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A METEORITE HUNTER’S GUIDE
Cite (sət) v. To put forward thought-provoking arguments; to offer insightful discussion and new perspectives on topics of social, political, economic or environmental relevance; to report on new thinking. Sight (sət) n. A feature or object in a particular place considered especially worth seeing. v. To frame or scrutinise community, research and business initiatives; to present points of view on current issues. Site (sət) n. The location of a building or an organisation, esp. as to its environment. v. To place or position in a physical and social context.

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CONTRIBUTING WRITERS

KIM COUSINS
Kim is a journalist, tutor and student whose research focuses on media, marketing and information delivery. She also writes about business, health and social issues.

SUE EMMETT
Sue is a freelance writer and photojournalist, with special interests in science, technology, Western Australian business, education and the marine environment.
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Rohan McDougall highlights the significant role of universities in the Federal Government’s National Innovation and Science Agenda.
As universities across the globe, including Curtin, expand their online course offerings, the relevance of the physical campus is increasingly challenged. The question is: How do we maximise the value of our physical premises in an environment that’s increasingly digitised?

There’s no simple answer, but it is clear that the modern university can’t afford to stand still. We need to extend the idea of the university campus as a place that solely supports study and research, to a place that fosters collaboration and innovation between students, academics, researchers, industry, government and the community.

Already in 2016, we’ve taken some great strides in this direction. The opening of two new city premises serves to strengthen our ties with the state’s commercial hub (see In Pictures on page 23) while the new medical school building and the beginning of a new main street precinct at the northern end of the Bentley Campus offers a glimpse of the long term vision for Greater Curtin, which will see new student accommodation, university facilities, public spaces and associated retail amenities attract a new mix of visitors to campus.

This ongoing evolution will yield many benefits for our teaching and research, as well as the wider community, as we improve our existing relationships and forge new ones. Our efforts to collaborate are already being recognised, with Curtin named the most collaborative university in Australia by the Nature Index in April and also the biggest Australian mover in the index.

The ‘most collaborative’ title is based on our contributions to high-quality natural science journals that include co-authors from outside Curtin. Geology and astronomy are two of our most prolific outputs in the natural sciences.

In this edition of Cite, we speak to Professor Phil Bland, whose work as a planetary geologist spans both these fields. Professor Bland is analysing meteorites to help answer fundamental questions about the origins of the Solar System and ultimately, life on Earth (see page 10).

We also explore the implications of solar storage technology, which has the potential to greatly reduce our reliance on fossil fuels, but will also require a careful rethink of our energy distribution model (see page 6).

In an inspiring story on page 18, we speak to academics who, through a variety of projects, are helping people with autism to integrate more successfully into society and the workforce.

Finally, I’d like to acknowledge our Olympic hopefuls as they prepare to represent Australia in Rio in August (see page 26). University study alone can be challenging without the pressures of elite sport, but some of our students have been able to successfully balance both. I wish them the best of luck.
Acclaimed street artists from across the globe joined forces with high profile local artists in April to transform Curtin’s vast concrete buildings into eye-catching murals. The works were organised by not-for-profit arts organisation, FORM. See page 5 for more.

Clockwise from top: Hayley Welsh, Perth; Millo, Italy; Chris Nixon, Curtin graduate and Perth artist.
Curtin’s WA-Organic and Isotope Geochemistry researchers will play a major role in an international project to understand how life recovered and repopulated Earth following the catastrophic asteroid impact event 66 million years ago that is associated with the extinction of the dinosaurs.

Curtin’s WA-Organic and Isotope Geochemistry researchers will play a major role in an international project to understand how life recovered and repopulated Earth following the catastrophic asteroid impact event 66 million years ago that is associated with the extinction of the dinosaurs.

Geomicrobiologist and ancient DNA expert Associate Professor Marco Coolen will be the only representative from Australia to visit the drilling site to obtain samples, which will be frozen and shipped to Curtin University for further analysis.

John Curtin Distinguished Professor Kliti Grice, a widely recognised expert in molecular fossils and mass extinction events, says the team will be applying an innovative approach to study the environmental factors accompanying life during and after the impact event.

“This international research effort will yield critical insights into how this major mass extinction impacted the evolution of life on a planetary scale,” Professor Grice says.
CURTIN EXPANDS ITS CITY PRESENCE

Curtin University has strengthened its city presence with the official opening of Curtin University St Georges Terrace and Curtin University Law School’s city premises in the Perth Central Business District.

Curtin University St Georges Terrace, operating in the former Old Perth Boys’ School building, will act as a hub for community and stakeholder engagement. Located at the entrance to Brookfield Place on 139 St Georges Terrace, it will connect with city-based alumni and prospective students and provide a central location for the public to pick up undergraduate and postgraduate course information.

At 57 Murray Street, Curtin University Law School is offering a new form of legal education for students by drawing the real world of legal practice into the classroom. When fully operational, it will include a law clinic specialising in small business disputes, and private barristers’ chambers, exposing students to the culture, community and ethics of legal practice early in their studies.

Curtin Vice-Chancellor Professor Deborah Terry says the new buildings “will help strengthen the University’s links with the business, legal and commercial heart of WA”.

See ‘In Pictures’ on page 23 for more.

05 / CURTIN SPLASHES OUT IN COLOUR

PUBLIC Campus 2016 attracted high-profile street artists from all over the world, including some homegrown talent, to create larger than life installations on prominent buildings at Curtin’s Bentley Campus.

The annual festival of urban activation and art was an initiative to bring public art to the community through FORM, an independent non-profit organisation that has helped advance artistic and creative practice in WA since 1968.

Each work reflected the artist’s individual talent and complemented the space around it. Lettering used on old Tunisian coins was recreated by calligraphy artist Karim Jabbari on Building 208, where many Curtin writing classes are held.

As well as providing a space for the artists’ murals, Curtin hosted a sold-out forum where guest artists and their appreciative audience could meet each other.

Curtin Vice-Chancellor Deborah Terry says she is delighted that Curtin partnered with FORM.

