Algae
It’s great with beef

Predators
The good news

Horror
A wise career move
Whether you are reading this as 2014 draws to a close, or in the early stages of 2015, it’s a time of year when James Cook University’s tropical location is particularly evident.

On our campuses in Singapore, Cairns and Townsville, this is when we keep a close eye on the skies – at first wondering when the monsoon will arrive, and later doubting whether it might ever leave.

At JCU we’re always mindful of our place in the tropics – it’s at the core of our stated intent, to be a university for this zone of extraordinary cultural and biological diversity.

With our 2014 State of the Tropics report, JCU and 11 partner organisations conducted the first in-depth, impartial assessment of the Tropics as an environmental and geopolitical entity in its own right.

We approached that mammoth task with one simple question in mind: Is life in the Tropics getting better?

Of course it’s not a simple question to answer, but with this landmark report behind us we now have the baseline measures and key indicators that will enable us to track change in the Tropics at a finer resolution and with greater accuracy and insight than ever before.

The findings in this initial report are sometimes encouraging, often confronting. Health and wellbeing, for example, have improved by most measures – but the people of the Tropics still represent more than two-thirds of the world’s poorest people. That figure gains even greater weight when we consider that by 2050, 67% of the world’s children will live in the Tropics.

This report reveals just how crucial the Tropics are to the world’s future: at a global level we must rethink our priorities on aid, development, research and education.

We intend to revisit and update State of the Tropics periodically, but in the meantime we have established an important biennial forum, the Future of Tropical Economies Conference. This is the beginning of a conversation in which we will identify and discuss economic opportunities for the Tropics.

JCU’s location at the intersection of the two great axes for growth – the Asian axis and the Tropical axis – presents us with both responsibility and opportunity to ensure that the answer to our simple question will become a more resoundingly positive one.

Sandra Harding
Vice Chancellor
Working from a gondola suspended from the crane’s 57-metre arm, scientists can work in and above the rainforest canopy of a hectare of rainforest, as well as accessing data about forest function via a network of 500 sensors that measure microclimates, tree growth and sap flow.

While the crane has been operating since the late 1990s, the Commonwealth Government’s Education Innovation Fund provided $9.37M to acquire the formerly leased site and add facilities that make it a globally significant field centre for rainforest research.

The Observatory is connected to international networks of research stations, including the International Long Term Ecological Research Network, and the Royal Society’s South-East Asia Rainforest Research program.

“Long-term research here has an important part to play in understanding global ecosystems and developing solutions to current and future environmental and community problems,” Professor Krockenberger said.

“Taking it to the top

The canopy is the business end of the rainforest, and the 47-metre canopy crane at James Cook University’s Daintree Rainforest Observatory (DRO) takes researchers right to the top.
We’d all like to save the planet – Lorenna Machado hopes her research will help to do just that, one bovine burp at a time.

A PhD candidate based at JCU’s Centre for Macroalgal Resources and Biotechnology in Townsville, Lorenna is working with a CSIRO team to investigate using seaweed to reduce the methane produced by cattle and other ruminants.
I’ve always had an interest in animal nutrition, as well as environmental issues, so this project is perfect for me. It brings together two of my biggest passions,” she says. “Our aim is to significantly reduce the meat industry’s carbon footprint."

Methane emissions from livestock account for approximately 10 per cent of Australia’s total greenhouse gas emissions, and over half of this comes from cattle grazing in northern Australia.

Methane’s global warming potential is 25 times higher than carbon dioxide and, in Australia, ruminant livestock are responsible for 84 per cent of the total methane emitted within the agricultural sector.

"Cattle ferment their food in their first stomach, the rumen, before regurgitating it and chewing it again," Lorenna explains.

"In a laboratory study of rumen fluid, we have found that algae can reduce methane production by 99 per cent. So far, the results are really promising. The next step is to work with CSIRO to test our theory on cattle."

Lorenna is under no doubt that this ‘reef and beef’ project, which brings land and sea together for the environmental benefit of the planet, has enormous potential.

"I’m very passionate about looking for natural ways to reduce climate change,” she says. “And with the demand for milk and meat increasing globally, there are many advantages to using seaweed as feed for cows and other ruminants."

"Seaweed is a highly nutritious food source, and the added bonus is that it doesn’t compete with human food consumption in terms of production."

"If we can improve ruminant digestion, we hope this in turn will result in less methane released into the atmosphere. It’s an out-there and new approach, but the early trial results suggest that seaweed could be an answer."

Lorenna and her colleagues have identified two forms of algae with particularly high nutritional value, and a greater effectiveness at combating methane emissions. These will be used in a trial with live animals.

