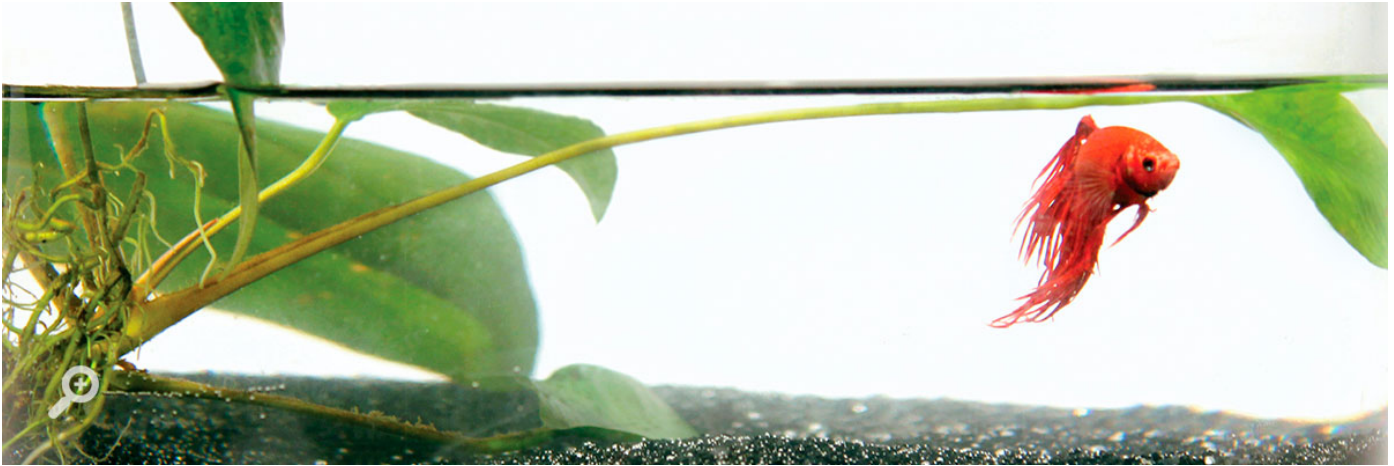
The Abovemarine is a vehicle like no other. Inspired by his pet fish to combat the misconception that fish were unexciting and limited creatures, Adam Ben-Dror designed the Abovemarine to allow fish to autonomously travel around on land.

Ben-Dror says: *The Abovemarine is a vehicle that enables José, or any other fish, to roam on the land freely. This small freedom allows him to interact with other species including humans and small animals. José is able to successfully navigate around a room, as he swims backwards (stopping the Abovemarine) before hitting obstacles.*

José and the Abovemarine engage our interest in the beauty and intelligence of [fish]. We are encouraged to ask questions that challenge our preconceived notions about fish and other living creatures: Does the fish have intention? Does the fish understand what he is doing? Do fish have memories?

[Watch The Abovemarine by Adam Ben-Dror [2:07 vimeo]](#)

[Find out more at ben-dror.com](#)

[Adam Ben-Dror](#)
Adam Ben-Dror is a South African living in New Zealand. With a passion for the synergy that exists between beauty and utility, Adam strives to create objects that achieve a balance between aesthetics and functional purpose. Adam has received over a dozen awards for his works, and has toured extensively through New Zealand and internationally to exhibitions in London, Moscow and Pittsburgh.

PINOKIO BY ADMAM BEN-DROR & SHANSHAN ZHOU

Challenge your idea of robotics and relationships, and meet Pinokio. Taking the form of a desk lamp, this little robot can detect motion and sound to interact with you – and maybe even win your heart.

One of the creators of Pinokio, Adam Ben-Dror, says: *Pinokio is an exploration into the expressive and behavioural potentials of robotic computing. Customized computer code and electronic circuit design imbues Pinokio with the ability to be aware of its environment, especially people, and to expresses a dynamic range of behaviour.*

As it negotiates its world, we the human audience can see that Pinokio shares many traits possessed by animals, generating a range of emotional sympathies. In the end we may ask: Is Pinokio only a lamp? A useful machine? Perhaps we should put the book aside and meet a new friend.

[Pinokio by Adam Ben-Dror [1:53 vimeo]](#)

[Find out more at ben-dror.com](#)

[Adam Ben-Dror](#)
Adam Ben-Dror is a South African living in New Zealand. With a passion for the synergy that exists between beauty and utility, Adam strives to create objects that achieve a balance between aesthetics and functional purpose. Adam has received over a dozen awards for his works, and has toured extensively through New Zealand and internationally to exhibitions in London, Moscow and Pittsburgh.

INNER WORLDS BY CAKE INDUSTRIES

B Discover unexpected scenes and miniature living worlds within the most commonplace of objects: the wheelie bin. Explore well-known story archetypes appearing suddenly from nowhere.

Cake Industries (Jesse Stevens & Dean Petersen)

[Cake Industries]

Artist duo Jesse Stevens & Dean Petersen from Melbourne, Australia, have worked under the collaborative pseudonym of Cake Industries since 2006. Touring nationally and internationally, their experimental practice uses electromechanics, handmade electronics, and robotics to create anthropomorphic and autonomous objects that embrace retro-futurism. Heavily influenced by 1950s science fiction dystopia, Cake Industries' installations, performances, and sculptural objects portray society, and investigate narratives, culture, reality, and future whilst engaging the next generation of creative robot dreamers.

HARD RUBBISH ALL-TERRAIN VEHICLE BY CAKE INDUSTRIES

Hard rubbish collection is the placement of unwanted household items on the street for collection by council and local residents. Through these items on the street we can see the histories of the people that have discarded them.

These histories come to life in Hard Rubbish All Terrain Vehicle. See if you can spot the Deceased Estate installation come alive between 1pm – 6pm.

This installation was created during the Melbourne iteration of Street | Life.

Cake Industries (Jesse Stevens & Dean Petersen), Bimo Suryojati and RM Altiyanto Henryawan

SUPPORTED BY

Australia Council for the Arts "Creative Partnerships with Asia" and "Emerging and Experimental Arts"

DFAT "Australia International Cultural Council" and "Australia Indonesia Institute"

Creative Victoria

Project in partnership with Multicultural Arts Victoria.

Cake Industries
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RIGHT OF WAY BY CAKE INDUSTRIES

Three hyperactive pedestrian crossing buttons have been released from the shackles of traffic light poles and hit the streets to find their own way in the world, leaving mayhem and hilarity in their wake. Watch your step, they're fast!

This installation was created during the Melbourne iteration of Street | Life, a collaboration between Cake Industries, Bimo Suryojati and RM Altiyanto Henryawan that transformed elements of contemporary street culture into "guerilla" art performance installations.

Cake Industries (Jesse Stevens & Dean Petersen), Bimo Suryojati and RM Altiyanto Henryawan

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HIF CLOUD: WEARABLE TECHNOLOGIES

The future of wearable technology is here. Mass markets are rapidly adapting and transitioning from portable (mobile phones, tablets) to wearable (Google glass and motion sensors) devices. Wearables that live on, near or in our bodies give rise to a previously unimagined level of data about users and the environment. By enabling the connection of divergent data sets, wearables provide life-augmenting levels of interactivity that could benefit and enrich the ways that we understand individual and community wellbeing. The absorption of technology into the very fabric of clothes, accessories and even bodies begins to dilute boundaries between physical,technological and social spheres and has potential implications for human evolution. The Haptic Interface (HiF), the line between humans and wearable technology, is the catalyst that will both blur and crystallise the future technological landscape. The HiF Cloud Workshop provides a platform for broader debate around wearable technology, our mediated future selves and human interactions in this future landscape.

HiF Cloud Workshop 2015 challenged students in an inter-disciplinary, international and inter-cultural collaboration to envision the future of wearables. The Cloud workshop installation at Robotronica presents three pieces: Flaneur, Tether and Collide, developed by students from Creative Industries and Science and Engineering Faculties - QUT, Queensland College of Art – Griffith University and the Academy of Visual Arts – Hong Kong Baptist University. The pieces represent the intersection of Design, Art and Technology, casting future scenarios for wearables that harness the power of cloud computing to enrich and transcend human interactions in the Asia-Pacific region.

