Marine mission
Reef scientist honoured

Busy bees
Pollinators tagged

View from on high
Reigning over the forest
2015 is certainly passing very quickly, and so far this year we’ve notched up many achievements.

We were delighted to have Australia’s former Prime Minister, the Hon Tony Abbott officially open JCU’s new Singapore campus recently, with Queensland’s Premier, the Hon Annastacia Palaszczuk in attendance.

We are internationally recognised as a university that focuses on making a better life for people living in the Tropics, and we are proud to be building upon our presence in Singapore to aid our ambition to be one university in two countries in three tropical locations.

It has also been exciting that more than 400 James Cook University students will have the opportunity to learn more about the Asia-Pacific region after JCU received nearly $1.5 million in New Colombo Plan funding.

Students will travel to countries including Cambodia, Sri Lanka, and Malaysia, and be immersed in their different languages and cultures. They will develop new international networks while gaining valuable work experience.

JCU graduates continue to be in high demand, with the latest Good Universities Guide, the authoritative tertiary education guide, awarding the University a ‘five star’ rating for getting a job.

It means JCU is in the top 20 per cent of universities whose graduates aged under 25 were able to find full-time work within four months of graduation. Only six other Australian universities made the grade, and it is the fifth year in a row JCU has achieved such a fantastic result. This is a wonderful reflection on the hard work of our teachers and graduates.

JCU’s largest-ever construction project is one step closer, with the announcement Lendlease will build the $85 million Science Place, a joint teaching and research facility, in Townsville. The project will transform the way tertiary education is delivered across north Queensland.

In other good news, this year we celebrate JCU’s Cairns campus turning 20. What started as a temporary facility at TAFE has become the science and research powerhouse on its own campus with thousands of students and staff.

The campus houses state-of-the-art teaching and research facilities, beautiful architecturally-designed buildings, and it shows no sign of its growth slowing.

Once again, JCU has again showed why it is a world-class research university, being ranked among the globe’s top 400 universities.

For the sixth year in a row, the Academic Ranking of World Universities, released by the Center for World-Class Universities at Shanghai Jiao Tong University, has ranked JCU in the 301-400 group of universities.

As a regional university and for one of our size, we have done very well. This ranking compares us to some of the world’s largest, most successful players.

There are many exciting things ahead for the University as we continue full steam ahead into the rest of the year, and into 2016.

Among all the achievements, it continues to be the JCU community and the broader communities in which we are based, that make us such a great university.

Sandra Harding
Vice Chancellor
Lendlease has been announced as the construction company that will build JCU’s ‘The Science Place’ on its Townsville campus.

The $85 million joint teaching and research facility is a JCU and federally-funded project that will transform the way tertiary education is delivered across North Queensland.

It is bigger than any project undertaken at JCU Townsville.

Lendlease won a tender process for the construction contract. Deputy Vice Chancellor, Services and Resources, Tricia Brand said the innovative building would revolutionise the teaching of science in North Queensland.

“The aim of the building is to promote the sciences and encourage interest in science-based careers in the wider community, as well as colocate the JCU science community on the Townsville campus,” Ms Brand said.

The building includes state-of-the-art laboratories and technology-enabled active learning spaces, with the capacity to link through to regional and remote, national and international locations.

The five-level, 12,000sqm facility will be built within the University’s Science and Engineering Precinct, and will accommodate projected growth in student and staff numbers in chemistry, biology and biochemistry over the next decade.

Construction is expected to be completed by December 2016.

www.thescienceplace.jcu.edu.au

Science finds its Place

Australia’s former Prime Minister, Tony Abbott officially opened JCU’s new Singapore campus recently.

The new JCU Singapore campus is closer to Singapore’s Central Business District and has more than 40 modern classrooms and lecture halls.

It also has 10 computer and research laboratories, administration offices, a purpose-built electronic financial trading room and a psychology clinic.

JCU’s Vice Chancellor, Professor Sandra Harding said Singapore was a fantastic location for an Australian university that has been charged with pursuing education and research on issues of importance to the peoples of the Tropics.

“Internationally recognised as a university that has focused on conducting teaching and research related to the Tropics, we believe that it is appropriate for us to build upon our presence in Singapore to give better effect to our ambition to be one university in two countries in three tropical locations,” Professor Harding said.

Established in 2003, JCU is the only Australian university with a fully-owned and operated campus in Singapore.
Trés Tropics

The land that epitomises style and is home to the croissant is far from the tropics, but the two converged recently in the name of climate change.

JCU’s State of the Tropics team recently co-convened a session at the Our Common Future Under Climate Change conference at UNESCO in Paris.

It was the largest meeting of scientists ahead of the 2015 Paris Climate Conference (COP21), which will be held in December.

Tiny transmitters are helping scientists understand how bees behave, to gain an insight into bee disease and improve honey production.

A JCU research team, headed by Dr Lori Lach, has performed the seemingly impossible task of gluing the transmitters on to the bodies of honey bees.

Dr Lach said the Radio-Frequency Identification (RFID) chips were glued to the backs of 960 bees.

“We just had to hold them in our hands and hope the glue dried quickly,” she said.