Working with Project Leader Dr Nigel Tomkins from the CSIRO, Lorenna says the project has the general support of the agriculture industry.

"The feedback we’ve received from the industry so far has been positive,” she said. “As long as it doesn’t decrease productivity, and the evidence so far suggests it doesn’t, farmers will be happy using seaweed in their cattle feed,” Lorenna said.

"I hope my project contributes to the sustainability of the agriculture industry, providing cost-effective natural alternatives to reduce its impact on climate change.

“The potential is there to make a real difference.”

– Gavin Broomhead

This project is part of the National Livestock Methane Program, through funding from the Australian Government Department of Agriculture, Carbon Farming Futures Filling the Research Gap Program and Meat and Livestock Australia.
The scientific world has welcomed two new lizards, found by Dr Conrad Hoskin in a remote area of Cape York Peninsula.

Dr Hoskin found the Cape Melville Rainbow Skink and the Cape Melville Bar-lipped Skink on an expedition to the rainforest plateau on top of the Cape Melville Range, 170 km north of Cooktown.

His earlier finds in the area—a leaf-tailed gecko, a boulder frog, and a golden lizard—prompted international headlines of a ‘lost world’ of animals isolated by a freak of geography.

Dr Hoskin says that’s not unfounded. “I think it’s justified. It’s a virtual mountaintop fortress cut off from the surrounding area by piles of huge granite boulders. It’s truly remarkable. It probably has more unique animal species per unit area than anywhere else in Australia.”

Another three vertebrate species were discovered there in past decades. So that’s eight animal species that are found only at Cape Melville, making their entire world distribution about the size of inner Sydney.”

The latest two lizards have been officially named and described in the international journal Zootaxa. Their scientific names—Carlia wundalthini and Glaphyromorphus othelarrni—are chosen by Traditional Owners of the Cape Melville region in collaboration with Dr Hoskin. Both names refer to Traditional Owners who once lived in the area.

The Cape Melville surveys were funded by the National Environmental Research Program, National Geographic, and the Australian Biological Resources Study.

What makes a great tropical building? And how does a sustainable building designed for the tropics differ from one designed for the temperate zone?

“The guidelines for building sustainably are more reflective of what works in a temperate climate, so our aim was to present case studies that draw on local expertise as to what makes for a great building in the tropics,” JCU urban geographer Dr Lisa Law said.

A website developed by James Cook University and the Tropical Green Building Network now shares success stories in designing for sustainability in the tropics.

“We started with 45 case studies of buildings that work brilliantly for the tropics, and we’re continuing to build up the database,” Dr Law said.

Emma Thirkell, facilitator of the Tropical Green Building Network and a team leader on the project with Dr Law, said the case studies were selected with reference to the standards for sustainable construction, as well as a working knowledge of building in tropical, regional Australia.

“For example, in temperate climates thermal mass and insulation are pluses for sustainable design, reducing energy use for heating in winter—but in the tropics we favour lightweight materials that allow buildings to shed heat.”

“Differences like that can make it difficult for a great tropical building to earn green stars for sustainability under the current guidelines.”

Developed with support from JCU’s Sustainability Fund, the website presents real-life examples with information including design, materials and energy use, as well as comments from the owners and users.

“Our aim is to share stories and information about what works. We hope to influence the choices that people make in designing their homes, but also provide an accessible learning and teaching resource,” Dr Law said.

www.jcu.edu.au/tsd
James Cook University Pharmacy is celebrating a clean sweep in the annual Pharmaceutical Society of Australia (Queensland branch) student awards.

Liam Mendiolea, from Townsville, is the Queensland Pharmacy Student of the Year and the fourth JCU student to win the award since its inception ten years ago.

Honours student Natalie Maher, from Cairns, is the Professor James Dare Pharmacy Student of the Year. This award recognises an outstanding student who excels academically and demonstrates leadership, ethics and extensive community engagement.

Pharmacy graduate Alexandra Pitiris, originally from Home Hill, is Intern of the Year – in recognition of her work at a pharmacy in Ayr.

“This is the first year we have won all three student awards,” Pharmacy head Dr Michelle Bellingan said.

“The awards reflect the dedication and enthusiasm of our students and graduates.”

Predators – they’re precious

A study of the global decline of large predators such as lions, dingoes, wolves and bears has found they are important to ecosystem health.

Scientists in the United States, Australia, Italy and Sweden examined the ecological roles and conservation status of the largest members of the order Carnivora.

“These are some of the world’s iconic predators,” said co-author Dr Arian Wallach.

“Because of their position at the top of the food web, they frequently come into conflict with humans.”

The study, published earlier this year in Science, focussed on 31 species and found that more than three-quarters of them are declining, with 17 species now occupying less than half of their former ranges.