FLANEUR

Chamya Dissanayake, Miaomiao (Lily) Ye, Louis van Dyke, Benjamin Williams, Stacey Lok Heng Chan, Doris Tak Yung Li

TETHER

Marnee Zamora, Sam Stewart, Liam Cripwell, Louis Chun Fai Ng, Siu Fung Lui,

COLLIDE

Natalia Scigulla, Thomas Duffy, Yannie Hiu Yan Hung, Rainbow Kwok, Laurence Fairbairn, Trang Le

SUPPORTED BY

Seeed Studios, The Woolmark Company, The Design Institute of Australia, State Library of Queensland, Queensland Government, Tronixlabs, 360Fashion Network, Dimsum Labs

GUIABOT

Meet Guiabot, the tour guide of the future. When visiting The Cube during the festival, let our little Guiabot lead the way! Just tell the Guiabot where you want to go by using its touch screen, and then follow the robot to your chosen destination.

As you interact with the Guiabot, it's not hard to imagine that this little guy could revolutionise the way we staff receptionist, night security officer, tour guide, or even private home-helper roles in the future.

Our robot, weighing at 60 kilograms and standing at around one meter, is an autonomous ground robot with the ability to navigate independently indoors. The Guiabot is equipped with a laser range finder, high definition camera, RGBD camera and touch screen.

EVOLUTION OF THE VEHICLE

[QUT Motorsport](#) and [Team Arrow](#) have partnered to bring you an evolutionary display of automobiles. They will be showcasing the student-designed Combustion and Electric Open Wheeled race vehicles of QUT Motorsport, as well as Team Arrow's Solar Racing Vehicle. You can join the action with Race Simulator (open all day) and hear from the students at presentations at 11am, 1pm and 3pm.

ROBOT MANIPULATION SPACE

The Robot Manipulation Space gives you an insight into how robots can engage with and influence the world around them. On display will be a range of robotic arms that allow robots to interact with their environment. Included in the range of robots will be the impressive dual-arm Baxter robot. Come and test your skills with interactive demos allowing you to get a feel for how challenging it is for a robot to interact with the world.

Connect 4 Challenge with Baxter
10am – 12.30pm | 3pm –5pm
Come and challenge Baxter to a game of Connect 4! Test your own wit against the artificial intelligence and dexterity of Baxter the robot.

Pick and Place Demo with Baxter
1.30pm – 2.30pm
See Baxter show off his moves! Baxter is a human-safe robot with dual manipulators featuring seven degrees of freedom on each arm. Baxter has been designed by Rethink Robotics and includes springs in each of his joints making him flexible and safe to interact with. The Baxter robot at QUT is being used as both a research and teaching platform. Some of the research we are applying on Baxter includes deep reinforcement learning, natural language programming and fruit picking.

Pick and Place Challenge with Jaco and Mico
10am – 12pm | 1pm – 3pm | 3:30pm – 5pm
You will be able to control ("teleoperate") a robotic arm that is set up in an area with some kids toys around. Your goal is to clean up the space – move the arm around, pick-up and try to even stack some of the toys in the playpen! It's not as easy as it sounds! The Jaco & Mico Brothers, both designed by Kinova Robotics, are lightweight manipulators with six degrees of freedom. These robot manipulators have been designed for assistive tasks such as aiding people who are disabled. Jaco and Mico are being used to perform research into medical robotics at QUT.

Fruit Picking Demo by Harvey the Robotic Fruit Harvester
10am – 1pm | 2pm – 3pm | 3.30pm – 5pm
Harvey is QUT's robotic fruit harvester designed to autonomously pick capsicums. Harvey is a six degree of freedom manipulator featuring a vacuum gripper and a 3D colour vision system. Harvey's robot arm was designed by Universal Robots and features force sensors that enable him to be a safe collaborative robot that can easily work around humans. Harvey has been designed to harvest fruit within a greenhouse environment and can reach up to 2 metres.

NAO ROBOTS
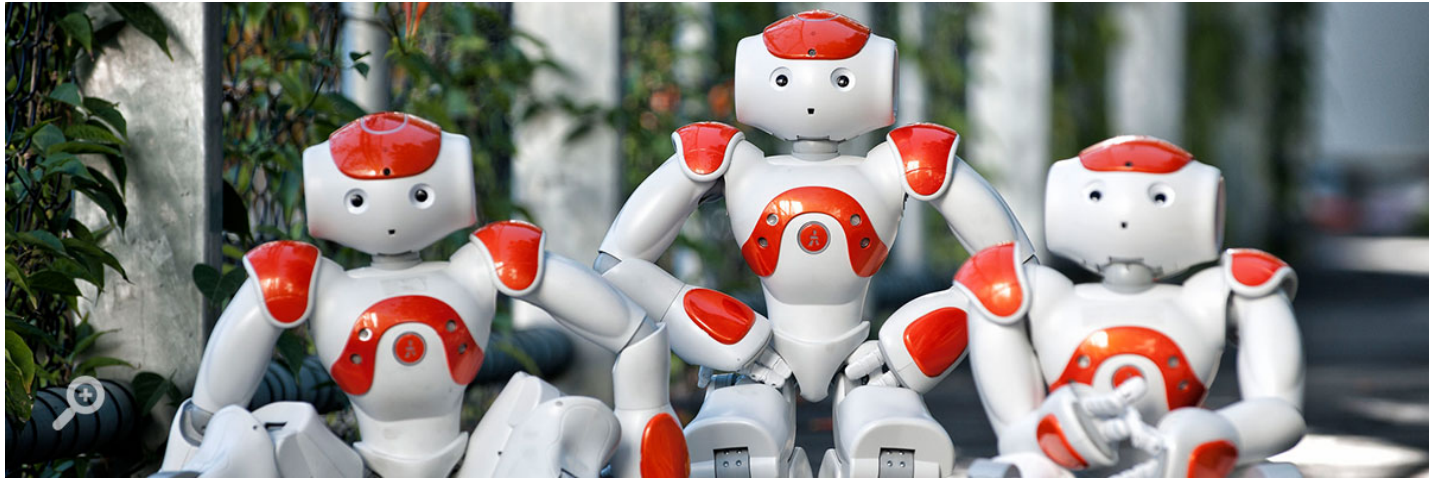
NAO is friendly, cute and measures 58cm tall. But don't be fooled by their adorable appearance, NAOs are powerful little guys with huge potential to contribute to the development and progress of science and technology education. The NAO also has revolutionary applications for healthcare, rehabilitation and special education.

NAOs are autonomous and fully programmable, and may be used to help teach people to code and to understand how robots can use visions and audio sensors. The NAO mission is to introduce more young people to technology, guide the gifted towards scientific careers, and provide an educational tool that adapts to all students and materials. NAO Robots will be roving the campus from 10am – 4pm, see if you can find one, say hi, hold their hand and snap a selfie!

At various times during the day on the main stage you can find the NAOs showing off, from storytelling, to dance performances, Tai Chi and Yoga – don't miss out on seeing what NAO can do!

QUT has recently acquired a brand new NAO. Can you help QUT name it?

AGBOT

Could robots become helpers in future farms? QUT is working on small, lightweight robots that are part of a new generation of agricultural machines. These robots are designed for getting rid of weeds, applying vital nutrients to crops, and gathering data to help farmers make informed decisions about their crops.

AgBots (agricultural robots) are expected to play a vital role in the day-to-day operation of farms across Australia. We have two AgBots on display at Robotronica: the first is a small utility vehicle modified with sensors to demonstrate how the robot can move and navigate autonomously on the farm. The second AgBot is a new robot fully designed and fabricated at QUT by our team of researchers. Check out the AgBots and talk to the creators and roboticists about them.

AQUABOTS

Learn about the robotic boat research at QUT and how the technology is transforming environmental science as well as inspiring a new breed of robotics students. You will see the *Inference* robotic boat system in action: consisting of multiple autonomous boats they are capable of staying on our waterways for extended periods of time, collecting data not previously possible. You can also see *Bruce*, QUT's podium-winning entry in the International Maritime RobotX Challenge. *Bruce* is a 5m long autonomous boat with many of its systems developed by undergraduate students as part of a competition. Its navigation capabilities include search and rescue, docking, and obstacle avoidance.

In addition to the moving robot demonstrations and underwater challenges, there will be a number of underwater and surface robots on display. Here you can learn how we are using this technology to help monitor and understand our marine and aquatic environments.

THE HOSPITAL OF THE FUTURE

Welcome to the hospital of the future. Come along to glimpse the future of medicine, where robots play a very important role – from surgical robots and robotic human simulators, to 3D printed body parts.