“As a leading centre for design, art, architecture, urban planning and research, Curtin is the perfect venue to embrace large scale, innovative, artistic expression,” Professor Terry says.

form.net.au/public2016

06 / CURTIN NAMED MOST COLLABORATIVE IN AUSTRALIA

Curtin University has been announced as the most collaborative of the Australian universities and the biggest Australian mover in the Nature Index results for 2016.

The Nature Index is a database of information collated from research articles published in a group of 68 high-quality natural science journals.

The Nature Index is built on an institution’s contributions to about 60,000 high-quality papers each year and counts both the number of papers and the relative contribution of the authors.

“The Nature Index identifies that overall Curtin has very strong collaborations in Australia as well as key international collaborations. Curtin’s collaboration with CSIRO is a standout,” said says Curtin Deputy Vice-Chancellor Research Professor Graeme Wright.

“Further, it identifies Curtin as the most collaborative of the Australian universities included in the index.

“Curtin improved by a compound annual average of 22.2 per cent between 2012 and 2015, making the university the biggest Australian mover in the index, and the third highest mover globally,” Professor Wright says.

natureindex.com

The shallow waters of the Yucatán Peninsula, site of the meteor impact thought to have led to the extinction of the dinosaurs.

NASA IMAGE COURTESY THE MODIS RAPID RESPONSE TEAM AT NASA GSFC
The shifting of power, is off-grid the answer?

A boom in new battery storage options for solar panel electricity has the potential to transform home energy usage. With sunny Australia well-positioned to take advantage of the new technology, how many of us will choose to abandon the traditional electricity grid and power our homes independently – and at what cost?

THERE’S a revolution heading for Australian homes: a device that allows us to take power into our own hands: the home storage battery, which stores power generated from solar panels during the day and releases it on demand, giving us power 24 hours a day.

Dubbed the “missing link” of the renewable power industry, the popularity of the new battery is set to soar. According to a report by the Climate Council, more than a million Australian homes are expected to install one within five years, with Australia tipped to become the number one market for home battery storage by 2018.

Traditionally, living off the grid was viewed as the ultimate ‘greenie’ lifestyle and too expensive for many Australian families. But when Tesla launched the ‘Powerwall’ in January this year, it generated huge community interest through social media and helped forge a clear pathway for independent power to move into mainstream living.

Homeowners now have the potential to not only sidestep rising utility bills, but also go off the grid altogether.

However, the consequences of doing so could be far-reaching and the question of whether homeowners should abandon the central electricity grid is open for debate.

The Federal Minister for the Environment Greg Hunt envisages a time when a significant number of Australians become independent of the electricity grid. He told ABC’s Lateline in October, “It’s inevitable. We have about 15 per cent of Australians, the highest level in the world, who have solar power. Increasingly, we will see the adoption of storage, which is the key thing that allows people to be off-grid. This is clearly the future.”

The pioneering Powerwall system is a compact seven-kilowatt hour lithium ion battery, sufficient to power most homes through the evening peak using electricity generated by solar panels during the day. It neatly affixes to a house wall, connecting to solar panels on the roof, an inverter and a meter.

Predictions of its success are linked to a change in attitude towards renewable energy in Australia, which is gaining momentum. Australians are embracing the need for collective efforts to tackle the threat of climate change. Through using solar power generated from their own rooftops and stored for later use, homeowners can reduce the environmental impacts of fossil fuel power generation while downsizing their own carbon footprints.

On top of this, installation costs could soon be outweighed by the financial returns. Curtin University Professor of Sustainability Peter Newman says people are already reaping the benefits of battery systems that pay for themselves from reduced or negative power bills, with Perth leading Australia in the move to home energy systems.

“Turning points in green energy innovation can create new demand and be cost-competitive as early as 2018. A 6-10 kWh system currently costs between A$10,000 and A$20,000, but prices are likely to drop as more people purchase them. Retail competition is strong, with home energy storage systems from BYD, Samsung and LG joining the market, and power distributors such as Queensland’s Ergon Energy and WA’s Alinta Gas trialling new leasing programs. According to the Climate Council, going off the grid could be as cost-competitive as staying connected as early as 2018.

CEO of Solar Balance and Adjunct Professor at the Curtin University Sustainability Policy Institute (CUSP) Rod Hayes has seen a huge increase in sales. Solar-storage energy systems are running out the door for off-grid and on-grid applications,” he says.

In Western Australia, the technology has been scaled up to include strata homes and whole suburbs, such as the One Planet Community development in White Gum Valley in Fremantle, for which CUSP received a Federal Government ARENA grant worth more than $500,000 to install the development with PV and batteries and monitor the results over several years.

In the One Planet Community, excess solar power is stored in batteries for use at night and also exported to the grid during the day and converted to a credit, delivering benefits to both resident and developer.
"Our research has developed the concept of a micro grid for solar and storage on strata apartments," says Curtin University Research Fellow Jemma Green, who is working on the four-year project. "The solar panels and batteries sit on the strata and are owner-managed by the strata manager. This allows tenants to pay their electricity bill to the strata company, providing an additional revenue stream to owners to justify the capital investment in solar and storage. In other words, strata companies can effectively become small utilities," she explains.

But on a mass scale, the capacity to move towards a distributed power model puts home energy systems well and truly in the ‘disruptive technology’ bucket, with the potential to significantly affect Australia’s centralised power sector and its three main electricity grids, including the eastern seaboard grid – the largest interconnected power system in the world.

By installing a home storage battery, a homeowner pays less to the power sector and becomes an energy producer rather than a consumer only. This shifts the cost of centralised power infrastructure to customers who have not installed a battery and as a consequence, the grid maintenance costs could become more expensive for those remaining on the grid.

As the adoption of home power systems accelerates, so too will the change from centralised power to distributed power. This raises public debate about who will be ultimately responsible for providing reliable electricity and could even render the current utility business model obsolete within a few years.

"The traditional uni-directional power system is rapidly disrupting," says Newman. "We must adapt to a new, distributed bi-directional energy system."

Newman’s research shows the optimal way forward is for people to have their home power systems working symbiotically with the central grid.

"Evidence shows the existing grid will still be needed, especially for essential services that require constant and large amounts of power such as hospitals; for customers whose own system breaks down, and in densely populated areas where there is not enough roof space to layout sufficient solar PV panels," he explains. "And grid-connected households can feed back their excess electricity into helping cities become regenerative."