“Globally, we are losing our large carnivores,” said lead author Professor William Ripple, from the Department of Forest Ecosystems and Society at Oregon State University.

“Many of these animals are at risk of extinction, either globally or locally. And ironically, they are vanishing just as we are learning about their important ecological effects.”

Professor Ripple and co-author Robert Beschta have documented impacts of cougars and wolves on forest and streamside vegetation in Yellowstone National Park and other reserves.

Dr Wallach, a JCU researcher at the time and now with Charles Darwin University, said Australia’s largest terrestrial predator helped to sustain biodiversity and control invasive species.

“Where dingo populations are healthy and stable we see fewer impacts from wild herbivores and smaller predators such as the red fox. That allows vegetation and small native animals to recover,” she said.

“Overall, the suppression of dingoes has probably contributed to the endangerment and extinction of small marsupials and rodents over much of the continent.”

Because members of Carnivora need large ranges, the researchers say protected areas alone will not be enough to save them – we need to find ways to co-exist with predators, in both natural and working landscapes.

“We know this is not a simple endeavour.” Dr Wallach said. “People can lose their livelihoods and even their lives to large carnivores. But the more we find out about them, the better we understand how valuable they are to us.”

www.dingobiodiversity.com/
The projections are detailed in the landmark 2014 State of the Tropics report, an initiative of 12 research institutions from across the world.

The report, which provides the first in-depth, impartial assessment of the Tropics as an environmental and geopolitical entity in its own right, was launched by Burmese Opposition Leader Aung San Suu Kyi and released simultaneously in Rangoon, Singapore and Australia.

"Because most of the world’s children will live in the Tropics by 2050, we must rethink the world’s priorities on aid, development, research and education," the project’s convener and JCU Vice Chancellor Professor Sandra Harding said.

State of the Tropics also includes groundbreaking analysis of the impacts of climate change, showing that while the tropical zone is expanding, the magnitude of that expansion is slower than earlier thought.

The comprehensive report shows the Tropics is a region that has much to offer, and its influence and impact on the rest of the world is set to dramatically rise in coming decades.

The report reveals that economic growth in the Tropics has outperformed the rest of the world over the past 30 years and is now estimated to represent 18.7 per cent of global economic activity, up from 14.5 per cent in 1980.

Climate change, however, has the potential to affect the Tropics disproportionately, through impacts on human and food security, renewable water availability, rising sea levels, and vector-borne diseases.

The report demonstrates that nations in the Tropics have made extraordinary progress across a wide range of environmental, social and economic indicators in recent decades. It also highlights the many significant and unique challenges the region continues to face.

"There is much the wider world can learn from the many innovative approaches to life adopted by the various peoples in the region; approaches which have served those peoples well," Professor Harding said. "But for a variety of reasons, the tropics have lagged behind the rest of the world. In many ways, this makes the Tropics more vulnerable to the world’s grand challenges than other regions.

"There are great opportunities for tropical nations to work together to solve these challenges. Countries in the region are more likely to have pragmatic solutions for problems experienced elsewhere in the Tropics where similar environmental and other conditions prevail."

Professor Harding said that at a time of increasing concern about social, environmental and economic sustainability, a different approach to the Tropics was long overdue. "We began this project to try to reframe how people see the world. It is time to recognise and acknowledge the Tropics as a region defined from within, rather than without, to embrace the wisdom and experience of its peoples and to ensure that solutions of merit deployed in one part of the Tropics can be shared elsewhere, across the Tropics and beyond."

By 2050, two-thirds of the world’s children will be living in the Tropics by 2050, raising serious implications for global policy makers.

The future is tropical

Half of the world’s population and 67% of the world’s children will be living in the Tropics by 2050, raising serious implications for global policy makers.

stateofthetropics.org
James Cook University researchers and collaborators have established that bacteria are killed by the wing’s physical structure — one of the first natural surfaces found to do so.

Husband and wife team Gregory and Jolanta Watson provided the genesis of the research and were part of an international team that came up with a detailed model of how this anti-microbial defence works on the nanoscale.

“It’s based on the fact that bacteria have an outer layer which can be torn under the right conditions,” Dr Gregory Watson said. “The cicada’s wing is covered with millions of minute, blunted spikes which bacteria can rest on. Over time the bacteria cell’s outer surface breaks down and begins to penetrate the spaces between the spikes, and eventually dies.”

The Watsons’ interest in cicadas was sparked in the late 1990s when they spotted a dead cicada on a bush pathway and noticed that its wings did not reflect light.