This display showcases the latest technologies in advanced 3D printing of replacement body parts, bionics, and surgical robotics. Here you will see one of our research-class biofabrication machines in action: using tens of thousands of volts and robotic precision to produce 3D plastic scaffolds out of fibers much thinner than a human hair. You can also take part in our robotic arm surgery challenge – can you save the patient in time?

Also on display will QUT's Metiman, a "robotic like" human simulator that breathes, blinks, talks, bleeds, has heart sounds and can simulate many medical conditions for students to immersed themselves in an experiential clinical setting without the risk of harming a patient. The Clinical Simulation Centre at QUT mimics clinical environments with real equipment for nursing, paramedics and other health disciplines in the Faculty of Health. Students can engage in clinical simulation experiences to practice their clinical skills and knowledge.

Associate Professor Mia Woodruff leads the Biomaterials and Tissue Morphology Group at QUT and has held both an ARC Postdoctoral Fellowship and a QUT Vice Chancellor's Senior Research Fellowship. She is an expert in bone tissue engineering with extensive experience in all aspects of biomaterial scaffold fabrication techniques and pre-clinical models and has built a world-leading histology laboratory since joining QUT. Mia was awarded second place (highly commended) as Queensland's Women in Technology "Rising Star" in 2012 and nominated for the Biotech researcher award in 2013. She was also the winner of the Queensland Young Tall Poppy Science Award in 2013 and last year was recognised in QWeekend's Queensland 50 Best and Brightest. Mia's exciting vision is of a future where the fabrication of patient-specific replacement tissue and organs is safe, cost-effective and routine. This dream drives her fascinating research to advance the high-tech sciences of tissue engineering and biofabrication.

Sean Powell is an academic and researcher in biofabrication and tissue engineering at the Queensland University of Technology (QUT). His research experience includes developing theoretical and computational models of particle transport, molecular diffusion and experimental nuclear magnetic resonance. Sean also has extensive industry experience in computer software and electronic hardware design. He currently works with the Biomaterials and Tissue Morphology research group leading the biofabrication team to develop next-generation technologies and techniques for 3D micron-fibre based polymer scaffold fabrication. Sean also lectures undergraduate physics at all year levels with a special interest in astrophysics and general relativity.

Christopher Aitken trained at St Vincent's Hospital in Melbourne and has extensive experience in critical care and post op cardio thoracic surgery in Australia and the UK. His previous positions were managing and educating for a wide range of clinical healthcare products including high fidelity human patient simulators. Chris is currently the Clinical and Simulated Learning Environments Coordinator at QUT in the Faculty of Health. He has a particular interest in healthcare simulation paradigm, envisioning the enhancement of undergraduate, postgraduate and research in clinical and simulated learning environments at QUT.

AUSTRALIAN ROBOTICS CHALLENGE: TEAM DEMONSTRATION
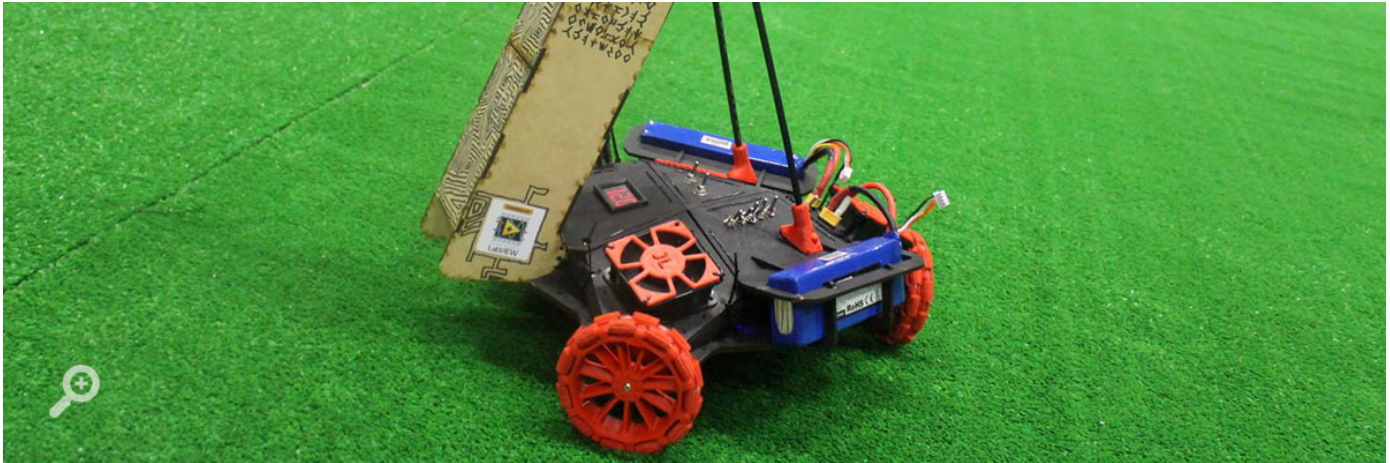
The National Instruments Autonomous Robotics Competition (NI ARC) is a student robotics competition designed to encourage development and innovation in the field of robotics. The NI ARC features competing student teams from top universities from across Australia and New Zealand, with each team developing an autonomous robot within 7 months that will ultimately compete in a live competition.

This year's competition task will focus on the logistics and transportation industry, a crucial component of many major local industries including mining, manufacturing, food and agriculture, and consumer goods. Built around the theme 'Transport and Roll-Out', robots will have to complete tasks such as navigating to a loading bay, collecting goods, navigating to drop off zones, avoiding both static and dynamic obstacles.

QUT's team of around 10 members will be demonstrating their tri-omni wheel chassis robot, which transports miniature shipping containers from boats to storage sites. You can meet the team and quiz them about their Continuous Translational Rotational Curvilinear Stepper Motor driver!

# AUSTRALIAN RESEARCH CENTRE FOR AEROSPACE AUTOMATION DISPLAY

The Australian Research Centre for Aerospace Automation (ARCAA) is a world-leading Queensland University of Technology (QUT) research facility based in Brisbane, Australia. At ARCAA, we combine robotics and aerospace knowledge, technologies and capabilities to research all aspects of the future aviation environment, with a specific focus on autonomy.

We pride ourselves on the ability to transform leading edge research concepts to flight-tested reality. The development of these autonomous technologies will support the more efficient and safer utilisation of airspace, and coupled with on-board sensor systems can be integrated into general aviation and unmanned aircraft to enable a wide range of commercial applications.

Currently, and into the future, the technologies being explored at ARCAA will be integrated into civilian manned and unmanned operations, offering significant time, cost and safety benefits to a variety of industries. Such real-world benefits could be realised for sectors across Australia including farming and agriculture; mining and resources; emergence services; building and construction and creative industries.

Come on over to the ARCAA display to meet the team and check out their Mobile Operations Centre (MOC), Unmanned Aerial Vehicles (UAV), and have a go on the RC Flight Simulator!

ROBOT STORY TIME
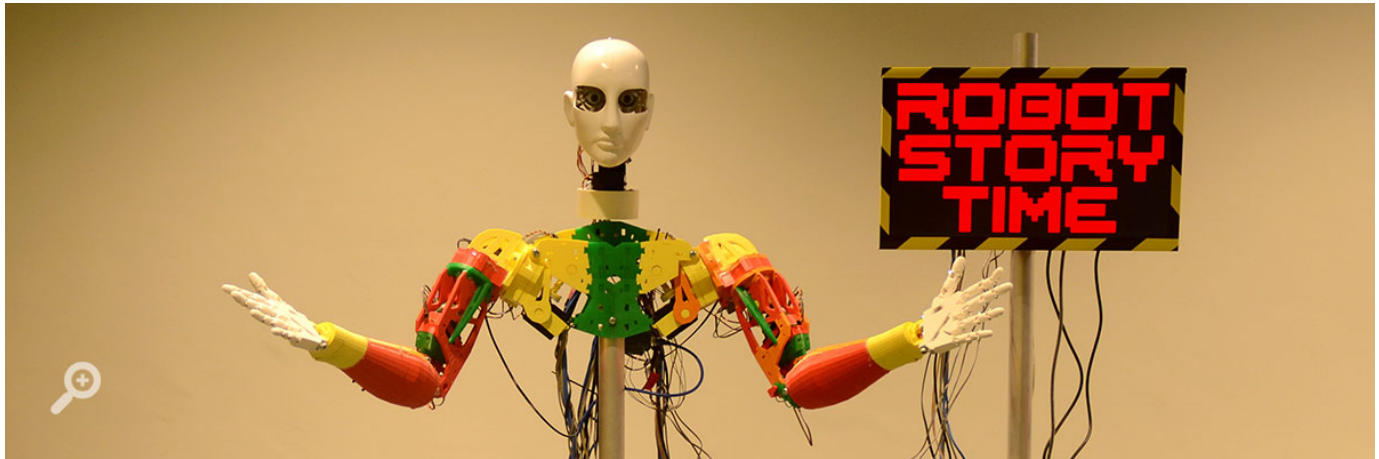
Meet Radius, the humanoid robot. This colourful robot's purpose is to educate and entertain children of future generations.