“It was actually quite a process - they had to be individually painted, then individually fed, then the tag glued on, then individually scanned so we knew which tag was on what colour and treatment bee and which hive it was going into. It all had to happen within about eight hours of emergence because as the day goes on they start learning how to fly and they get better at stinging.”

It was a unique use of the technology and allowed the bees to be monitored individually for the first time.

“No one had looked at bees at this level before, to see what individual bees do when they are sick,” Dr Lach said.

Scientists infected half the insects with a low dose of nosema spores, a gut parasite common amongst adult honeybees, while the rest remained disease-free.

Using the RFID tags in combination with observations at the hives and artificial flowers, the researchers were able to see how hard the bees worked and what kind of material they gathered.

“We knew dead bees couldn’t forage or pollinate,” said Dr Lach. “But what we wanted to investigate was the behaviour of live bees that are affected by non-lethal stressors.”

Researchers found infected bees were 4.3 times less likely to be carrying pollen than uninfected bees, and carried less pollen when they did. Infected bees also started working later, stopped working sooner and died younger.

Dr Lach said the most significant implications of the research were for humans.

“About a quarter of our food production is dependent on honey bee pollination. Declines in the ability of honey bees to pollinate will result in lower crop yields.”

www.stateofthetropics.org

The session explored the vulnerability of tropical regions to climate change and included presentations by JCU’s State of the Tropics report co-authors Professor Richard Corlett and Professor Steve Turton.

The State of the Tropics project is continuing to search for answers to the question: is life in the Tropics getting better?
From a sugar cane field to a university campus, from just two postgraduate research students to more than 250 – a lot has changed in the 20 years since JCU Cairns relocated from temporary quarters at TAFE to a stand-alone campus at Smithfield.

“Enrolments have more than quadrupled since then, and we have the great pleasure of working and studying on one of the most beautiful campuses in Australia,” the head of the campus, Deputy Vice Chancellor Professor Robyn McGuiggan said.

“Thanks to the foresight of our community leaders, JCU’s Cairns campus has given us room to build state-of-the-art teaching and research facilities, and to keep on growing.”

In July, students and staff from 1995 joined community leaders to celebrate the 20th anniversary.

Photographer – Dominic Chaplin

Lead researcher, Dr Craig Costion says the findings have important implications for some rare and ancient species. “They already live on mountain tops, they have no other place to go,” he says.

The scientists looked at 19 tropical plant species found at this altitude and predicted that by 2040 the climate niche the species grow in would decline anywhere between a minimum of 17 per cent and a maximum of 100 per cent.

By 2080, even using conservative assumptions, nearly half of the plants would not have what the scientists believe is a survivable climate.

Dr Costion says there were some caveats on the findings.

“Our study indicates that the current climate on Queensland’s mountaintops will virtually disappear. What we don’t know is if these plants can adapt.”

Dr Costion says plans are underway to confirm and expand on the findings.

20 reasons to celebrate

From a sugar cane field to a university campus, from just two postgraduate research students to more than 250 – a lot has changed in the 20 years since JCU Cairns relocated from temporary quarters at TAFE to a stand-alone campus at Smithfield.

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Photographer – Dominic Chaplin
Dr Rummer, from JCU’s ARC Centre of Excellence for Coral Reef Studies, has received a L’oréal Australia and New Zealand For Women in Science Fellowship for her innovative research into the behaviour of reef and tropical sharks.

She has been awarded one of the four $25,000, one-year fellowships for early-career women scientists for her project, Growing up strong in a changing climate: maintaining physiological performance in juvenile reef sharks under challenging environmental conditions.

Dr Rummer is examining the effects of future climate change scenarios, such as elevated temperatures, elevated carbon dioxide levels, and low oxygen on how reef fish and tropical sharks behave.

“As top-order predators, sharks play a key role in structuring marine ecosystems and indirectly protect habitat, for example coral reefs, and food security for humans,” she said.

“Although strategies are in place to better protect the oceans’ 500 shark species, over half are in danger or threatened with extinction. Mitigation steps such as banning fishing, prohibiting possession or trade, and developing marine protected areas, or MPAs, have been taken. However, even the best-protected areas in the world are not immune to global climate change.”

Dr Rummer said increasing atmospheric carbon dioxide is warming the oceans, increasing the frequency and extent of hypoxia, or low oxygen, and increasing ocean acidity, a rate 100 times faster than over the past million years.

Dr Rummer said the Fellowship would allow her to expand her current research program.
Outstanding Alumni honoured

The Chancellor’s Award

Cathy-Ann McLennan, who graduated from James Cook University in 1992 with a Bachelor of Laws, was recently appointed as a Queensland magistrate.

She is the first graduate of JCU to be appointed to the Bench.

In her last year at JCU, Magistrate McLennan was appointed as the first Associate to the Honourable Justice Cullinane, AM.

In 1994 she was admitted to the Bar. Just past her 22nd birthday, she was the youngest barrister in Queensland.

Since then she has had a distinguished career in the courtroom and has also achieved remarkable success in the wider community.

Fourteen high-achieving James Cook University alumni were honoured at a special breakfast ceremony recently.

The annual Outstanding Alumni Awards recognise graduates of the University and its predecessor institutions who have made an outstanding contribution in their field of endeavour at a local, state, national or international level.