“Being nanoscientists and biophysicists, we were interested in the natural world of the very, very small from the start,” Dr Jolanta Watson said. “While collecting more specimens for study, we noticed that the wings of dead cicadas were not consumed or contaminated in the same manner as their bodies.”

The Watsons investigated further, wondering what was protecting the wings from decomposition.

“When we examined them with an atomic force microscope we measured very little adhesion between the cicada wings and natural contaminants such as plant material and soil fragments,” Gregory said.

This combination, as well as intuition, provided the reasons for the studies of bacterial interactions with not only the cicada wings but also other insect wings.

Collaborating with microbiologists, they investigated how the nanostructures of the cicada wing interacted with some bacteria.

“Resistance to antibiotics is a world-wide challenge with serious implications for public health,” Gregory said. “Natural biological surfaces such as insect wings could be templates for novel antibacterial materials for industrial and especially biomedical applications.”

More recently Gregory and Jolanta, in collaboration with Dr David Green from the University of Hong Kong, have succeeded in growing a range of human cells on cicada wings.

“The JCU researchers have also shown that cicadas, as well as some other insects, are able to clean their wings without relying on rain.

“These are ultra-low adhesion and self-cleaning surfaces that can control the interaction of different living cells and also repel liquids,” Jolanta said. “The insect world is proving to be fascinating and fruitful.”

The healing touch

Humans use all sorts of chemical weapons in their fight against harmful bacteria, but a noisy Australian insect has another technique: the clanger cicada can kill bacteria just by touching them with its wing.

“Thanks to cicadas, we now know of a surface that kills bacteria, but allows some human and animal cells to grow in specific ways,” Gregory said. This may find application in a range of human implants and devices, where we need to minimise post-surgery infections and promote wound healing.

Blunted spikes on the cicada’s wings can burst bacteria.
Outstanding Alumni 2014

JCU’s Outstanding Alumni Awards recognise graduates of JCU who have made an outstanding contribution in their field of endeavour.

From left, Professor Sandra Harding, Daniel Christie, Dr Sam Goodwin, Professor Gracelyn Smallwood, Andrea Ambrosio, Natalie James, Sarah Douglass, Dr Colin Grant, Dr Jeffrey Ayton and Lt Gen John Grey AC.

The Chancellor’s Award

Dr Jeffrey Ayton, who graduated with a Master of Public Health and Tropical Medicine in 2002, received the Chancellor’s Award. Dr Ayton is the Chief Medical Officer, Australian Antarctic Division, in the Australian Government’s Department of Environment. He has a passion for rural and remote medicine and has inspired Australian doctors and students to pursue careers in rural and remote medicine.

Outstanding Alumni

Professor Paul Amato was awarded his Doctor of Philosophy (Behavioural Science) in 1983. Professor Amato is a leading US researcher in the areas of causes and consequences of separation and divorce, marriage and marital quality, parent-child relationships, psychological distress and wellbeing over a person’s life.

Mr Daniel Christie graduated from JCU with a Bachelor of Engineering with Honours in 1998. He is the Glencore Copper Refinery and Port Operations Manager in Townsville and has more than 15 years’ experience in large-scale engineering projects.

Dr Colin Grant was conferred his Doctorate in fisheries production ecology in 1977. He is First Assistant Secretary, Port Operations Manager in Townsville and has more than 15 years’ experience in large-scale engineering projects.

Ms Natalie James graduated in 1996 with a Bachelor of Arts and Bachelor of Laws. She later completed a Masters in Industrial Law at the Australian National University. In 2013 she was appointed to the position of Australia’s Fair Work Ombudsman.

Mr David Peever graduated with a Bachelor of Economics in 1978 and retired this year as Managing Director of Rio Tinto Australia. His other appointments include Chairman-elect of Cricket Australia, and Chair of an eminent persons panel undertaking a First Principles Review of the Defence Department.

Mr George Peever graduated with a Bachelor of Arts in 1977 and a Master of Education Degree in 2005. He has been Chief Executive Officer of TORGAS, an organisation providing apprentices and trainees to businesses throughout Queensland, since 2010.

Professor Gracelyn Smallwood received a Master of Science from James Cook University in 1993 and a PhD in 2011. Professor Smallwood has been an outspoken advocate for the rights of Aboriginal and Torres Strait Islander peoples since 1968. In 2014 she was awarded the NAIDOC Person of the Year Award.

Early Career Alumni

As an undergraduate Ms Andrea Ambrosio secured project work with Outsource Management through JCU’s Careers Hub. She joined the company after graduation in 2005 and is now the Business Development Manager.

Dr Katherine Bode completed her Bachelor of Arts with First Class Honours in 2001, winning eight prizes including the University Medal. She is now a Senior Lecturer in ANU’s Centre for Digital Humanities Research.