Griffith University School of Engineering Professor Rodney Stewart on The Conversation highlighted the need to develop intelligent energy storage management systems that enable communications between the grid transformers and other energy storage devices, including home batteries. These allow excess energy generated by homeowners to be released to the grid on an as-needs basis and could keep grid-maintenance costs down.

"A combined solar PV and battery storage system should not get people thinking they can survive off the grid. Instead, they should be thinking about how they can be part of an intelligent electricity network that delivers efficiencies for all," explains Professor Stewart.

"Intelligent metering combined with a rethink on electricity tariff arrangements such as time-of-day pricing and peak pricing could enable an efficient, cost-reflective pricing regime to take hold in Australia."

Peter Newman agrees. "It’s time for us to show how to make a 21st century grid work as a collection of distributed local power sources," he says. "This is a new kind of energy market, operated by consumers, which will change the way we generate, consume and transact electricity. Facilitating this transition can enable significant economic advantages to a city."

No doubt we can expect to see wide changes in Australia’s energy system as we shift from centralised power to distributed, bi-directional energy generation. In the future, we may not only be powering our own homes and vehicles, but connecting to other power devices and feeding the country’s overall energy demands. And with Australia’s sunshine tipped to become a major resource in a fossil-fuel-free world, the future of solar power is shining brightly.
Ideas don’t have a postcode.

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How to find a meteorite in four ‘easy’ steps

On 27 November 2015 a bright fireball hurtled towards Earth at a velocity of 50,000 km/h. The greenish streak of burning cosmic debris lit up the night sky over Kati Thanda–Lake Eyre in South Australia for a brief six seconds before disappearing from view once more. Soon, the fireball would become just one of the 84,000 meteorites estimated to hit the Earth’s surface every year.

As the outback returned to its usual tranquillity, the quiet whirr of strategically placed cameras signified the beginning of a series of events that would result in one of the most important meteorite recovery operations to date.

Expert meteorite hunter and planetary geologist Professor Phil Bland from Curtin Western Australian School of Mines explains what exactly is involved in tracking and recovering a meteorite.

YOU WILL NEED:

32 DSLR cameras with all-weather housing

a team of really smart people with a passion for science

a small aircraft, or access to one, and good eyesight

two quad bikes

permission from traditional landowners

faith in yourself
STEP 1  DO THE GROUNDWORK

Meteorites may have their origins in space, but the foundations for tracking them are best laid on the ground. On that November evening, an intelligent camera network played a key role in a bold mission to track and recover a meteorite.

“Meteorites are very rare rocks that tell us a lot about the beginning of the Solar System, as they’ve not really been altered since before planets formed,” explains Professor Phil Bland, the man behind the operation. “The problem is, we don’t know where any of them come from.”

In 2012, Professor Bland and his team from Curtin University began work on a prototype for an intelligent mechanical observatory capable of tracking a meteorite’s descent through the Earth’s atmosphere.

Comprising a DSLR camera, weatherproof housing and intelligent software, the observatory offers a simple and cheap (A$8,000) solution to tracking meteorites.

Now, the number of observatories has been scaled up, with 32 located across remote Western and South Australia. This is the Desert Fireball Network (DFN).

Each night, the DFN automatically generates a list of observed fireballs, most of which vaporise before ever hitting the ground. The night of 27 November was no different.

“We see fireballs all the time, so the lists can be quite long,” Professor Bland explains. “It took us a few days to realise that we had observed a big one – and that meant there was probably a rock on the ground. It was then that everything clicked into action.”

STEP 2  PIECE TOGETHER THE DATA JIGSAW PUZZLE

Tracking an object punching through the Earth’s atmosphere at tens of kilometres a second isn’t easy, plus there are distortions in the camera lens that have to be accounted for.

“We looked at the information from each different camera to triangulate the exact trajectory of the fireball,” Professor Bland says. “One of my PhD students has created a model that uses advanced tracking algorithms to work out how quickly a meteorite is decelerating in the atmosphere, and that gives us an idea of the mass of it.”

The team tracked the meteorite from an altitude of 85 km as it descended through the atmosphere. But at about 18 km above the Earth’s surface, the fireball went dark.

“When the light went out, we had to use an advanced climate model to work out how the wind was blowing the rock off course,” he says. “At that point, we finally had an idea of where it was going to be.”

STEP 3  COMBINE THEORY WITH OBSERVATION

But data analysis can only get you so far. In this case, the predictive modelling suggested the final location to be somewhere along a 2 km fall line in the middle of the mainly dry Kati Thanda–Lake Eyre.

With an approximate location in mind, the team organised a scouting mission.

“We sent out a couple of guys to get on a little spotter plane to get a first look,” says Professor Bland. “They saw a feature on the lake that looked like where it might have hit. Now, we just had to figure out how to get there.”

With a visual on a possible impact site, combined with the data modelling from the DFN, it was starting to look like the real deal. This could be the first meteorite that was accurately tracked and recovered with a simple, low-cost camera network. But Professor Bland remained cautious.

“Really, you don’t know whether the technology is going to work,” he says. “You hope it is, you tick every single box you can think of – but at the end of the day, nature can have a way of tripping you up.”

The feature on the lake, seen by a spotter on the scouting mission.
“Unfortunately, between the scouting mission and us getting out there, there was a lot of rain and part of the lake had filled up,” Professor Bland says.

It had been two weeks. With people, accommodation and transport to organise – and across the Christmas period no less – the only part that went smoothly was getting permission to search the lake from the local Arabana people.

On 29 December, the team finally arrived at the lake and began searching. But two days later, they still hadn’t found the meteorite. To make matters worse, the forecast showed heavy rain. The clock was ticking.

“On the last day of our mission, I was actually about as stressed as I’ve been on a field trip. Professor Bland recalls. Knowing this would be their last chance to recover the meteorite before the rain wiped all trace of it away forever, the team organised another spotter plane to search from above.

Meanwhile, Professor Bland and one of his PhD students jumped on the quad bikes to continue the search on the ground. But a light drizzle turned into heavier rain, and forced them to pull part-way off the lake to avoid some of the more serious mud until the rain stopped.