Radius is able to tell various stories to groups of children using his voice and gestures. He also utilises screens to illustrate the story and assist with the plot.

These engaging interactive story times include conversations with onscreen characters, quiz times, and lots of silly fun. Jesse and Dean are on hand in costume to perform and assist.

See more kids' activities

It is recommended that a parent or guardian attend this performance with their child as the Robot can sometimes be a little scary at first. Please let us know when you book how many children and how many adults you are booking for.

Cake Industries (Jesse Stevens & Dean Petersen).

Cake Industries
Artist duo Jesse Stevens & Dean Petersen from Melbourne, Australia, have worked under the collaborative pseudonym of Cake Industries since 2006. Touring nationally and internationally, their experimental practice uses electromechanics, handmade electronics, and robotics to create anthropomorphic and autonomous objects that embrace retro-futurism. Heavily influenced by 1950s science fiction dystopia, Cake Industries' installations, performances, and sculptural objects portray society, and investigate narratives, culture, reality, and future whilst engaging the next generation of creative robot dreamers.

SHIMON ROBOT & FRIENDS – MUSICAL ROBOTS AND CYBORGS
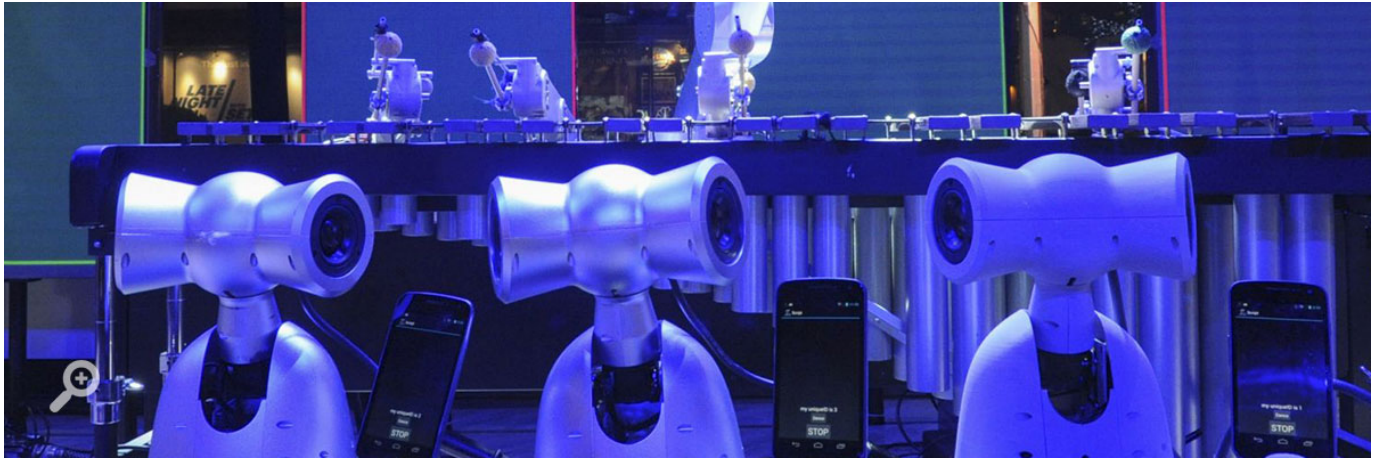
For the first time in Australia, Shimon Robot & Friends will delight audiences with its combination of human, cyborg and robot musicians. This spectacularly unique performance features Shimon, an improvising robotic marimba player that creates inspiring musical interactions with humans. Shimon listens to, understands, and collaborates with live musicians.

Shimon uses artificial intelligence and creativity algorithms to push the boundaries of musical experiences to uncharted domains. Joining Shimon will be a number of other robotic musicians and musical cyborgs developed by Georgia Tech's Robotic Musicianship group in Atlanta, USA. Shimon Robot & Friends aim to combine human creativity, emotion and aesthetic judgment with the algorithmic computational capability of computers. Their goal is to allow human and artificial players to creatively collaborate, building upon each other's ideas.

Shimon Robot & Friends have performed with human musicians in dozens of concerts and festivals from DLD (Munich), to the US Science Festival (Washington DC), Google IO (San Francisco), TED, CNN, The Colbert Report, The Today Show, and the John F. Kennedy Center for the Performing Arts (Washington DC). The Robotic Musicianship Group at Georgia Tech Center for Music Technology aims to facilitate meaningful musical interactions between humans and machines, leading to previously uncharted artistic expression with each party's unique strengths.

Following the performance demonstration there will be a Q&A with the researchers who have developed this ground breaking technology.

Shimon Videos

ROVING PERFORMERS FROM THE 501ST LEGION

The 501st Legion is an all-volunteer group formed for the express purpose of making movie-quality costumes of the 'Bad Guys' in the Star Wars universe.

With over 10,000 members worldwide, they are the world's largest costuming club. The Redback Garrison is comprised of almost 150 501st Legion members based in Queensland. As well as creating some of the highest quality Star Wars costumes in the world, the Redbacks also attend many events and devote themselves to supporting a number of charities throughout the state. Most importantly, they enjoy bringing smiles to those who most need it – they are the Bad Guys doing good!

Joining Redback Garrison at Robotronica will be Drawn2Life, a Queensland-based costuming group that supports a wide range of smaller charities through appearing at events in high quality, authentic-looking superhero and villain costumes.

DEEPBLUE AND THE PERFF BOTS
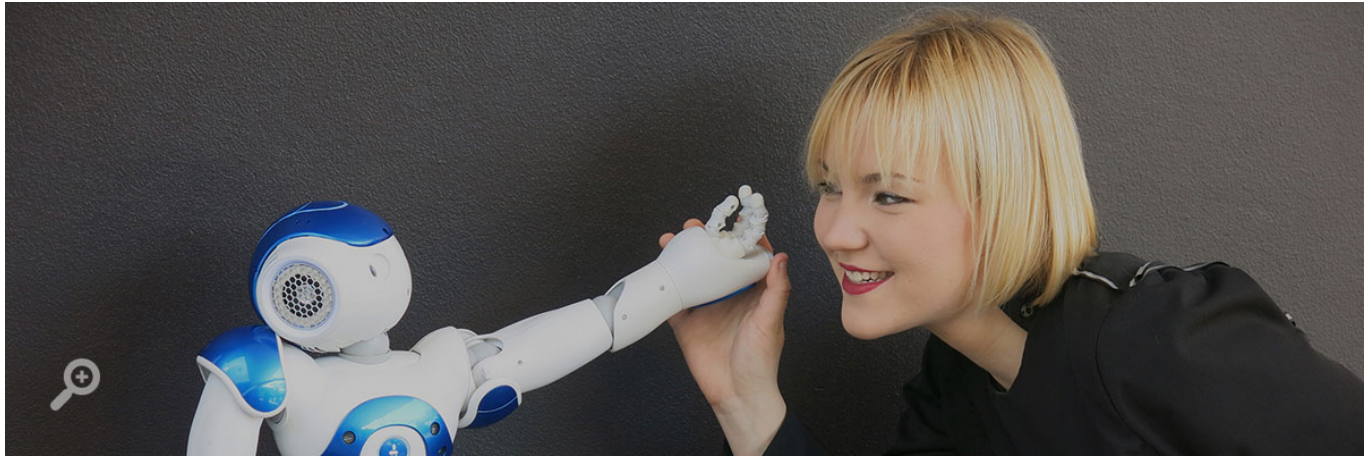
The closing performance for Robotronica features a plethora of talent including the human orchestra DeepBlue and over 40 robots developed through a ground-breaking art and sciences collaboration between QUT's Faculties of Science & Engineering and Creative Industries. The performance tells a fantasy story of the evolution of humans and their machines and is co-directed by Andy Arthurs, Jonathan Roberts and Jared Donovan.

DeepBlue is the orchestra unleashed, comprising of strings, electronics and physical theatre and movement amplified and magnified by video and lighting and interactivity. Distinctive, disruptive and innovative, tossing many traditional notions of the orchestra overboard. Formally trained they've applied their creative and performing skills to shaking the musical tree, coaxing back mainstream audiences to experience their take on the orchestra of the 21st Century.