Ms Sarah Douglass graduated with a Bachelor of Arts and a Bachelor of Science in 2012. She is now an International Chemical Policy Officer in the Australian Government Department of Environment, developing policy related to hazardous materials.

Dr Samuel Goodwin graduated in 2007 with a Bachelor of Medicine and Bachelor of Surgery. He is Deputy Director of Medical and Clinical Services at the Central Australian Health Service in Alice Springs. His award recognises his rural medical leadership.
Researchers from James Cook University’s Australian Institute of Tropical Health and Medicine (AITHM) in Cairns will work with Janssen Cilag Pty Limited (Janssen) to investigate ‘a very promising protein’, with a view to developing a treatment.

The collaboration was facilitated by Johnson & Johnson’s just-launched Asia Pacific Innovation Centre.

“In earlier research, most recently in clinical trials in which we inoculated coeliac patients with hookworms, we’ve been investigating the worms’ ability to survive in the human gut by regulating their host’s immune response,” JCU parasitologist Professor Alex Loukas said.

“After we established that the proteins the worms secrete are the key to this anti-inflammatory effect, we then sifted through all the proteins involved, synthesised the most abundant ones, investigated those, and identified our most promising candidate.

“With Janssen’s support, we now plan to investigate that protein as a potential treatment – testing it on human cells and doing all the preparation required for eventually conducting human clinical trials of a potential treatment for IBD.”

The researchers will also investigate the mechanism whereby the protein reduces the inflammatory response, without compromising the host’s ability to fight off infectious diseases.

“Understanding that mechanism will help us determine whether the therapeutic application of this protein may also extend to inflammatory conditions other than IBD, such as asthma,” JCU immunologist Dr Severine Navarro said.

“Although IBD and asthma are very different conditions, they have in common an imbalance in certain T cell functionality, which results in overwhelming inflammatory processes.

“Our previous work has established that hookworms can change T cells from pro-inflammatory to anti-inflammatory,” Dr Navarro said.

“The good news is that these newly generated anti-inflammatory T cells don’t just protect the gut, they are also able to protect other organs, such as the airways.”

Professor Loukas said collaborating with Janssen at this early stage would significantly accelerate the investigation’s progress.

“Thinking of hookworms as a potential treatment isn’t exactly a mainstream idea. We’re excited that Janssen is willing to look outside the box for new anti-inflammatory treatments. Their expertise in drug development is going to be invaluable to us,” he said.

“This stage of research – after early discovery work but before clinical trials – can be hard to find funding for. The Asia Pacific Innovation Centre is a welcome development for researchers like us. It bridges that gap.”

Ironically, Janssen produces drugs that are used around the world to treat hookworm and other parasitic worm infections.

“Our interest is in Janssen’s expertise in inflammatory bowel disease,” Professor Loukas said.

“But let’s hope the worms can see the poetic justice in Janssen helping us put one of their proteins to work as a healing agent.”

The Australian Institute of Tropical Health and Medicine at James Cook University has a research focus on tropical health issues, including diseases and illnesses that are prominent in the tropics. Its research programs include malaria, dengue, dangerous common parasites and chronic disease. AITHM will provide world class tropical medicine that can be translated into health system outcomes and ensure long-term health security for Australia.

www.aithm.jcu.edu.au
Kate Domett remarkably goes one step further unlocking the secrets of human skeletal remains thousands of years old.

The New Zealand-born paleopathologist has investigated prehistoric, historic and modern human skeletal remains from Thailand, Cambodia, Vietnam, Burma and Australia.

“I have a particular interest in community health and disease,” she says. “Osteoarthritis, trauma, dental health, and infectious diseases can tell us a lot about how successful a community was in the past, and we can learn from those successes and failures.”

Dr Domett concedes there are limits to the stories bones can tell. “Bones can only change in three ways – you can lose bone, grow bone or there can be a combination of both, and these changes need time, so we tend to see the more chronic diseases.

“Many untreated tropical infections can kill you quite quickly, but they won’t show in your bones. So in about 95 per cent of cases, we won’t know how they died, but in others it’s very clear – for example, in Cambodia we found a skull with lesions from an obvious sword injury.”

Novelist Kathy Reichs’ fictional character Temperance Brennan often amazes readers with her ability to solve crimes by forensic examination of human bones.

“Paleopathologist Kate Domett at work in Cambodia.”

Western Gate, Angkor Thom

“JCU students excavating a burial site in Thailand.”
Trained in biological and forensic anthropology as well as human anatomy, Dr Domett sometimes assists police on more current investigations. However, paleopathology – the study of disease in the past – is her main focus.