Dr Dylan Morris graduated from James Cook University in 2014 with a Bachelor of Medicine, Bachelor of Surgery. He is a resident medical officer at the Townsville Hospital and a Clinical Research Associate at the Queensland Research Centre for Peripheral Vascular Disease at JCU.

Dr Suman Majumdar received a Master of Public Health and Tropical Medicine at James Cook University in 2007. He is an infectious diseases specialist, and senior fellow at the Burnet Institute in Melbourne. He is working to redress health inequalities from infectious diseases, and enhance health care delivery in countries with low and middle-income populations.

Ms Lauren Chapman is the Manager of the Ayr branch of the Helping Hands Clinic, after working in both the private and public hand therapy sectors. Ms Chapman completed a Bachelor of Occupational Therapy at JCU in 2004.

Dr Danielle Dixon graduated from James Cook University in 2011 with a Cum Laude PhD thesis in Marine Science. She is now an Assistant Professor in the School of Marine Science and Policy at the University of Delaware in Newark in the United States.

Mr Douglas Kirwin works as an independent mining and geological consultant in Thailand. Over his 45-year career as a mineral exploration geologist, he has worked in various senior management roles in international companies. Mr Kirwin completed a Master of Science degree in mineral exploration at JCU in 1990.

Professor Marc Shaw is Medical Director of Worldwide Travellers’ Health Centres in New Zealand, working in tropical and geographical medicine in Australia and New Zealand, and also internationally through his research and workforce development. Professor Shaw completed his Doctorate in Public Health in 2009.

Dr Donna Kwan was awarded a Bachelor of Science (Biological Science) at JCU in 1986, a Master of Science in Marine Science and Policy in 2002. She is now the program manager responsible for the implementation of the Dugong Memorandum of Understanding under the United Nations Environment Program.

Ms Katarina Carroll is the newly appointed Commissioner for the Queensland Fire & Emergency Services. Her career in policing and emergency services spans more than 32 years. Ms Carroll was awarded an Associate Diploma in Community Welfare in 1983.

Dr Bradley Garrett is a human geography lecturer in economics, governance and culture at the University of Southampton in the United Kingdom. He has also worked for the United States federal government as an archaeologist. Dr Garrett received a Master of Arts in Maritime Archeology in 2006.

Dr Jennifer Sando is the Chair of the Cairns and Hinterland Hospital and Health Service Clinical Council. She is also the Nursing Director for Education and Research within the Health Service. Dr Sando has extensive experience in nursing and midwifery education and training. She graduated with a Doctorate of Philosophy in 2010.

Mr Leigh Graham graduated with a Bachelor of Engineering with Honours (Mechanical) in 2004. He is a Senior Engineer with Dewpont Air, an air conditioning and mechanical services business. He oversees the design, installation, performance and commissioning of large-scale air conditioning and mechanical projects.

Mr Andrew Anderson is a Director in law firm Boe Williams Anderson, a leading Queensland criminal law firm, representing clients throughout Australia. Mr Anderson has worked both in private practice and as a Principal Crown Prosecutor. Mr Anderson graduated with a Bachelor of Economics – Bachelor of Laws with Honours in 2006.

Mr Trent Twomey is the Chairman of the North Queensland Primary Healthcare Network and Chairman of Advance Cairns, among other roles. Mr Twomey purchased his first pharmacy in 2008, and is now a partner in a group of four pharmacies in North Queensland. He graduated with a Bachelor of Pharmacy in 2004 and with a Bachelor of Business in 2005.
**Researchers have made significant progress in identifying potential vaccines against a carcinogenic blood fluke that affects more than 100 million people throughout Africa.**

A study led by the AITHM’s Dr Mark Pearson focused on people who had been exposed to Schistosoma haematobium but had developed resistance to schistosomiasis, the disease caused by the parasite.

“We found that those people produced significantly higher than usual quantities of antibodies that targeted a sub-set of the blood fluke’s surface proteins,” Dr Pearson said.

“The success of those antibodies in fighting schistosomiasis indicates that those targeted proteins are essential to Schistosoma’s survival in humans.”

**A win against worms**

**Talent to tackle disease**

One of Australia’s leading infectious disease experts has joined JCU’s AITHM to lead research into tuberculosis and hospital-acquired infections.

Professor Emma McBryde joins AITHM from Melbourne, where she was the Head of Epidemiology of Infectious Diseases at the Royal Melbourne Hospital and Head of Modeling and Biostatistics at the Burnett Institute.

Tuberculosis and other infectious diseases have extremely high prevalence in the Tropics, including in Papua New Guinea.

Professor McBryde is also an infectious diseases physician, receiving the University Medal for her medical degree at the University of Queensland in 1994 and her FRACP qualification in 2003. She is still actively treating patients and wants to work with hospitals throughout Northern Queensland.

Professor McBryde grew up in Queensland and has been keen to return Northern Queensland.

“I am excited to start working with people passionate about improving the lives of the people of Far North Queensland and the Asia-Pacific region. There are many challenges ahead but there is also great commitment and support from everyone at AITHM, JCU, and government at all levels,” she said.

JCU researcher Professor Emma McBryde

**AITHM powers ahead**

Work has begun on a new building in Cairns for the Australian Institute of Tropical Health and Medicine (AITHM).