“It was really touch and go,” he says. Suddenly, the aerial spotters radioed in.

“Heads said, ‘We’ve seen it! We’ve seen it!’” He pauses, “But then they lost it again.”

With time against them, he couldn’t wait for aerial confirmation. Leaving his bike, he headed out on foot to where the spotters had first radioed in.

“I was running through the mud, which was really knackering, until finally I saw the little impact crater – but you’re still not sure,” he confides. “You’ve got to have an awful lot of faith in the analysis to even get to this point, and it’s impossible really to do that without any element of doubt in your mind.”

Without any equipment nearby, he dug with his bare hands. He didn’t know it, but the meteorite’s impact had buried it half a metre deep in the mud. With adrenaline coursing through his system, he continued to rip out the thick clay, shredding tendons in his hands as he went.

“Finally, my fingers touched it at the bottom of this dirty, great hole,” he recalls, “and I knew that all of those little pieces in the puzzle had clicked into place.”
The love-heart shaped rock is now undergoing analysis to determine what it comprises and how long ago it broke off from its parent asteroid.

It’s orbit has already been roughly tracked back to the main Asteroid Belt, located between Mars and Jupiter.

“What will be really exciting is when we really get into the detail of that orbit and run the clockwork Solar System backwards in time to see if it matches up with a specific asteroid,” Professor Bland says.

“If our network can continue getting samples of asteroids from down here on Earth, then it becomes a really cheap way of getting data that can help us determine how our Solar System was formed.

“And maybe, it will even begin to answer some questions about the formation and creation of life on Earth.”

Did you know?
Of the 50,000 meteorites held in museums, we only know accurate orbits for 20 of them.

**WHAT HAPPENS NOW?**

**THE LOVE-HEART-SHAPED METEORITE ...**

is about 4.565 million years old, about 20 million years older than Earth.

is probably part of an asteroid that was broken up tens of millions of years ago.

entered the Earth’s atmosphere weighing about 80 kg, but only weighed 1.7 kg by the time it hit the surface.

is a chondrite, or stony meteorite - one of the most common types.

**WHICH SPACE ROCK IS WHICH?**

A meteorite is a piece of metal or rock that survives the journey through the atmosphere and impacts upon the Earth’s surface.

A meteoroid is a fragment of an asteroid, comet or planet that is travelling in space.

A meteor is a rocky object that burns and vaporises upon entry into the Earth’s atmosphere.

An asteroid is a rocky object that’s smaller than a planet and orbits the Sun.

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Online video: Search YouTube for “Phil Bland”
In her element

When most 16 year-olds were enjoying their down time in-between exams, Katherine Downie was winning two gold medals at the 2012 London Paralympics. Four years on, the young swimmer is fiercely determined to add to her medal tally at the Paralympic Games in Rio de Janeiro this September.
BORN in Scotland, Katherine Downie started swimming competitively after her family moved to Australia when she was eight years old. It was her new neighbours who suggested she should develop her swimming skills to avoid being eaten by sharks. Being an impressionable eight-year old, Downie admits she probably took the remark too literally, but she soon started swimming in squads at the local pool and fell in love with the sport.

When she was fifteen, however, Downie’s muscles started to spasm uncontrollably. Doctors diagnosed her with a mild form of cerebral palsy right hemiplegia, a condition acquired from a brain injury when she was born.

Despite her diagnosis, her difficulties with day-to-day tasks involving fine motor skills, co-ordination and strength suddenly made sense and Downie persevered with swimming. As she learned more about living with cerebral palsy, she found she was still in her element in the water.

“After I was diagnosed I kept swimming because I loved it and I found this side of swimming I didn’t know. It opened me up to what it means to be a person with a disability, and how to overcome obstacles and discrimination.”

Former Paralympian Rod Bonsack became Downie’s coach, and a profound influence on her both personally and professionally. He encouraged her to compete in her first international competition at the 2011 Arafura Games, where she won two gold and three silver medals.

“He didn’t take no for an answer. He used to make us do these horrible sets where we’d be kicking along and he’d say, ‘I can kick faster than you!’ and he’s a double amputee from the waist down.”

Downie is currently training to compete in the 200 metre individual medley in Rio. She will receive confirmation of her place at the Games on 24 June.

“At my peak I train nine times a week. I also have an hour technical session, and then I do two gym sessions, a spin session and Pilates,” she says.

She finds motivation through her current coach, Paul Bruce, and her teammates, whose competitiveness inspire her to work harder.

“It’s other people around me doing what they love, getting through the sets and putting in all the hard work. I like working hard and I like the reward at the end of the day … I can also eat whatever I want which is awesome!”

Downie’s bubbly persona belies the intense preparation, pain and personal sacrifices she’s endured to become an athlete.

In 2015, two weeks out from her national trials, she started to experience extreme stomach pain. She had appendicitis, but was back in the pool just days after her appendix was removed, and figuring out a way to still compete.

She swam backstroke in the nationals with two incisions in her stomach, which she says was the most painful experience of her life.

“I saw it as a challenge. I thought if I could do it, nothing would ever hurt as much as that did.”

Competing at an elite level is certainly not for the faint hearted, but competing at an elite level with a disability requires its own kind of strength.

“Due to compensation of using my left side over my right, I get a lot of opposing injuries, so my left side will get more tight than my bad side, and that will be a terrible day in the pool.”

But she admits the real challenge is overcoming people’s opinions of Paralympic sport.

“Seeing me with all four limbs, we are perceived differently from athletes with more obvious impairments, such as amputees or those with severe neurological disabilities.”

“It’s about changing condition, Downie has persevered with day-to-day tasks involving fine motor skills, co-ordination and strength suddenly made sense and Downie persevered with swimming. As she learned more about living with cerebral palsy, she found she was still in her element in the water.

When I look back at places I’ve been and they inspire competitiveness, comradeship and patriotism; it’s beautiful to think what architecture can do for an atmosphere.”

Downie juggles swimming and study through Curtin’s Elite Athlete program, which helps and supports Curtin students who are in a state or national representative sport.

“I know that swimming is not going to last forever, as much as I want it to, so I need to have a higher education,” she says.