DeepBlue have received huge exposure through live performances and TV appearances across the country, and at massive festivals in India, Vietnam, Taiwan, Malyasia, Thailand, Indonesia and China. DeepBlue's last three Australian seasons sold out. They have completed five successful national tours, performing at major metropolitan and regional entertainment centers. Catch DeepBlue in a one night only robot spectacular!

KEYNOTE TALK: PROFESSOR GIL WEINBERG
# ROBOTIC MUSICIANSHIP AND ARTIFICIAL CREATIVITY

Gil Weinberg is the founding director of the Georgia Tech Centre for Music Technology, an international centre for creative and technological research in music that seeks to redefine the way we create, perform, listen to and consume music. He is a Professor in the School of Music and Adjunct Professor in the School of Interactive Computing. A key area of his research is robotic musicianship. His research group aims to facilitate meaningful musical interactions between humans and machines, leading to novel musical experiences and outcomes, and it is pushing the boundaries of creativity and artificial intelligence. Their work is based on the hypothesis that real-time collaboration between human and robotic players can capitalise on the combination of their unique strengths to produce new and compelling music. The group's goal is to combine human qualities such as musical expression and emotions with robotic abilities such as powerful processing, sophisticated mathematical transformations, robust long-term memory, and the capacity to play accurately without practice. This talk will feature the history of the robotic musicianship group at Georgia Tech, highlighting a number of computational approaches for improvisation using genetic algorithms, hidden Markov models, and fractals which were implemented in four different robotic platforms: Haile, Shimon, Shimi, and the robotic drumming prosthesis.

Professor Weinberg will also be presenting Shimon Robot & Friends, a one-hour robotic music performance demonstration, followed by a Q&A with the audience on Sunday 23 August at 3:30pm. Bookings for the Shimon Robot & Friends performance are essential.

Find out more about IFE

KEYNOTE TALK: IAN BERNSTEIN TOMORROW'S TOYS: SHAPING OUR FUTURE
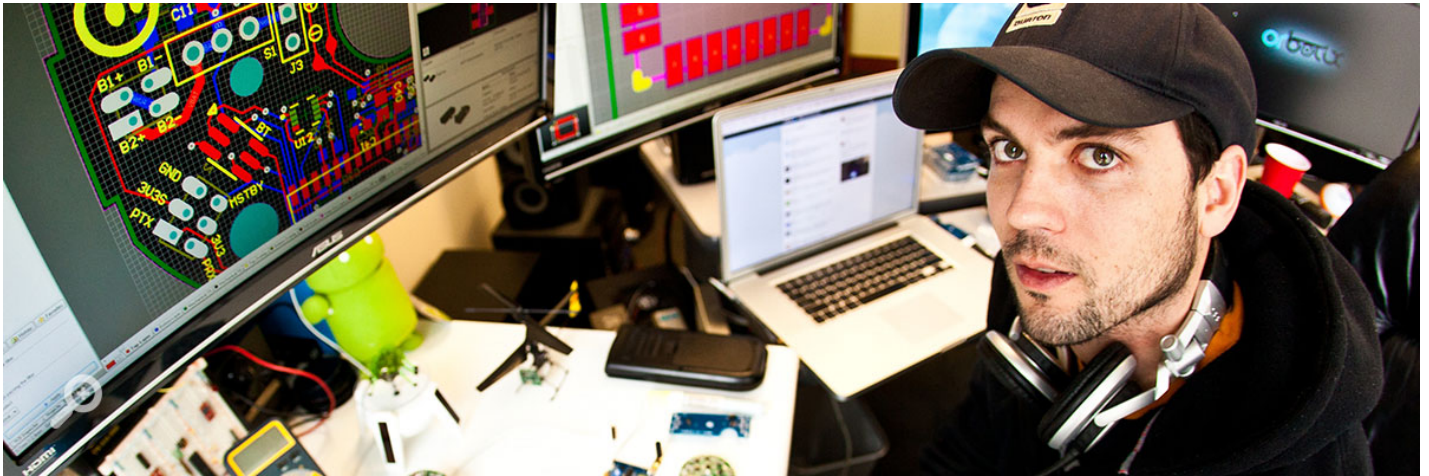
Ian Bernstein has been hooked on robotics since the age of 12, and is now making a name for himself as a prominent figure in the world of connected play, robotics and coding. Through the Techstars program, a global network that enables entrepreneurs to bring new technologies to market, Ian teamed up with hacker and long-time friend Adam Wilson to co-found Sphero, based in Boulder, Colorado, focusing on the fusing of emerging technology with the latest innovations in robotics. In 2011 they launched *Sphero*, their first robotic, connected toy which won the award for excellence in toy design at the annual TAGIE (Toy and Game Inventor) Awards in the US in 2014.

The upcoming *Star Wars: The Force Awakens* film will feature BB-8, a new droid with technology created by Sphero, which is already the breakout star of the movie.

This talk will explore how connected toys are enhancing children's learning, helping to positively shape their curiosity by engaging and entertaining, as well as informing and inspiring. Ian will discuss the potential of popular toys to shape an ongoing interest in the fields of technology and programming, and where tomorrow's toys can lead us. Ian will also speak about his background in the field, how he became interested in robotics, and how this led him to co-founding Sphero, the world leader in connected play.

It is becoming increasingly useful to learn the language of computers and even more important that these lessons are instilled at a young age. In response to this trend, Sphero have released *SPRK* (Schools, Parents, Robots, Kids) *Edition*, which allows children to learn the basics of programming and see the inner workings of the unit's robotic components. *SPRK Edition* will have its Australian launch at Robotronica, featuring in two of the festival's workshops.

Find out more at sphero.com

KEYNOTE TALK: STELARC HYBRIDS, HUMANOIDS, NANOBOTS & DRONES: THE UNCANNY, THE CREEPY & THE CONTESTABLE
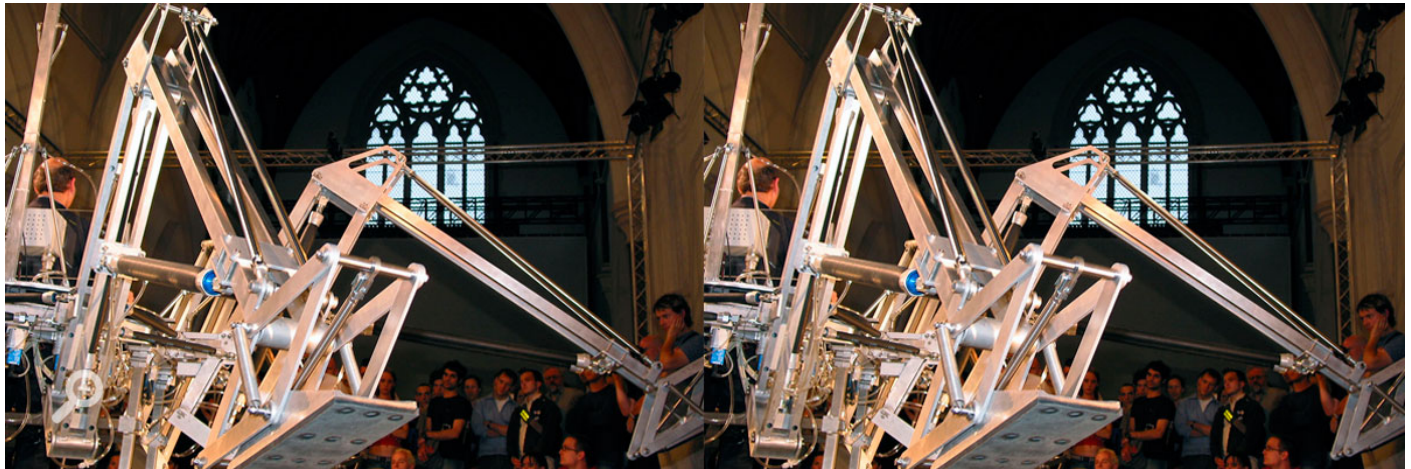
Stelarc is one of Australia's most significant living artists. He uses his body as the object for physical and technical experiments in order to push the limitations of human flesh. Stelarc has used medical instruments, prosthetics, robotics, Virtual Reality systems, the Internet and biotechnology to explore alternate, intimate and involuntary interfaces with the body. Legendary sci-fi scribe William Gibson described his work as "moments of the purest technologically induced cognitive disjunction". In 1996 he was made an Honorary Professor of Art and Robotics at Carnegie Mellon University, Pittsburgh.