The building will include specialist research laboratories, a quarantine insectary for mosquito research, a state-of-the-art animal research facility, laboratory support spaces and offices, and is due for completion in April 2017.

This $24.5 million dollar project, along with buildings in Townsville, Mackay and the Torres Strait, is jointly funded by a $42.12 million Queensland Government grant and a further $42 million Australian Commonwealth contribution. Construction on the Townsville AITHM building is nearing completion.

**Construction is underway on the new AITHM building in Cairns.**

**Construction is underway on the new AITHM building in Cairns.**

**AITHM powers ahead**

With that information, we’ve been able to identify a number of potential vaccines that are strong candidates for the job of fighting schistosomiasis.

Schistosoma penetrate the skin of people exposed to contaminated water.

Depending on where the parasite’s eggs develop, they can damage the liver, intestine, lungs, bladder and brain.

Children who suffer repeated infections can develop anaemia and malnutrition.

The parasite is also strongly associated with cancer of the urinary system.

The research was published in Frontiers in Immunology.
Suspended sediment damages fish gills and can increase the rate of disease in fish.

A research team from the ARC Centre of Excellence for Coral Reef Studies at JCU made the discovery recently.

"Suspended sediments result from flood plumes, coastal agricultural and industrial development, and from dredging operations, and are increasing in coastal waters worldwide," says study co-author, Dr Amelia Wenger.

"Fish gills are in direct contact with their environment and are the first line of defence in the animal’s immune response, which makes them the perfect place to look for damage associated with sediment," co-author Dr Jodie Rummer says.

"Plus, harm to this vital organ affects every activity in the animal’s body that requires oxygen."

For the study, the researchers simulated sediment conditions frequently found on inshore reefs on the Great Barrier Reef, but they say the problem isn’t limited to Australian waters.

Juvenile reef fish are often exposed to sediment as they swim in open waters before settling on a chosen reef. During this critical developmental stage they need great amounts of oxygen, but damage to their gills makes it hard for them to get it.

"The gills in sediment-exposed larval clownfish were congested, exhibiting twice as much mucus as those found in clean-water exposed fish," says study lead author, PhD student Sybille Hess.

Graduates in demand

It’s official: JCU is top of the class when it comes to graduates getting a job.

JCU graduates continue to be in high demand, with the latest Good Universities Guide awarding the University a five star rating for getting a job.

For the fifth year in a row, the authoritative tertiary education guide has given JCU five out of five stars for job success.

The rating means JCU is in the top 20 per cent of universities whose graduates [aged under 25] were able to find full-time work within four months of graduation.

Only six other Australian universities scored such a result.

JCU continues to record extremely strong results for the standard of its teaching, with the guide awarding the University four stars for “teaching quality”.

JCU also received four stars for the “generic skills” it teaches its students, and a four star rating for the proportion of its domestic students from a low socio-economic background.

JCU Vice Chancellor, Professor Sandra Harding said it was very pleasing JCU graduates are in demand and finding employment quickly.

"JCU graduates are receiving a high quality education that provides them with very strong career prospects."

"Our graduates are highly sought after by employers, and they continue to make a difference in their communities.”

Dirty water makes it hard to breathe

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Sediment-laden water entering the coastal environment

Photo: S.Hess et al

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Sharks on film!

JCU has joined a world-first, global effort to survey the planet’s shark populations – the biggest ever survey of its kind.

Scientists are using baited underwater video cameras to measure shark numbers around the world’s coral reefs, which will provide essential data to conserve declining shark populations.

Together with the Australian Institute of Marine Science (AIMS), researchers have joined a global effort to survey shark numbers in coral reef environments.

The three-year The Global FinPrint survey of sharks and rays is designed to provide fundamental data to help build effective conservation programs. The Australian Institute of Marine Science (AIMS) has also joined the research effort.

New research shows that social networking sites could be crucial in sharing information during large-scale emergencies.

A new disaster management portal, developed by JCU researchers Jess Faber, Trina Myers and Ian Atkinson, along with colleagues from Griffith University, uses Twitter to gather up-to-date information.

Following a disaster such as a fire or flood, essential services such as electricity and phone lines can fail. And that’s just the moment when the need for up-to-date information is crucial for disaster recovery and planning, and also for those awaiting news of loved-ones.

Researchers say social media can be more beneficial than mainstream media in the initial stages of a disaster.

The Riskr Project was developed to investigate whether large social networking sites could be used to feed information into a central disaster portal.

The portal consists of a web server, map interface and newsfeed. It was tested on campus at JCU – users were given the mobile web service to report a hypothetical fire at the library. The majority of users reported that the portal was easy to use and understand, and more than 70 per cent of users could estimate the correct location of the disaster.

Dr Ian Atkinson said portals like Riskr could work to help organise emergency services. “The system was intended to be used as a conduit from the public to emergency services. As more data from public networking is entered the system builds a more accurate picture of an event that can be used to better plan and respond,” he said.

The Global FinPrint survey is sponsored by Vulcan Inc., a Paul G. Allen company in the United States and the research team is led by Dr Demian Chapman of Stony Brook University in the US.

Joining them is Dr Michelle Heupel from JCU and AIMS, Dr Aaron MacNeil and Dr Mark Meekan from AIMS, and Dr Mike Heithaus from Florida International University.