Despite being diagnosed with a life-changing condition, Downie has persevered to become an optimistic and determined individual. Though she is tentative about her aspirations for this year’s Paralympics, judging from her past achievements, she is sure to make a splash on the world stage.

“Most of the time all I want to do is to do my best,” she says. “I want to improve on what I’ve done the years before and come out of that race thinking I did everything I possibly could to do that race the best I could.”
For Curtin Fine Art graduate Abdul Rahman Abdullah, becoming a self-employed artist and sculptor was never a question of if, but rather when.

"It chose me," he says.

Working mainly in sculpture and installations, Abdullah draws on his memories of his family and growing up in Australia as a Muslim in the 80s. Each piece tells a story and gives physical form to snippets of Abdullah’s childhood, which he then shares with the wider world.

His autobiographical piece, Wednesday’s Child, located in the Town of Victoria Park, Perth, recalls the morning drive to his family’s local mosque before school.

"Each morning began an hour before dawn. Dressed in pyjamas and a traditional Toppee, we would drive from our family home in Victoria Park to the Rivervale mosque for Qur’an lessons with Imam Abdul-Jalil before the Fajr prayer. I remember those morning drives home from the mosque, watching the world awaken as we returned for breakfast, changing into our uniforms and heading off for another day of school."

"The artwork is a self-portrait at the age of nine, looking back at the formative era of the mid-1980s that marked a growing awareness of my own identity as a Muslim boy seeking a sense of belonging in the Australian social landscape," says Abdullah.

In the Australian art scene, his work is frequently described as ‘magic realist’. Robert Cook from the Art Gallery of Western Australia describes Abdullah’s sculptures as “realistic, but loaded with narrative and personal investment.”

Before deciding to become a full-time artist at the age of 35, art was always part of Abdullah’s life.

"I performed a variety of roles in different creative industries that gave me a lot of the technical skills that I brought to my current role as an artist," he says. These included commercial sculpture, illustration and fabrication, as well as working as a zoo designer building animal habitats, and corporate Christmas designer.

"Curtin offered the most in-depth field of study in terms of contemporary art in Perth," he says. “I was allowed to pursue my interests as an artist. My lecturers understood that most of the learning curve that I was undertaking was occurring in my studio at home.”

Frequently touted one of WA’s prominent emerging artists, Abdullah’s success in the art scene began half-way through the final year of his degree.

"I was offered a solo exhibition at Venn Gallery, which at the time was the best commercial gallery space in Perth," Abdullah says. “The opportunity that they provided to me while I was still a student played a vital role in my career trajectory.”
Abdullah went on to win the Qantas Foundation Encouragement of Australian Contemporary Art Award 2013 (WA recipient), the Credit Suisse Private Banking / Art and Australia Contemporary Art Award 2014 and the Fisher’s, Ghost Sculpture Prize 2014.

In June 2015, he was a finalist in the New South Wales Wynne Prize for his sculpture IN THE NAME.

"Dad used to slaughter sheep in the backyard as a way of getting Halal meat, it just wasn’t really available growing up in suburban Perth in the ‘80s," Abdullah told the Sydney Morning Herald.

"The piece evokes stark imagery for Abdullah: "I would sit with the yearlings, wiping snot from their nostrils and staring into their bulging yellow eyes, buried in the smell of wet wool. Facing death with a whispered prayer, those eyes glazed blue with a spasm of black shit and a spray of arterial red against the asbestos fence.""

Earlier this year, Abdullah’s wooden sculpture Merantau was presented at the Adelaide Biennial of Australian Art 2016.

"To be curated by Lisa Slade [Curator, Art Gallery of South Australia], produce work for such a high profile event and work with Australia’s best artists and art professionals is a dream for me," Abdullah says.

Looking forward, he hopes to continue producing relevant, thought provoking and rewarding bodies of work as his career grows.

Web: abdulrahmanabdullah.com

Wednesday’s Child. 2015, bronze, concrete.

IN THE NAME. 2015, tinted silicone, steel gambrel, galvanised chain, laminate flooring.

IMAGE COURTESY OF THE ARTIST AND THIS IS NO FANTASY + DIANNE TANZER GALLERY
Shining through the spectrum

The diagnosis of autism has risen rapidly, but thankfully, so have our efforts to understand the condition and integrate those with autism into society.

AUTISM, a lifelong condition that involves problems with communication and social interaction, plus restricted and repetitive behaviour patterns, is one of the most prevalent neurodevelopmental conditions in children and young adults. 2012 figures from the Australian Bureau of Statistics show that 154,000, or 0.5 per cent, of the Australian population have autism – a staggering 79 per cent increase on the 2009 figures. It’s estimated that the annual support costs of people with autism exceed $7 billion.

Severity ranges from high functioning or less severe autism, where people with autism generally have normal to high IQs but struggle with social situations, to more severe
autism, where learning difficulties are part of the equation.

A number of programs, events and initiatives are helping Curtin University researchers find ways to more fully incorporate people with autism into society.

Jeremy Marriott from the School of Psychology and Speech Pathology is a sessional lecturer at Curtin University and runs a mobile private practice that treats challenging behaviours of children with disabilities, such as autism, in their natural environments.

He says this increase in the number of people with autism is possibly due to changes in diagnostic methods, not diet, immunisation or other factors often blamed by non-research groups.

“Diagnosis can be difficult as the spectrum is so wide and the variances vast,” Marriott says.

“Autism is still a relatively new condition according to the Diagnostic and Statistical Manual of Mental Disorders (DSM), and in the most recent manual, the DSM-5, the diagnostic criteria has changed significantly.”

Marriott, who has worked as a disability carer and teacher’s aide for more than 20 years, is finishing a PhD titled Music, Arousal and Self-Injurious Behaviour: A 3-Stage Mediating Model for Children with Low Functioning Autism.

His research involved collaborating with pianist David Helfgott to develop music to soothe children with autism.

As part of the research, Marriott collected saliva samples, tested them for stress levels and found that cortisol, a hormone, and alpha amylase, a protein enzyme, were significantly lowered when participants listened to the music.

Marriott hopes his research can be used to help children with autism and make a difference to their lives once they become adults.