Hear Stelarc speak about how insect, animal and human anatomies, although complex and highly adaptive, are inadequate. There is a need to go beyond bio-mimicry in engineering robots. Designing robots generates unexpected possibilities of hybridizing biology and technology to create new operational systems. Soft materials, smart materials, conductive materials, sensors and computational circuitry combine to produce alternate anatomical architectures, ones that can be imposingly present or massively distributed and connected. The engineering of aliveness and affect in robots and machines is about generating contestable futures, ones involving the aesthetics and ethics of social interaction with a proliferation of prosthetically augmented humans and increasingly autonomous and intelligent machines. The uncanny becomes amplified in these liminal spaces of interaction.

Performance image by Mark Bennett

Find out more at stelarc.org

KEYNOTE TALK: NEIL HARBISSON LIFE IN THE AGE OF CYBORGS

Hear from the world's first government-recognised cyborg, UK artist Neil Harbisson. Neil will speak about his path to becoming a cyborg, beginning in 2004 when he and collaborator Adam Montandon developed the eyeborg, a cybernetic system now permanently implanted in his head, allowing the colour-blind Harbisson to perceive colours as sounds. Recent upgrades have included an internet connection allowing him to receive music and phone calls directly to his skull.

In 2010, he and Moon Ribas co-founded the Cyborg Foundation, an international organisation that aims to help humans become cyborgs, defend cyborg rights and promote cyborgism as a social and artistic movement.

As an artist, Harbisson investigates the relationship between colour and sound, and experiments with the boundaries of human perception through the use of cybernetics applied to the body.

Hear Harbisson's truly unique perspectives and experiences, including why he finds supermarkets more beautiful than the ocean, and what makes a melodious face. In this unforgettable keynote lecture, Harbisson will explain why he believes that he isn't just using or wearing technology, but rather that he is technology and he will talk about how becoming a cyborg has brought him closer to nature and animals.

The Eyeborg app is a mobile application that places the experience of being a cyborg like Neil Harbisson into your hands. Listen to the sound of colours and create and share your own colour scores!

# PANEL DISCUSSION – DRONES: RACING, STARTUPS AND R&D
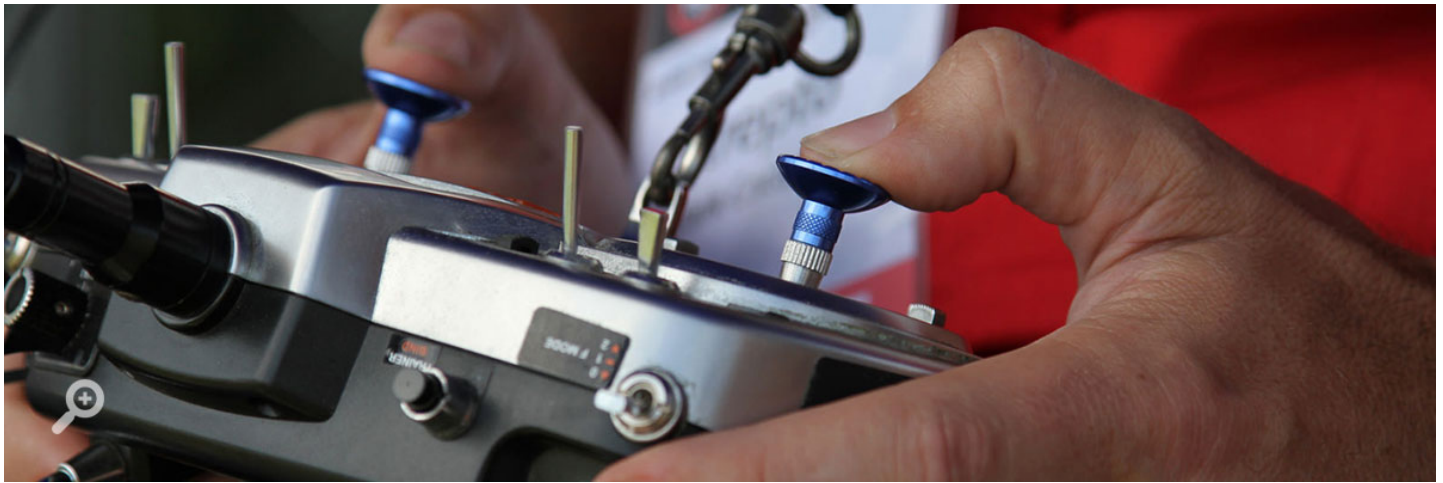
CHAIR: Bernie Hobbs
Speakers: Chad Nowak, Mark Cocquio, Professor Duncan Campbell & Geoff Barker

It wasn't so long ago that flying robots were the stuff of science fiction. Now we can see that UAVs (unmanned aerial vehicles), also known as drones, are reshaping our world. While drones are changing the face of military operations, this has perhaps overshadowed the significant applications for agriculture, mining and resources, emergency services, building and construction, creative industries and sport.

Brisbane is home to key areas of this developing sector, from the R&D conducted by QUT's Australian Research Centre for Aerospace Automation (ARCAA), to UAS Pacific – applying 30+ years' Airline Industry experience to the provision of Australia's leading commercial drone services, and now also the emerging sport of first-person view (FPV) drone racing. The sport involves small, custom-built drones with attached cameras that broadcast video feeds to specially-designed goggles that allow pilots to see what the drones see. Recently, the first US National Drone Racing Championships were held in California, where Brisbane local Chad Nowak took home the crown, beating a field of 120 contestants.

Our expert panel will talk about their vision of the future for this rapidly evolving technology driven by DIY hobbyists, startups and university research centers. Chad Nowakand fellow contestant Mark Cocquio will speak about their success in the competition, and the emerging sport of drone racing. ARCAA Director, Professor Duncan Campbellwill speak about the success of the international UAV challenge, driving innovation in the sector, and the theme for the 2016 UAV Challenge Medical Express. Director of UAS Pacific Geoff Barker will speak about the business opportunities derived from this new technology and compliance with regulations that govern the commercial operation of drones.

PANEL DISCUSSION – THE LOVELACE TEST: CAN ROBOTS BE CREATIVE
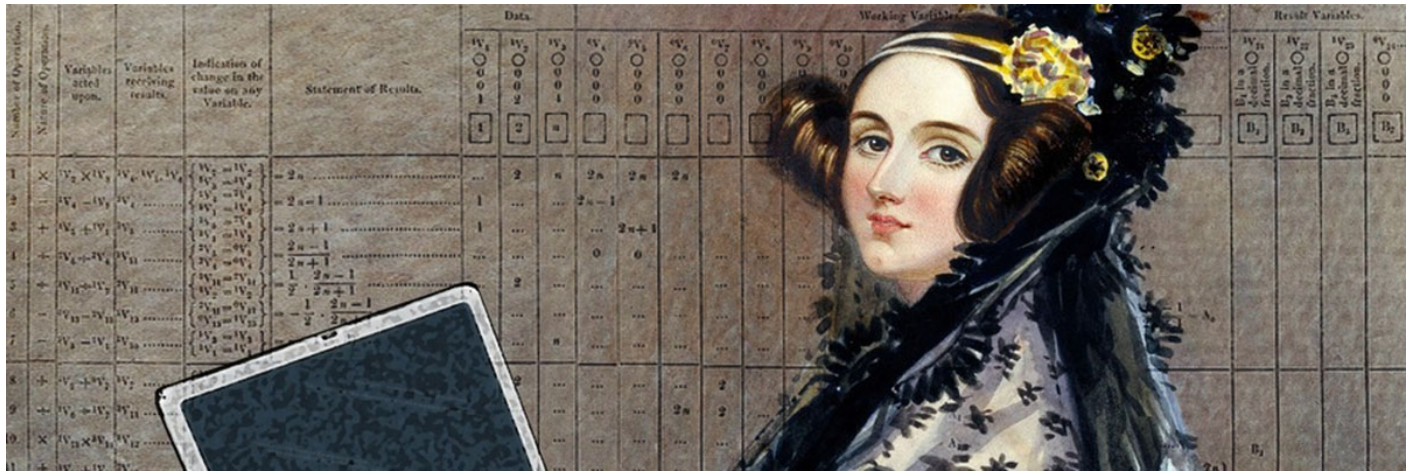
Chair: Professor David Lovell
Speakers: Jared Donovan, Michael Milford & Kim Vincs

The Lovelace Test named to honour one of the world's first computer programmers, the 19th century mathematician Ada Lovelace, is a test to see if artificial intelligence (AI) is on par with humans. AI would pass the test if it develops a creative artifact such as a painting or poetry that displays human like creativity. Stephen Hawking recently warned that advances in AI such as successfully passing The Lovelace Test could ultimately lead to the downfall of humankind. Why do we want our robots to be creative and what uses could this serve? Our panelists will discuss the current state of creativity and robots and how advances in AI may open up new opportunities. Will robots become our creative collaborators of the future?