Survey data will be made available through an open-access database platform created by Vulcan’s technology development team and will include information on species’ density, habitats and diversity trends.
The freshwater Black Bass is a highly sought-after game fish the world over, and now it may help communities in Papua New Guinea to prosper.

A team from JCU is trying to kick-start a sports fishing industry on the PNG coast that will provide sustainable livelihoods for local people.

The Black Bass, one of the world’s toughest fighting fish, is found in coastal rivers and estuaries where it grows to more than 20 kg.

JCU experts in marine science, ecology, business, tourism and social science have teamed up to design a sustainable fishery that will benefit local people, many of whom live in extreme poverty.

Team leader, Professor Marcus Sheaves, said the collaboration could have many benefits.

“This is one of the big opportunities in science because it provides the opportunity to provide much-needed new income streams for local people while promoting environmental stewardship,” he said. “It’s a win-win situation for people and the environment.”

“Understanding the ecology of the fish and its reliance on healthy environments is crucial for it to thrive in the long-term,” he said.

Black Bass habitats are being mapped with sonar and movements tracked by acoustic tags. The team is also working to ensure the fishery is planned and managed properly, to maximise community involvement.

They are also collecting biological data on the fish in small and easily accessible river systems west of Port Moresby and in West New Britain.

www.niuginiblackbassresearch.com

Photos: Ian McLeod, TropWATER, JCU
View from the treetops

A towering crane is the star attraction in an experiment to study how global warming might affect the world’s rainforests.

It is the first time such a machine has been used in this type of project anywhere in the world.

JCU’s Associate Professor Susan Laurance is running the project at JCU’s Daintree Rainforest Observatory near Cairns. After more than two years of preparation, construction of the huge ‘rainforest laboratory’ is now complete.

Scientists are trying to determine which rainforest trees will survive drought and which will be damaged or die.

The innovative, multi-million dollar experiment covers a hectare of rainforest and is hoped to deliver crucial insights into how rainforests will be affected by climate change.

The elevated platform on the “canopy crane” moves in and around the treetops, enabling researchers to get a bird’s eye view of the experiment and access tree leaves from above, in order to understand how they cope with a drying climate.

Tree roots have been covered with clear plastic roof panels to limit their access to water, leaving others uncovered as a control group.

We estimate there are at least 45,000 tree species in the world’s rainforests but only one per cent of the species stores about 50 per cent of the carbon,” she said.

“We are trying to discover which tree species are most vulnerable to drought and which are more resilient. We will then know what the implications will be for future carbon storage, if droughts become more common.”

Unlocking artery secrets

One of JCU’s highest achievers is tackling one of the world’s most common circulatory problems.

Professor Jonathan Golledge is Head of the Queensland Research Centre for Peripheral Vascular Disease and its pre-clinical arm, The Vascular Biology Unit, based at James Cook University and The Townsville Hospital.

Peripheral artery disease (PAD) is caused by a range of problems, which leads to narrowed or dilated arteries, which reduces blood flow to the abdomen and limbs.

Those suffering from PAD have problems such as difficulty walking due to poor blood supply, or weakened arteries (aneurysms) at risk of bleeding.

Professor Golledge’s ground-breaking research is improving understanding of PAD, and his list of achievements is long.

Since 2006, he has received almost $23 million in research funding, which includes funding up until 2020.

In the period from 2010 to 2014, Professor Golledge authored 121 publications, the highest publication rate at JCU [SciVal, June 2015].

Dr Golledge said PAD was common all over the world, particularly in north Queensland, but was often poorly managed.

“North Queensland is pioneering work in this area and recently held a meeting of a group of pre-clinical and clinical researchers and clinicians from around Australia to discuss this problem,” he said.

“A range of approaches is being developed to try and improve outcomes for people with blood vessel problems such as behaviour interventions and medications.”

Professor Golledge joined JCU in 2002 and established the VBU with the aim of carrying out research intended to be translated into improved management of aortic aneurysm and other peripheral vascular conditions.

He said between two and five per cent of men aged over 60 have an Abdominal Aortic Aneurysm (AAA), for which there is currently no drug treatment.

“So we are using pre-clinical models to test potential agents to address management deficiencies in our patients,” he said.

“If we achieve promising results then we examine the agents in clinical trials.”

“Currently we are conducting a number of randomised trials to assess the efficacy of different agents in limiting the growth of small AAAs.

“We are also doing a trial to assess the value of a self-management program in patients with blocked leg arteries.”
Under the guidance of marine researchers and leaders, the young scholars engaged in interactive workshops and came face-to-face with fish and coral during a five-day field experience at JCU’s Orpheus Island Research Station.

The students also toured the Australian Institute of Marine Science’s $35 million National Sea Simulator and experienced a taste of life as an undergraduate student at JCU.

The learning experience is part of the Aboriginals and Torres Strait Islanders in Marine Science (ATSIMS) program, which aims to inspire high school students to pursue careers in marine science and management.

ATSIMS Founding Director, Joe Pollock said the program had been a resounding success over the past three years, with many of the students who attended in 2013 preparing to apply to study marine science and management at JCU.