“The approach could be used in any controlled setting, such as the doctor’s office or dentist, or other environments where people with autism experience high levels of anxiety,” he says.

RESEARCH is also being carried out through Curtin Autism Research Group, a collaborative collection of academics, PhD and honours students, and volunteers from the general public looking at ways to incorporate people with autism into the workforce.

It’s an important area of study, with the labour participation rate for people with autism at 42 per cent, half that of people without autism or other disabilities.

Occupational Therapy and Social Work Professor Torbjorn Falkmer, leads the group and says creating opportunities for adults with autism to join the workforce is beneficial from a societal and economic perspective and that people with autism have some wonderful skills to contribute to the workforce.

“It’s all about finding different talents and building the potential of these workers,” Falkmer says.

“For example, people with autism are generally great at analysing data, however there are challenges. If they get stuck on a task they can sometimes be stressed.”

“Whilst attention to detail, focus and task delivery is superb, not to mention their work ethics, flexibility is not a strong point of people with autism. However, you can mitigate this with foresight and planning.”

Curtin Autism Research Group is part of the Cooperative Research Centre for Living with Autism (Autism CRC), the world’s first national, cooperative research effort
focused on studying autism in three stages: diagnosis, education and adult life.

There are seven Australian universities involved in the eight year, $104 million project and Professor Falkmer’s group is looking at ways people on the autism spectrum can successfully transition to post school life, participate in higher education, further training and employment, and experience improved health and wellbeing.

The main focus is on longitudinal studies and randomised controlled trials and Professor Falkmer says there is a range of approaches being used.

Eye tracking and electroencephalography (EEG), which detects electrical activity in the brain, are being used together to test cognition processes.

Newer testing methods such as magnetoencephalography (MEG) look at the brain cortex instead of electrical activity and allow for the development of games that use biofeedback to gauge and reward players for face recognition and eye contact, two things that many people with autism find difficult.

CURTIN University has also been integral in the launch of the Academy for Software Quality Assurance (AASQA), aimed at leveraging the unique skills of people with autism for the software testing market.

AASQA and the Australian Computer Society Foundation have developed Australia’s first information technology internship designed for people with autism, and Bankwest is on board as an employer.

AASQA Deputy Director, Curtin Associate Professor Tele Tan, says this industry approach is needed to ensure younger people with autism are given the chance to gain fulfilling employment while filling gaps in the Australian information and communications technology industry.

“There’s a natural link between people with autism and software testing,” Tan says.

“We noticed employment issues for graduates with autism – even with qualifications they couldn’t get jobs due to poor performance at job interviews, which is a huge obstacle.

“We want employers to see the merits of employing people with autism.”

These merits include attention to detail, highly developed problem-solving skills and a tenacity to go through computer codes with a fine-toothed comb.

However issues surrounding communication and work expectations can arise for employers.

“AASQA has also set up procedures for educating employers on how to understand and care for staff with autism, enabling optimum job design processes and assisting in long-term employee retention,” Tan says.

So far, three interns have been employed by Bankwest as undergraduate software testers.

One of the interns, Michael New, says his job is generally quite time consuming as it involves a lot of manual testing, but he’s gained a lot of confidence from it.

“My job at Bankwest involves working within a team to test various Bankwest systems and ensuring that they perform as expected,” New says.

“When they don’t perform as expected, it’s my and my team’s job to identify why and escalate the problem to the relevant team.

“Three weeks in, and I am working on a project to automate a testing procedure. By automating this process, human error can be mitigated as well as time and manpower.”

New also appreciates the office environment, where he is encouraged to work with other interns but on their own terms.

“I like that I’m not suffocated by a small cubicle. Instead I share a table with my fellow team members.”

New’s experience is one that researchers say they want to see more of.

“People have to recognise autism as a disability and get over the stereotypes,” Marriott says.

“I want to celebrate diversity in autism. Everybody is different.”

WHAT’S ON

AUTISM OPEN DAY
AT CURTIN UNIVERSITY
Sunday July 17
news.curtin.edu.au/events/autism-open-day

CURTIN AUTISM RESEARCH GROUP
Meets monthly (all welcome)
Email Dr Elinda Lee: elinda.lee@curtin.edu.au

CURTIN SPECIALIST MENTORING PROGRAM (CSMP)
curtin.edu/csmp
Over the last ten years, Professor Andrew Whitehouse has become a local and national champion of autism spectrum disorders (ASD) research.

As the author of *Will Mozart Make My Baby Smart?*, Whitehouse’s research has attracted worldwide media interest from *TIME*, *The New York Times*, CNN and the BBC, and he has won numerous awards and accolades, including *WA Business News* 40 under 40 (2012). Most recently, he was awarded the Professional Achievement Award for Health Sciences at the 2015 Curtin University Alumni Awards, which recognises the outstanding accomplishments and excellence of a Curtin graduate in the field of health.

Whitehouse’s first exposure to autism was through a family friend whose son had the condition. As a Curtin graduate in Speech Pathology, he provided language therapy to adults and children with ASD. But it wasn’t until he travelled to the UK for post-doctorate studies that he began to specialise in ASD research.

Now Whitehouse is the head of the Developmental Disorders Research Group at the Telethon Kids Institute, where he and his team are investigating the genetic and neurodevelopmental causes of ASD and language impairment.

“It sounds uncomfortably trite, but I feel most proud of developing a highly active research program that has not lost its primary focus of helping families touched by autism,” Whitehouse says.

ASD disorders are typically diagnosed between the ages of two and five years. In Australia the average of diagnosis is 4.5 years – leaving a lot of room for improvement, according to Whitehouse. Years of anecdotal evidence, and recent research from the University of Washington, show that the earlier ASD is detected, the more effective the therapy.

Currently, it is difficult to positively diagnose ASD earlier than 24 months for several reasons, such as the fact that there is no one clear cause of ASD and that infants are not neurologically developed enough to have recognisable ASD symptoms.

To this end, Whitehouse has created a “constellation” of factors to determine if infants at 12 months of age with developmental difficulties are likely to go on to develop ASD. Factors can include having a family history of ASD, as well as behaviors such as a lack of eye contact and inattention to human speech that indicate a breakdown of innate social behaviors that can lead to ASD.