Professor Kim Vincs is the Director of the Deakin Motion.Lab, Deakin University's motion capture studio and performance technology research centre, which she established in 2006. Her research brings together scientific, technological and artistic methodologies to develop new ways of creating dance performance. In 2014 the lab presented Emergence, a duet performed between a human dancer and an artificially intelligent performing agent co-created by John McCormick, Steph Hutchison and an AI agent.

Dr Jared Donovan is a lecturer and researcher in Interaction Design at QUT's Creative Industries and co-director for the Robotronica closing performance. His research interests include uncovering better ways of interacting with computer technologies.

Michael Milford is an Associate Professor and Future Fellow at QUT who conducts research at the boundary between robotics and neuroscience. His lifelong passion is to understand what makes us intelligent and creative and how robots can be the same.

PANEL DISCUSSION – EDUCATION OR LEARNING? CONSUMER OR PARTICIPANT? MIND THE GAP

Chair: Jacina Leong
Speakers: Professor Erica McWilliam, David Byworth & Chelsea Edmonds

The Committee for Economic Development of Australia (CEDA) recently predicted that almost 40% of Australian jobs had a "moderate to high" likelihood of disappearing in the next 10-15 years. This is just one of the many seismic changes predicted to occur due by advancements in robotics. What are the skills we require to be successful in a robotic society and where will you be able to develop them? Our panel of experts will examine the changes on the horizon and the different education and pedagogies required. Is there a widening gap between what formal educational programs deliver and the learning we need to live well in this century? What might educational well-being look like above and beyond academic success?

Professor Erica McWilliam has extensive experience as a secondary school teacher, teacher educator and writer. Her research focus is on creative capacity building for 21st century living, learning and earning and is an adjunct professor in the Creative Workforce 2.0 Research Program in the ARC's Centre of Excellence for Creative Industries and Innovation at QUT.

David Byworth is the manager of the first Australian MIT-Fab Lab established in Adelaide in 2012. Fab Lab Adelaide is a community workshop where new products and creative works can be designed and made, using digital fabrication equipment including 3D printing.

Chelsea Edmonds is a fourth year student at UQ studying software engineering and maths and is the is the Regional Executive Director of Robogals Asia Pacific, a student run organization that aims to increase female participation in engineering, science and technology.

PERFORMANCE LECTURE: FRIEDRICH KIRSCHNER
SOCIAL FICTION AND THE FUTURE
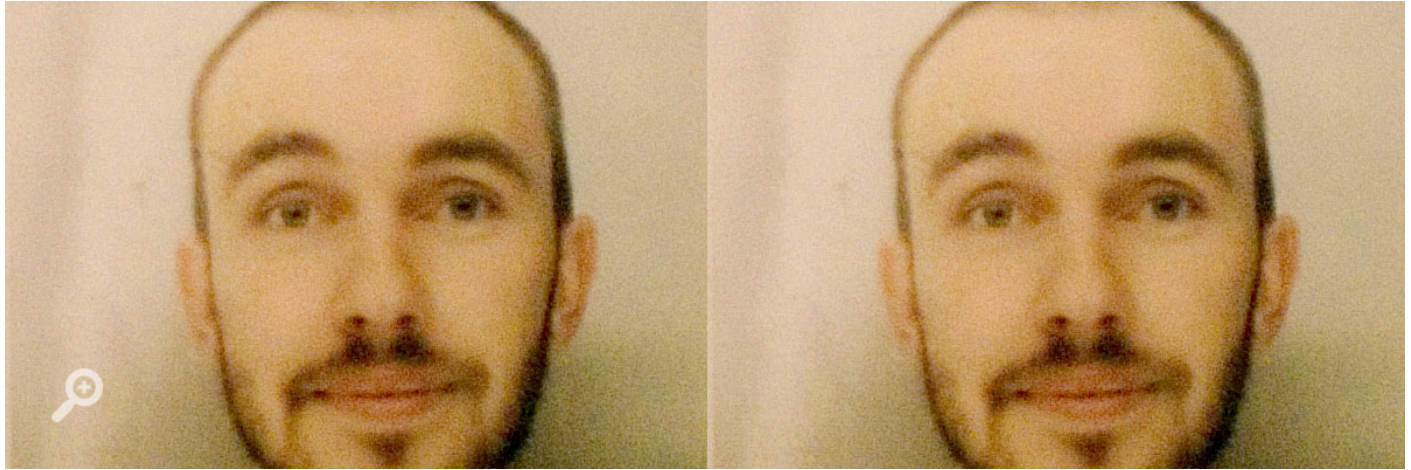
In this performance lecture by Friedrich Kirschner, co-founder of the Society for Cultural Optimism he will illustrate the value of speculative social simulations as a productive way for thinking about a possible future. Simulation is a well known approach found within many computer games and the Society for Cultural Optimism has borrowed this gaming framework and applied it to real time invented situations as a research method for exploring our possible futures.

Friedrich Kirschner is a theatre director, software developer and digital artist. He re-purposes video-game structures and technology to create participatory performances and real-time interactive experiences. He is currently Professor for digital media in Puppetry at the University for performing arts "Ernst-Busch" in Berlin and in 2014 he established with Christiane Hütter, The Society for Cultural Optimism. They develop site specific social games that engage participants through overwhelming optimism. They are currently here as part of six week residency program at QUT where they will be conducting a number of simulation experiments including one specially developed for Robotronica. You will be able to find them at their base camp at Robotronica in the Dining Room at Old Government House.

ADAM BEN-DROR
CREATIVE TECHNOLOGIST & DESIGNER FOR ANIMALS

In primary school, Adam's irresistible urge to hack, re-engineer and reimagine the world around him inspired a redesign of the family vacuum cleaner, reversing its action, leaving a huge mess of dust and debris on the lounge room floor. In high school, a swift hack got the school clock to tick backwards. His concerned parents sent him to design school and he is now a designer with Alt Group in Auckland, New Zealand.

Adam will speak about his practice and how he creates beautiful objects that are designed to inspire debate, provoke thought or simply bring about delight. His work spans a continuum of art, design and technology, and explores the boundaries between functional purpose and whimsy. He also has a particular interest in design for animals, and has an ongoing project exploring pigeons in our urban landscapes. Two of his creations, The Abovemarine and Pinokio, are featured at Robotronica. Pinokio (in collaboration with Shanshan Zhou) was featured in the 2014 exhibition Digital Revolution at the Barbican Center in London.

LEGO® EDUCATION ROBOTS

Kids can join in the fun with the Robotics@QUT team to explore LEGO® robots. Robotics@QUT introduces kids to the wide possibilities of robotics: from driving remote control robots, to drawing with creative robots, and using sensors to complete fun challenges.

The Robotics@QUT Widening Participation Program is a joint Faculty of Education and QUT Equity Services program, delivering engaging STEM learning experiences for students and teachers. The program supports pre- and in-service teacher STEM education and builds school students' aspirations to pursue an education in STEM areas

BUILDACODE

Buildacode is a music-building interactive for kids! By placing and reconfiguring soft building blocks, kids can generate sounds and create their own musical soundscape. Mónica Rikić, the artist who created *Buildacode*, calls this [Tangible Sound Programming](#).

Mónica is an interactive artist and programmer from Barcelona, with a Fine Arts degree from the University of Barcelona and a Masters in Digital Arts from UPF (Barcelona). *Buildacode* was selected as a semi-finalist of the 2015 Margaret Guthman Musical Instrument Competition held at Georgia Tech, Atlanta.

The work was realised as part of the [EMARE](#) Move On residency at [The Cube](#) with support of the Culture Programme of the European Commission and the [Goethe Institute](#) and [Werkleitz Centre for Media Arts](#) and has been exhibited at the Ars Electronica Center (Linz).

SUPER BOX FRIENDS

SUPER BOX FRIENDS

Enter a world of crawling, walking, rolling box friends! These weird and wonderful box creatures will need your help tending to them so that they don't bump into each other. A robot hospital along with friendly box attendants will be on hand in case of any emergencies, so don't panic!