Currently working predominantly in mainland Southeast Asia, she has collaborative projects in Cambodia (Paddy to Pura) and Thailand (Environment and Society before Angkor) with a new project about to start in Laos.

On these projects, she is working closely with archaeologists to uncover remains from ancient cemeteries dated between 1,000 to 5,000 years ago.

On a project near Angkor she has made a find she describes as ‘incredible’.

“This region of Cambodia served as the seat of the Angkorian Empire, flourishing from approximately the 9th to 15th centuries,” she explains. “Just prior to this there began a huge change in society, which eventually led to people and resources, such as water, being heavily controlled by the state.

On a dig in the northwest we uncovered skeletal remains and found that nearly a quarter of individuals had cranial trauma, including many with healed skull fractures. We also uncovered one metre-long swords. From all of this, we can deduce possible violence with a nearby community, perhaps in competition for resources due to the beginnings of state control.

“From a few skulls and bones, we can link deaths to a defined period in history, and find an answer as to how they lived, and how and why they might have died.”

Dr Domett believes her work in skeletal analysis and investigating ancient disease can help us understand both the past and present.

“Another aspect of my research is to look at the evolution of diseases, scrutinizing skeletons and searching for subtle differences in the development and progression of diseases that medical specialists examining live patients may not get to see,” she said.

“For example, I can spot the very early signs of osteoarthritis in bones, and I think this is really useful in the world of modern medicine. We see how chronic diseases progress without medical intervention.

“I’m really interested in how we can diagnose diseases by examining bones, and really focus on how someone may have lived, not just on how they might have died. I see a skeleton as representing a person, not as a set of dry bones.”
There's a piece of Vanuatu that calls Australia home, and it may cause a rethink on how continents are built.

Geologists thought the volcanic Vanuatu islands, about 2200km east of Townsville, were isolated from continental influences – but research by a JCU team suggests the 'geological basement' of Vanuatu contains ancient material from northern Australia.

The team discovered volcanic rocks from Vanuatu contained tiny crystals of the mineral zircon, carried up in magma from the depths by the volcanic plumbing systems. Using state-of-the-art radiometric dating techniques, they have established the crystals are up to three billion years old.

Dr Carl Spandler, one of the co-authors of the paper, said the zircon "shouldn't be there" and its presence has major implications for how scientists understand continents are made.

"The range of ages of the zircon crystals from Vanuatu closely matches the age of rocks that make up northern Australia. There is nothing else like it in the south west Pacific," he said.

The fragment of Australian crust now under Vanuatu is thought to have separated from the mainland prior to the Cenozoic Era, around 100 million years ago.

"Just because island chains or landmasses may be far removed from each other today, that doesn't mean they always were. This calls for a rethink of how we calculate the rates and processes of generating new crust on Earth," Dr Spandler said.

Dr Spandler said it was particularly satisfying that the findings were made by one of JCU's honours students, Janrich Buys, who completed his geology degree in 2013.

"It goes to show that you don't have to be a long established researcher to make a significant scientific breakthrough," he said.

More than 900 students were awarded their degrees from James Cook University in Singapore in 2014.

The students have earned their bachelor and postgraduate degrees in areas including business, education, environmental science, information technology, psychology and tourism management.

At the most recent of three graduation ceremonies, held in November at the Marina Bay Sands ballroom, three doctorates were conferred.

Mr Lim Kim Hai, Executive Chairman of Regional Express (Rex Airlines) delivered the occasional address at the November ceremony.

Valeri Yu, who majored in interactive technologies and game design, was valedictorian at an earlier ceremony.

Deputy Vice Chancellor and Head of the Singapore campus Dr Dale Anderson said JCU Singapore has made a significant contribution to the Singapore education scene.

"For more than ten years we have provided an avenue for Singaporean and international students to receive Australian university degrees at a dynamic and vibrant location in Asia.

"We have seen the local education landscape evolve dramatically over this past decade and we are keen to continue providing opportunities to those who wish to seek a qualification from a world-ranked Australian university," Dr Anderson said.

James Cook University has acquired a new property to accommodate the growth of the Singapore campus. The new campus is located at 149 Sims Drive in the eastern part of the island, a short distance from the CBD and near the newly completed Singapore Sports Hub.
Torres Straits scholar

A Torres Strait Islander woman who wants to be a teacher and encourage brighter futures for her people is the recipient of this year’s Morey Scholarship, established by Senator Sue Boyce.

Katijah Keenan, 22, is a JCU education student with a bright future of her own. After attending high school in Brisbane, she returned to Cairns and joined JCU’s Remote Area Teacher Education Program, where she has excelled.