“By trialing new therapies with infants, when the brain is at its most changeable, we hope to have an even more positive impact on their development and long-term outcome,” Whitehouse says. His goal is to reduce the national average of ASD diagnosis from 4.5 years to two years.

“I am ridiculously excited about this project,” Whitehouse says. “There aren’t too many jobs where you get to exercise both the nerdy side of your personality, while also satisfying deep-rooted ideals of compassion. My area of science really allows this, and I love it to bits.”
Curtin extends its global reach.

Celebrating a partnership with a world-leading education platform.

Curtin University has been accepted to join edX, a consortium of elite higher education institutions established by Harvard and MIT, which offers interactive online classes and Massive Open Online Courses (MOOCs). We’re the only WA university and only the fourth Australian university in this bold initiative that partners with international universities recognised for their cutting edge innovation and transformative, online learning opportunities.

Engage with this future-focused platform by registering now at curtin.edu/edx
Two of Perth’s oldest inner-city premises are Curtin’s newest. Joining the already-established Curtin Graduate School of Business, the new premises will help strengthen Curtin’s links with industry and alumni in the heart of the city.

Curtin’s Graduate School of Business paved the way for Curtin’s expansion to the city in 2002 when it moved into the old Government Printing Works building at 73 Murray Street. Built in stages between 1891 and 1907, the red brick building was restored in 2000. Respect for the heritage of the building is complemented by new design features in a dramatic fusion of old and new.
At 139 St Georges Terrace, Curtin University’s new hub for community engagement is housed in the oldest stone building in the Perth central business district.

Built in 1854 in the Gothic Revival style, the building has accommodated the Perth Boys’ School (1854 - 1897) and two of Curtin’s predecessors - Perth Technical School (1900 - 1969) and the Western Australian Institute of Technology (1970 - 1976).

From 1977, the National Trust of Australia (WA) has managed the building on behalf of the community.

Curtin’s leasing deal with the National Trust in 2015 allows the building to come full circle. Our acquisition ensures the building - Perth’s oldest educational landmark - will once again be synonymous with innovation and high-quality education.

Now celebrated for its colonial heritage, the people of Perth once thought the small building would be destroyed. In the 1947 book Perth Boys’ School, 1847-1947, WA author John K. Ewers wrote, “the old building is doomed to early destruction to make room for something more up-to-date and useful.”
Redefining the Classroom

Curtin University Law School’s new inner-city teaching premises at 57 Murray Street will deliver legal education for a new generation, facilitating formal and informal interactions between staff, students and in-house legal professionals. The heritage-listed building, which has undergone significant restoration work by the National Trust and Curtin, includes a law clinic specialising in small business disputes, and private barristers’ chambers, exposing students to the culture, community and ethics of legal practice early in their studies.

Left to right: Foundation Dean of Curtin Law School, Professor Paul Fairall, Vice-Chancellor Professor Deborah Terry, the Hon. Chief Justice Wayne Martin AC QC and Christian Porter MP.
Twelve Olympic hopefuls from Curtin are balancing their studies with gruelling training schedules in the lead up to the 2016 Olympic Games in Rio de Janeiro.

“The intensity at training has lifted so much more than previous years,” says Jane Claxton, member of the Australian Women’s Hockey Team. “Mainly because every other country in the world is lifting so you need to improve your performance, and improve your ability to compete against them.”

“[Study] gives a sense of normality that you need in your life,” says kayaker Steve Bird. “It’s actually an amazing challenge and very rewarding to know that I’m not just a kayaker.”

We wish our student athletes the best of luck in their 2016 Olympic campaigns.

MEN’S HOCKEY:
• Matthew Swann – Bachelor of Commerce (Accounting and Finance)
• Aran Zalewski – Bachelor of Commerce (Finance and Marketing)
• Simon Orchard – Bachelor of Commerce (Public Relations and Journalism).

WOMEN’S HOCKEY:
• Jane Claxton – Bachelor of Science (Occupational Therapy)
• Kathryn Slattery – Bachelor of Agribusiness
• Emily Smith - Bachelor of Commerce.

SYNCHRONISED SWIMMING:
• Amie Thompson – Bachelor of Engineering.

SPRINT KAYAKING:
• Steve Bird – Bachelor of Psychology.

GYMNASTICS:
• Lauren Mitchell – Bachelor of Science (Medical Imaging).

MEN’S WATER POLO:
• Aaron Younger – Bachelor of Commerce (Accounting and Finance)
• Joel Swift - Bachelor of Commerce.

WOMEN’S WATER POLO:
• Zoe Arancini – Bachelor of Science (Laboratory Medicine).

PARALYMPIC SWIMMING:
• Katherine Downie – Bachelor of Architectural Science.

SAILING:
• Carrie Smith – Bachelor of Arts (Urban and Regional Planning).

WOMEN TAKE CENTRE STAGE

Coinciding with the week of International Women’s Day – 10 March – the Curtin-hosted Athena Festival celebrated women in music, showcasing some of Australia’s most talented musicians.

Arranged by the Curtin Student Guild, the festival featured many well-known artists including Asta, Abbe May, Tired Lion, Nicole Millar, Bad Ezzy and Mosquito Coast. DJs from the Curtin Electronic Music Appreciation Society gave their support to the performers on stage and the party afterwards.

The festival’s main aim was to provide a platform for Australia’s female artists. It also raised money for the Patricia Giles Centre, which provides accommodation and counselling for women and children affected by domestic violence.

With the event now over, Australia can proudly add itself to the list of countries, including the United States, the United Kingdom and China, which have hosted female-led music festivals.
Continuing a successful partnership with world-leading online course provider edX, Curtin has launched its latest free, online course, titled, Reputation Management in a Digital World.

The massive open online course (MOOC) challenges students to manage the reputation of a fictional organisation in the online space, where everyone is a media producer, information spreads like wildfire and fiction is often confused for fact.

Running over six weeks, students learn how to develop, promote and manage an organisation's online reputation by studying real-life examples and taking on the role of communications manager for a fictional business. They also discover how to build a strong participatory culture and appropriately control an online crisis across multiple platforms.