Photos: Marie Roman

A crash course in marine science was an eye-opener for 40 Townsville-based Australian Aboriginal and Torres Strait Islander high school students.

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Photos: Marie Roman
How do jellyfish catch fish? With lines and lures.

The first feeding study of tropical Australia’s Irukandji box jellyfish has found that they actively fish, extending their tentacles as lines and using their nematocyst clusters (stinging structures) as lures.

It’s an impressive feat by any standards, but particularly so for an animal that doesn’t have a defined brain.

“This species is small, less than two centimetres across the bell, they’re 96 per cent water, they lack a defined brain or central nervous system, and yet they’re using their tentacles and nematocyst clusters like experienced fishers use lines and lures,” researcher Robert Courtney said.

They’re not opportunistically grazing – they’re targeting and catching fish that are at times as big as they are, and far more complex. This is a really neat animal displaying a surprisingly complex prey capture strategy.

Researchers at JCU in Cairns used infrared-sensitive equipment to catch the tiny but deadly Carukia barnesi in the act, by filming through a full day and night cycle.

During the night the jellyfish were less active, contracting their tentacles down to four to five centimetres, with the nematocyst clusters bunched up.

In daylight, they went fishing – stretching their tentacles out as long as 1.2 metres, with the nematocyst clusters evenly spaced along each almost invisible thread.

“The nematocyst clusters look like a series of bright pearls, which the jellyfish twitches to attract the attention of its prey,” Mr Courtney said.

It’s a highly successful strategy, and the only account of a box jellyfish using aggressive mimicry to capture prey.

Robert Courtney’s research is supported by the Australian Lions Foundation.

— Linden Woodward

Inspirational scholar

Adding to her long list of honours, JCU’s Michelle Deshong has won the National NAIDOC Award for Scholar of the Year.

The award is the most prestigious honour for Australian Aboriginal and Torres Strait Islander scholars in Australia.

The annual awards recognise the outstanding contributions that Australian Aboriginal and Torres Strait Islanders make to improve the lives of their people.

Ms Deshong grew up in the Townsville region of North Queensland and is a proud Kuku Yalanji woman from north-east Australia and the mother of three children.

She has worked in both the government and NGO sectors as a senior manager and held prominent senior leadership roles.

Ms Deshong graduated from JCU with a BA Honours (First Class) in Political Science and Indigenous Studies after being awarded the University Medal, a Deans List Award and is a Golden Key International Honours Society member.

She is in the final stages of her PhD on ‘Enabling the Participation of Aboriginal Women in Public and Political Life in Australia’.

Ms Deshong was also this year’s recipient of the Fulbright Indigenous Professional Scholarship.

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JCU researchers have found black leopards actually do have spots, and the discovery may help to save them.

The researchers have uncovered a surprising way to tell the leopards apart – by taking infrared camera photos.

The scientists from JCU are part of a team that has been studying the leopards on the Malay Peninsula, where almost all of the big cats are jet black.

Experts have no idea why the leopards are black and, until recently, could not tell them apart, hindering research and conservation efforts.

But researchers have now devised a simple method to solve the problem by manipulating the mechanism of automatic cameras.

Most automatic cameras have an infrared flash, but it’s only activated at night,” said Dr Gopalasamy Reuben Clements from JCU. “However, by blocking the camera’s light sensor, we can fool the camera into thinking it’s night even during the day, so it always flashes. ”

With the infrared flash firing, the seemingly black leopards suddenly show complex patterns of spotting. The spots can be used to distinguish different animals and help estimate the population size of the species.

The researchers aim to use their new method to study black leopards in other parts of Peninsular Malaysia where there is abundant prey but few leopards to be seen.

Unfriendly fish on the move

A fish that can walk on land seems like something from science fiction.

However, it is a reality for one dangerous fish species and it appears to be headed toward Australia’s mainland.

The aggressive climbing perch can live out of water for up to six days and crawl across dry land.

It is being closely watched by JCU scientists as it moves south from PNG towards Australia.

It has already overrun Australia’s two most northerly outposts – the Torres Strait Islands of Boigu and Saibai – respectively just four and six kilometres south of the PNG mainland.

JCU scientists have been monitoring the perch’s spread in partnership with rangers from the Torres Strait Regional Authority and Torres Strait communities.

Team member, Dr Nathan Waltham said it would prove very difficult to eradicate the fish from the two islands, despite it only being first officially recorded there in late 2005.

He said the bad news is that there’s now evidence the freshwater fish could tolerate exposure to saltwater.

“IT does seem to be able to handle a little bit of salt. In our trip up there in December we found it in some hyper-saline water holes, so there is some ability to resist exposure. ”

The fish drags itself from waterhole to waterhole and is very invasive, outcompeting native species once it is established in a new environment. It is extremely hardy, and has been known to hibernate in the mud of dried-up creek beds for up to six months.

It has been witnessed swelling up when swallowed by larger predators, blocking their throats so they either choke or starve.

Dr Waltham said the perch may have come to Boigu and Saibai on a surge of fresh water from flooding rivers in the nearby PNG mainland. But its ability to live in saltwater was a concern, in terms of it moving closer to Cape York and becoming established in mainland Australia.

“But I still think the chances of it getting to Australia by swimming are quite low,” said Dr Waltham.