Katijah is committed to living and working in the Torres Strait, which was one of the requirements of the $6000 bursary. “Ever since I began my uni studies that’s been my vision,” she said. “It motivates me to know that, after all the stresses of studying, I can use my degree to help empower the younger students.”

The name of the scholarship acknowledges Senator Boyce’s late paternal great-grandfather, Frederick E. Morey, who owned and operated pearling luggers based at Thursday Island before World War II. Senator Boyce said Ms Keenan was a fine recipient. “A strong focus on education is the single most important long-term answer to many of the problems encountered by Australia’s Indigenous population,” she said.

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Katijah is very dedicated and enthusiastic as a student and pre-service teacher and she deserves this recognition and the opportunity to realise her full potential.

Greener concrete

Australia pours more than 25 million cubic metres of concrete a year, so research that could reduce its environmental cost is welcome news.

JCU’s Dr Rabin Tuladhar has found that short pieces of recycled plastic can be added as reinforcement, removing the need for steel mesh in concrete footpaths and precast elements such as drainage pits and concrete sleepers.

“Using recycled plastic, we were able to get more than a 90 per cent saving on CO2 emissions and fossil fuel usage involved in using the traditional steel mesh reinforcing. The recycled plastic also has obvious environmental advantages over using virgin plastic fibres.”

Dr Tuladhar’s team has conducted successful strength and durability tests on the precast concrete elements made with the recycled plastic fibres. Talks are now underway with concrete producers and local and federal governments on how to employ the new findings.

Dr Tuladhar’s work focuses on making concrete production more sustainable. Other possibilities include replacing natural sand with crusher dust [a by-product of stone quarries] and replacing cement with up to 30 per cent mining waste.

The Federal Education Department has forecast that between 2010 and 2022 there will be a 45 per cent increase in school enrolments in Queensland, the largest projected increase of all the states and territories.

Professor Nola Alloway, Dean of the College of Arts, Society & Education, said there was already strong demand for JCU’s graduate teachers.

“I often take calls from school principals asking about our final-year students before they have actually graduated,” Professor Alloway said. For the fourth year in a row, the Good Universities Guide has given JCU five stars in the category ‘Getting a full-time job’. Only six other universities scored as high, putting JCU in the top 20 per cent of universities for graduate employment.

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Dr Tuladhar’s team has conducted successful strength and durability tests on the precast concrete elements made with the recycled plastic fibres. Talks are now underway with concrete producers and local and federal governments on how to employ the new findings.

Dr Tuladhar’s work focuses on making concrete production more sustainable. Other possibilities include replacing natural sand with crusher dust [a by-product of stone quarries] and replacing cement with up to 30 per cent mining waste.

Last year, according to the Good Universities Guide, JCU had the most impressive uptake of graduate teachers in the country. Almost 97 per cent of our education graduates were offered jobs within four months of completion. Now that’s five stars for employability!

For the fourth year in a row, the Good Universities Guide has given JCU five stars in the category ‘Getting a full-time job’. Only six other universities scored as high, putting JCU in the top 20 per cent of universities for graduate employment.

“Ever since I began my uni studies that’s been my vision,” she said.

“It motivates me to know that, after all the stresses of studying, I can use my degree to help empower the younger students.”

The name of the scholarship acknowledges Senator Boyce’s late paternal great-grandfather, Frederick E. Morey, who owned and operated pearling luggers based at Thursday Island before World War II.

Senator Boyce said Ms Keenan was a fine recipient. “A strong focus on education is the single most important long-term answer to many of the problems encountered by Australia’s Indigenous population,” she said.

“Katijah is very dedicated and enthusiastic as a student and pre-service teacher and she deserves this recognition and the opportunity to realise her full potential.”

Predictions of strong growth in education, combined with James Cook University’s five-star rating for graduate employment, are good news for anyone planning a career in teaching.

Five-star jobs

Predictions of strong growth in education, combined with James Cook University’s five-star rating for graduate employment, are good news for anyone planning a career in teaching.
It all began with a uni assignment, making short videos explaining concepts in psychology.

“...but I got the bug,” Travis says. “I started writing scripts, but I still planned to do postgrad study in criminal psychology.

“I had all the paperwork filled out for that, but at the last minute I chose a one-year film course at the Moreton Institute of TAFE. I liked that it was short and practical, and I’ve been making movies ever since. I’m not getting rich, but I’m loving it.”

With no luck getting producers to take on his scripts, Travis made his first feature himself. Scratched is a cautionary tale of one crazy night of greed and intrigue in a share house in Townsville. “There was pretty much no budget, so I needed a cheap set and a small cast. The story involves a million-dollar lotto ticket, a bloke in a coma, and there’s a cyclone approaching.”