The course is relevant to anyone working in marketing, communications, public relations, social media and advertising, and those who want to remain ahead in a sector that is fast-paced and ever changing.

Reputation Management in a Digital World is the second course in Curtin's digital marketing MOOC series. Curtin is the only Western Australian university in the edX consortium.

edx.org/school/curtinx

Curtin University Professor Kliti Grice has been awarded the Geological Society of Australia’s 2016 Gibb Maitland Medal for her outstanding contribution to the petroleum and minerals resources sector in Western Australia and internationally.

Professor Grice, a John Curtin Distinguished Professor in Curtin’s Department of Chemistry, is widely recognised for her work in organic and isotope geochemistry.

She is the founding director of the Curtin’s WA-Organic and Isotope Geochemistry Centre and has been responsible for a number of major international scientific breakthroughs including knowledge around the causes and recovery of four of the five largest mass extinction events on Earth.

The professor’s recent focus has been on organic geochemistry in Australia’s mineral deposits, through her leadership of the CSIRO Minerals System cluster. Her team’s research has led to ground-breaking evolutionary theories associated with preservation of fossils within ancient concretions – rounded masses of mineral matter.

In accepting the award, Professor Grice acknowledged the Geological Society of Australia, the award committee, her students and research team, and the industry partners and collaborators she has worked with.

Curtin University Professor Kliti Grice

FREE, ONLINE COURSES GO FROM STRENGTH TO STRENGTH

Curtin Student Film Festival
Wednesday 3 August 2016

Short documentary and drama films by first and second year screen arts students. Screening commences at 7pm at The Forum, Bentley Campus.

Curtin Stadium Boot Camp
Round 3 starts Monday 13 June

Stay active over winter with an eight-week group training course. The one-hour sessions are individually designed and instructed by qualified trainers to focus on full body conditioning. Flexible class times and days are available.

life.curtin.edu.au/curtin-stadium/boot-camp.htm

Autism Open Day at Curtin
Sunday July 17

Meet autism researchers from Curtin University and Telethon Kids Institute, see live demonstrations of the newest technologies available, and hear from parents and individuals with autism.

news.curtin.edu.au/events/autism-open-day
Australia has a rich natural resource base that has driven prosperity for most of its history. The cyclical nature and shifting demand for commodities present future challenges for maintaining this prosperity, and this is particularly acute in Western Australia.

However, Australia’s performance does not compare well with its international peers in collaboration between industry and universities, and bringing new innovation to market. The National Innovation and Science Agenda is seeking to address this issue through targeted programs that encourage closer collaboration between industry and universities and technology-based entrepreneurship.

There are a number of key elements to a successful innovation hub. These include a culture that supports innovation and entrepreneurship, access to expertise and business development tools that provide advice and frameworks for new business concept development, and access to capital including significant infrastructure to develop new ideas.

Curtin has existing programs and activities that support these elements such as the Curtin Commercial Innovation Awards, our Commercialisation Advisory Board, Curtin Accelerate, OzAPP Awards and our Kickstart commercial proof of concept funding program.

The University has a long history of effectively collaborating with industry and a number of new products and services have resulted from research conducted here. Examples include the Scanalyse service for monitoring wear on mining equipment, high-definition 3D seismic services for minerals exploration provided by HiSeis and video analytics technology being marketed by iCetana.

But universities have multiple missions that include education, research and commercialisation and must balance these with finite resources. The National Innovation and Science Agenda is an important step in providing the support required to improve Australia’s innovation performance.

We are already seeing a greater level of interest in innovation activities at Curtin as a result. One of the recently announced initiatives is a roll out of CSIRO’s ON accelerator program to universities.

Curtin startup, ePAT Pty Ltd, pitched for one of two places in the first stage of the roll out and was selected in a competitive process against eight other universities. It will now participate in an intensive business development process for its proposed automated pain assessment tool.

In the future, we anticipate more successful collaboration and stronger links between research, innovation and industry will further connect universities with the community and provide more opportunities to bring new ideas to reality.

“AUSTRALIA has a rich natural resource base that has driven prosperity for most of its history. The cyclical nature and shifting demand for commodities present future challenges for maintaining this prosperity, and this is particularly acute in Western Australia.

Diversification into new markets and the development of new products and services provide an opportunity to create a sustainable economic future for Australia. Universities have a significant role to play in enabling this future through development of next generation technology that can form the basis of new products and services, and training the entrepreneurs who can bring them to market.”
Curtin University is an inspiring, vibrant, international organisation, committed to making tomorrow better. It is a beacon for innovation, driving advances in technology through high-impact research and offering more than 100 practical, industry-aligned courses connecting to workplaces of tomorrow.

Curtin University is ranked in the top two per cent of universities worldwide in the Academic Ranking of World Universities 2015. It is ranked amongst the top 50 universities in the world under the age of 50 in the QS World University Rankings 2015 and ranked as one of the world’s most international universities in 2016 by Times Higher Education.

The university has a multitude of global connections with campuses in Perth, Singapore and Sarawak, a strong presence in South-East Asia and partnerships with over 90 institutions worldwide.

Everything at Curtin from teaching to research, from collaboration to community engagement is done with integrity, courage, respect, excellence and impact in mind. These are the values that our staff and students embrace. They allow us to create an environment where everyone can make tomorrow better.

VISION 2030
A recognised international leader in research and education.

OUR MISSION
To change minds, lives and the world through leadership, innovation and excellence in teaching and research.
YOU ESTABLISHED A GLOBAL NETWORK YEARS AGO.

You just didn’t know it then.

Now is the time to reconnect with fellow Curtin University and WA Institute of Technology (WAIT) grads and put the Curtin network of over 200,000 alumni, spanning 150 countries, into action.

Next year marks 50 years since the founding of WAIT and 30 years since the establishment of Curtin University. These milestones will be celebrated in 2017 under the banner of 50 years of innovation, highlighting the significant contributions of WAIT and Curtin to the WA and Australian communities. We’d love for you to be involved.

To reconnect with classmates and lecturers and stay up to date with the planned activities, visit the URL below and update your details.

Reconnect now at curtin.edu/cite-update-details