By Cake Industries (Jesse Stevens & Dean Petersen)

ROBOT STORY TIME

Meet Radius, the humanoid robot. This colourful robot's purpose is to educate and entertain children of future generations.

Radius is able to tell various stories to groups of children using his voice and gestures. He also utilises screens to illustrate the story and assist with the plot. These engaging interactive story times include conversations with onscreen characters, quiz times, and lots of silly fun. Jesse and Dean are on hand in costume to perform and assist.

By Cake Industries (Jesse Stevens & Dean Petersen).

It is recommended that a parent or guardian attend this performance with their child as the Robot can sometimes be a little scary at first. Please let us know when you book how many children and how many adults you are booking for.

QUT GLOBAL GOGGLES AT ROBOTRONICA

Virtual reality is here and it's bringing the world closer than you think.

QUT has developed an amazing virtual reality experience and it's yours by downloading the App to your device.

If you have a VR headset you're all set to go. No headset? Don't worry you can grab a free headset at Robotronica.

Let QUT take you into a world where anything is possible.

QUT Global Goggles

HIVE

Want to capture your experience of Robotronica and have it shown on The Cube? Just download HIVE to your smartphone and get filming!

HIVE is an ongoing artistic research experiment developed by Ars Electronica and QUT for collecting and contextualizing video content. It is a cross-media system for crowdsourced video documentation. Here's how you can get involved:

- Download the app from your device's App Store - simply search for "Robotronica HIVE"

- Make your own hive by entering a personal tag in the app

- Film your favorite parts of Robotronica, and don't forget to tag them!

- View your tagged videos on The Cube

CODER DOJO

CoderDojo Brisbane is a coding club for 7 – 17 year-olds to explore technology, learn how to code, and develop websites, apps, programs, and games. CoderDojo is a global movement of free, volunteer-led, community-based coding clubs for young people. CoderDojo Brisbane is proud to be the first CoderDojo running in Australia and is a Brisbane Marketing initiative of the Digital Brisbane Strategy. Head along to their stall at Robotronica to find out more and CoderDojo Brisbane and how you can get involved.

Anybody can learn – 60 second teaser

THE BRAINERY
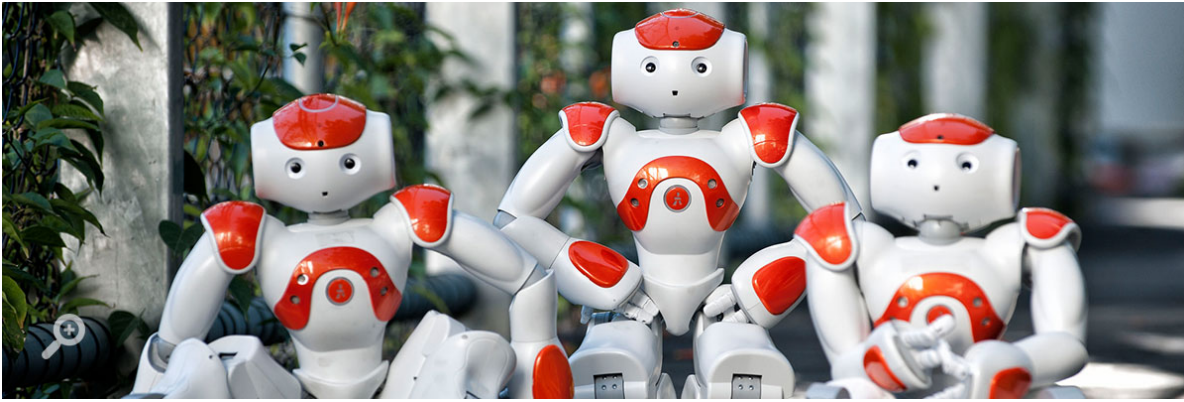
Come and visit the The Brainary stall on the Kidney Lawn! The Brainary is the Australian & New Zealand distributor for the NAO humanoid robot and a supplier of world-leading educational resources. You can find out about The Brainary's in-school robotics workshops delivered in conjunction with several Australian university partners and how NAO can help you learn!

Every hour on the main stage you can find The Brainary's NAOs showing off, from storytelling, to dance performances, Tai Chi and Yoga – don't miss out on seeing what NAO can do!

QUT RESEARCH LAB GUIDED TOURS

What does an atom look like? Find out on a tour of the laboratories of QUT's Central Analytical Research Facility. See what the world looks like through an electron microscope, an X-ray diffractometer and various other cutting-edge scientific instruments. Learn how QUT's scientists use these machines to uncover the mysteries of nature and develop new technologies and materials.

MAKERS EMPIRE

Makers Empire is the world's easiest to use 3D printing software. Users can start designing in 3D in seconds – no CAD or IT skills necessary!

Makers Empire's 3D design and printing Learning Program for primary schools is the first of its kind developed anywhere in the world. They help teachers achieve real learning outcomes, engage students in STEAM topics, and become confident teachers of 3D printing technology. They help students enjoy learning through appealing and inspiring curriculum-aligned lesson plans.

3D printing technology is being used every day to make people's lives better: like computing, it has potential application in almost every single industry. So students with 3D printing experience have a clear advantage over their peers in terms of future tertiary education and career prospects.

To find out more about how you can help today's students prepare for the jobs of tomorrow, come and visit Makers Empire at Robotronica - you can try your hand at designing a robot, check out QUT's 3D printer in action and submit your designs to win your very own 3D printed robot!

SOCIETY FOR CULTURAL OPTIMISM CASE CAMP

The Society for Cultural Optimism will be undertaking research at this year's Robotronica, in the form of a social and technical speculation laboratory. Their aim is to gather data on possible human-robot relationships by running some speculative social simulations that you are invited to participate in. To get involved come to their base camp, operational all day at Old Government House. The simulations conducted at Robotronica will inform a larger project taking place at QUT over the coming weeks that seeks to explore a possible future society where the boundaries between the virtual and the physical have completely evaporated.

The Society for Cultural Optimism was established in Berlin in 2014 by Friedrich Kirschner and Christiane Hütter. They develop site specific social games that engage participants in overwhelming optimism. They are currently here on a six week residency program at QUT.

NOMENCLUSTER ON THE CUBE

Brett Interact with Nomencluster on The Cube where you will be able to create your own designs made from images of famous robots, circuits, programming languages, machines, and industrial robots.

Nomencluster was designed by Jason Nelson, with the help of programmer Matthew Horton as part of the Cube's Australia Council for the Arts Digital Writing Residency program. Nomencluster has been specially adapted by Petra Knapp to the theme of Robotronica and is a highly interactive digital artwork and poem that explores the space as a drawing and creative play environment.

Jason and Matt wanted to transform The Cube into a dynamic artwork, a space where hand movements – the swipes and presses – across the screens would create truly beautiful collages of code, image and design.

In this workshop you'll learn basic mechanics, and build your very own wind-up automata to take home. No batteries required!

VISUALISATION AND E-RESEARCH (VISER)

Want to get a taste for cutting-edge virtual reality? Want to learn more about The Cube? Visit the ViseR team on Level 6 to see how QUT's group of specialist programmers, designers, and project managers develop cutting-edge projects and facilities in QUT and around the globe.

ROBOTICS AND AUTONOMOUS SYSTEMS

The Robotics and Autonomous Systems discipline creates robots and robotic systems that can operate in and interact with the world in the same complex ways as humans. Their projects span a wide range of areas including robotic vision, sustainable agriculture, lifelong autonomy for robots, neuroscience and robotics, as well as flying, ground and underwater robotics. Several major robotics initiatives based at QUT include the Australian Research Council's Centre of Excellence for Robotic Vision (ACRV), the Australian Research Centre for Aerospace Automation (ARCAA), and the Strategic Investment in Farm Robotics (SIFR). QUT also teach a range of introductory and advanced robotics courses and have pioneered free Massive Open Online Courses (MOOCs) in robotics and robotic vision. Check out the Robotics and Autonomous Systems stall at Robotronica to find out more.

UAS PACIFIC

[UAS Pacific](#) is one of Australia's leading UAV (drone) companies, applying the most advanced unmanned aerial vehicle technologies to solving real world problems.

Come and take a look at some fully operational unmanned systems on the Kidney Lawn. Talk to the UAS Pacific team to discover the myriad of ways in which UAVs are improving outcomes for engineering, survey and emergency services organisations to name a few.