“There is a greater chance it will arrive in the bottom of a fishing boat or as discarded live-bait fish.

“It’s only through active education and monitoring, in partnership with relevant authorities and local communities, that we can keep it under control. If we do it early enough.”
Charting the depths

Looking where few have looked before, a JCU researcher has completed detailed 3D depth maps of Australia’s Coral Sea reefs.

Dr Robin Beaman’s work has shed new light on the likely distribution of coral diversity and sea life in the area.

Mapping these offshore reefs has always been a challenge, because their remote locations and shallow nature has meant it has been difficult to use modern surveying techniques, such as vessel-mounted echo sounders.

Instead, Dr Beaman has worked with the German Earth observation company, EOMAP and used satellite imagery to develop 3D bathymetry (or depth) data over a large group of Coral Sea reefs.

“These reefs lie in clear, sunlit waters, so the Landsat8 images were able to provide high-resolution data down to a depth of about 50 metres,” he said.

By refining the satellite data and merging it with existing data, I’ve produced 3D depth maps for these reefs. That gives us a much more detailed picture than was previously available.

The project focused on the reefs on the Queensland Plateau, which lie within the waters of the Coral Sea Commonwealth Marine Reserve.

While many of the largest reefs have been progressively mapped by the Royal Australian Navy using their LADS airborne lidar bathymetry system, there are still large areas of shallow reefs with no detailed depth data over them.

“The Flinders Reefs, about 230km offshore from Townsville, were an ideal place to start, being close to the Australian mainland and lacking an accurate 3D map,” Dr Beaman said.

These reefs grew upwards from tilted continental blocks created when Gondwana was breaking up. The 3D images we now have of North and South Flinders Reefs are really stunning, showing classic atoll shapes with a shallow coral rim around a deeper lagoon.

“With this new 3D information we can now better predict where coral diversity is located around the edge of these reefs, because we know where we’re likely to find the shallow and deeper coral communities,” he said.

See page 18 for details of the book Southern Surveyor – Stories from onboard Australia’s ocean research vessel upon which Dr Beaman conducted geoscience research in the deep Great Barrier Reef and Coral Sea.

Photos and images: www.deepreef.org
The 2015 International Brain Bee saw 23 of the world’s brightest high school students competing for the title of ‘best brain’ in a series of challenges at JCU in Cairns.

The Brain Bee is a competition in which students aged between 14 and 18 years compete on topics including intelligence, memory, emotions, stress, ageing, sleep, brain research, and neurological and psychological diseases.

The Australian champion, Jade Pham from James Ruse Agriculture High School in New South Wales, won the title against tough competition.

The head of anatomy at JCU, Dr Helen Anscomb, hopes the event will inspire local students with a passion for science to explore the science of the brain.

Australia has done exceptionally well in the competition in recent years, also winning in 2012 and 2013.

Brains abuzz

Originally, I’m from Eritrea – a small east African country. My family and I left Eritrea when I was three and moved to Nairobi, Kenya, where we lived for two and a half years. After that, we made our way as refugees from Nairobi to Hobart, Tasmania, where I spent my childhood.

During my years in high school, I developed a desire to study medicine at university.

As a result, I applied for the JCU Medicine course, which involved a rigorous written application process, after which I received an interview. While it was nerve-wracking, I was successful, and I am now a very grateful JCU medical student.

In my family, education is emphasised as a fundamental tool for life – in fact, the reason we moved to Australia was for access to educational opportunities that otherwise we may not have had.

I think the biggest challenge has been moving away from home. So far, this challenge is being overcome with the support of my family, students [whom I have had the pleasure of meeting], and the College of Medicine and Dentistry.

Another highlight has been the opportunity to build new relationships. Being exposed to people from many different parts of Australia and the world has broadened my horizons, increasing my appreciation of diversity.

Perhaps the most significant highlight has been the satisfaction I have gained from completing first semester. It was a challenge, but it has provided me with validation of my ability.

Prospectively, I’d like to practice in regional, rural or remote Australia. I also hope to return to Eritrea to practice in the areas of obstetrics, gynecology and pediatrics.

On a recent trip back to Eritrea, my ambition to study medicine was magnified.

While my cousins living in Eritrea exist in relative wealth, the standard of living is so far removed from my reality in Australia. I saw children who were not materialistically advantaged, but were totally focused on education.

Access to medical care in Eritrea is quite a significant problem. The devastating results (preventable deaths) have been the strongest motivator for me to study medicine.

I feel that by studying and practicing medicine within Australia, I can give back to a country that has given so much to me.
Linguistics expert, Professor Robert Dixon explores three of Northern Australia’s First Nations’ languages in his latest book.

Edible Gender, Mother-in-Law Style, & Other Grammatical Wonders – Studies in Dyirbal, Yidiñ, & Warrgamay is an exploration of an intriguing language phenomena.

The book draws on Professor Dixon’s 40 years of experience in documenting endangered and understudied languages.


This latest work includes further studies on these languages, and the interrelations between them.

Following an account of the anthropological and linguistic background, he provides a thorough examination of, and comparison between, the gender system in Dyirbal – one of whose members refers to ‘edible vegetables’ – and nominal classifiers in Yidiñ.

He also describes Dyirbal’s unusual kinship system and the ‘mother-in-law’ language style, and the origins of ‘mother-in-law’ vocabulary in Dyirbal and in Yidiñ.

He also deals with grammatical variation across the dialects of Dyirbal, phonological changes, and a study of language contact across the Cairns rainforest region. The final chapters recount the sad stories of how the Yidiñ and Dyirbal languages slowly slipped into oblivion.

Edible Gender, Mother-in-Law Style, & Other Grammatical Wonders – Studies in Dyirbal, Yidiñ, & Warrgamay
By Professor Robert Dixon, Adjunct Professor and Deputy Director of the Language and Culture Research Centre at JCU.
Oxford: Oxford University Press
ISBN: 978-0-19-870290-0

Marketing ethics
Why and how marketers approach ethical questions is examined in this book, as well as how they can respond.

The book, which is co-edited by JCU Professor of Marketing, Lynne Eagle and Stephan Dahl from the University of Hull, takes an holistic and international perspective to these challenges.

It explores strategies marketers can use to respond and examines specific aspects of marketing activities and combines these with wider discussions of frameworks that enable marketers to respond to ethical challenges.

It also includes discussions of cross-cultural and international perspectives, consumer responses and ethical consumption movements, as well as shifting historical perceptions of marketing ethics.

Professor Jeff French PhD, MBA, and CEO of Strategic Social Marketing said:
“In this fantastic addition to the field of marketing ethics, Eagle and Dahl set out and explore the broad range of ethical challenges that face the marketing profession today. This book is one that I will be recommending to practitioners, academics and students as the go-to resource for an up-to-date and comprehensive review of how and why ethical considerations sit at the heart of modern marketing practice.”

Marketing Ethics and Society
Edited by Lynne Eagle and Stephan Dahl
Sage Publications

Into the deep

For 10 years, the RV Southern Surveyor represented the vanguard of Australian marine science.

On more than 100 voyages, the former North Sea fishing trawler with her distinctive blue and white livery carried scientists and technicians across the Southern, Pacific and Indian Oceans, as well as the waters off northern Australia.

She conducted physical, chemical, geological and biological investigations and deployed state-of-the-art instruments to map vast unexplored tracts of the sea floor.

Over the course of a year, well-known Australian actor, comedian, TV presenter and journalist Michael Veitch interviewed the Southern Surveyor’s former captains and crew, support staff and scientists.

JCU’s Professor Rob Beaman was one of the marine geologists involved in providing geoscientific research for the book.

The result is a warm, engaging and sometimes dramatic account of their adventures — finding sunken WWII shipwrecks and swirling coastal vortexes, ‘undiscovering’ islands and watching pre-dawn fireworks from undersea volcanoes.

But these are also stories of discovery, which tell the legacy of scientific innovation and impact that the RV Southern Surveyor left in her wake.
Freshwater turtles are not usually associated with North Queensland, but the shelled creatures are becoming their own star attraction.

JCU, in collaboration with the Gudjuda Rangers, Townsville Skindiving Club and a local high school, have been studying the turtles in a waterway less than 20km from Townsville’s city centre.

Leading the project, JCU senior lecturer and turtle expert, Dr Ellen Ariel, is studying the two species of turtles found in the Alligator Creek region.

The study, being conducted just outside the Mount Elliott National Park south of Townsville, focuses on the Krefft’s River Turtle and the Sawshell Turtle.

The former is quite common in Townsville, and is often sighted along Ross River, whereas the latter is more elusive and usually only found in the tributaries of the river.

The freshwater turtles have little clawed, or webbed, feet, and tend to ‘walk’ on the bottom of the creek beds, rather than swim.

Dr Ariel said the two species would look much the same to the untrained eye, but the Krefft’s has a thin yellow line through its eye and the Sawshell has a saw-like rear end to its shell.

The Alligator Creek project started in 2010, with Dr Ariel working with undergraduate and postgraduate students as well as with the Kirwan State High School Science Department.

“We have been taking Year 12 Biology students out in the field every year since then, and it’s proved to be beneficial to all involved,” she said.

Dr Ariel said that the Townsville Skindiving Club had been incredibly helpful in diving into the cold creek water and finding the turtles for the study.

“They have been amazing, and are a big part of the success of the day,” Dr Ariel said.

The divers can hold their breath for a long time, and dive to the bottom of a freshwater pond, sometimes 5-6m deep.

They gently swim the turtles to the water’s edge, and hand them to students on the banks, carefully avoiding any stress to the animal.

Dr Ariel said in order to keep the turtles calm, they are placed in cloth bags and the team work as quickly as possible to return them to their pond. On the most recent expedition, they captured 66 turtles in less than an hour.

All animals are tagged and their weight, width and the curvature of their shells is measured, to collect data on their growth, then they are carefully released.

“This data gives us an indication of how well they’re doing,” she said.

The project is great for both high school students and the undergraduates, it’s a real ‘hands-on’ experience which shows them what a researcher actually does in the field.

“Hopefully it inspires their future career choices, seeing what is possible and where their education can take them.”

Photos: Ian McLeod, TropWATER, JCU

Dr Ellen Ariel (left) capturing data on freshwater turtles

Townsville Skindivers helping out with the research

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