There’s also plenty of homemade fake blood. “After many trials, we chose a mix of chocolate sauce and red food colouring,” Travis reveals. “The consistency is just right, you can add extra colouring for arterial spray, and if you get some in your mouth it tastes ok.”

This is a long way from the original career plan of forensic psychology, but Travis says his studies were a good grounding for script writing and character development.

“Psychology instills the habit of observing people, thinking about their stories and their motivations. That’s an essential habit for a writer. You can have all the blood and gore you like, but you still need three-dimensional characters and some idea of how they’ll react under pressure.”

Enjoying local success with Scratched, Travis began work on Throwback. While pondering who to cast in the role of McNab, a disgruntled detective, he put his wish list online. “I wrote something like ‘Ideally I’d like to cast someone who looks like one of these guys, or is one of these guys’ and I listed actors like Bryan Brown, Sam Neil, and Vernon Wells.

“Vernon saw it! He looked at my trailer online, and he said he’d do it so long as we shot all his scenes in one day. Vernon’s first big break was playing Wez, the homicidal biker with the mohawk in Mad Max 2, so we were pretty excited about working with him.”

After a few years of weekend shoots, Throwback was born. It has screened at 10 international festivals and a DVD distribution deal is planned for Australia, New Zealand and the UK in 2015.

Travis, meantime, has moved on. “I’m working on an H.P. Lovecraft-inspired outback-sci-fi-horror story about a documentary film crew from Cairns who go off to investigate a doomsday cult.

“I’m aiming to raise $500,000, which would be more than a hundred times what we spent on Throwback – I want to pay my actors properly and spend some money on special effects. We might even buy some real fake blood. We’ve had some ant problems with the chocolate sauce.”

Rhiannon (Melanie Serafin) and Jack (Shawn Brack) see something they wish they hadn’t.
I came here as an undergraduate student, later I started my masters, and I’ve been working for about a year and a half now in School Engagement.

We work with 26 schools from the Cairns region up to the Torres Strait. Our focus is on Indigenous students, and students from low socio-economic areas. We aim to raise their aspirations, get them thinking about higher education.

We’re also involved with Indigenous Leaders of Tomorrow (ILT) conferences, working with Catholic Education Diocese, Education Queensland and other external partners, and I help co-ordinate the Student Ambassador program with undergraduate students who help deliver our message.

I’m from Thursday Island originally, but I grew up in Cairns. I can say I’m a successful product of the kind of program I work in now – for most of my schooling I was with the Aboriginal and Islander Tertiary Program, which later became ILT.

It’s all about creating a positive vibe to inspire kids, building up the confidence and academic momentum that will carry them through. I tell them education is one of our tools, that we’re the new warriors of education and social change in our communities.

Earlier this year I gave a presentation at the World Indigenous Peoples Conference on Education in Hawaii about how JCU works to increase recruitment and retention of Aboriginal and Torres Strait Islander students.

My work now is with a top-down program, but as an undergrad I worked on some student initiatives – we formed Bama Nguma-Barra Indigenous Student Association, and we got the Deadly Mentors program going on the Cairns campus. Building a network of like-minded students really supported my confidence and my academic growth.

Connection helps recovery

This home was split in two when Cyclone Yasi hit Innisfail. Researchers have found that community connections help with recovery.

People with strong connections to their community fare better in recovering from extreme weather events, a study of disaster survivors has found. In addition, those who remain in their community after a disaster are more likely to be resilient to disaster events.

Helen Boon, a senior lecturer in JCU’s College of Arts, Society and Education, is the lead author of Recovery from Disaster: Resilience, Adaptability and Perceptions of Climate Change.

“Connection helps recovery”

We found that resilience is both an individual personality trait and a process, whereby resilience is moulded through social and environmental interactions,” Dr Boon said. “The strongest direct predictors of resilience were adaptability and a sense of place.”

We hope the results will inform planning for climate change events, ensuring that emergency management policies and mitigation strategies are appropriate and equitable.

As a traditional dancer, I’ve always danced at cultural events on campus. When I’m dancing, and when I’m wearing my Dhari around my neck, I feel I represent everyone back home in the Torres Strait and our community in the Cairns region. I take a lot of pride in sharing my culture and there’s always a good response.

My masters is on hold for now, but I’ll definitely come back to that. I plan to research Torres Strait Islander dance, and how we uphold our spirituality through dance today. Our culture is strongly evangelised – I want to look further at what our dances and practices mean now.

Some of our dances are from before Christianity, some from after, and some have influences from the Pacific. One of my grandfathers came with the missionaries as a young cabin boy from Lifou, so I feel connected to every stage.

I’ll be leaving JCU soon to take up a position at the National Library in Canberra. I’m looking forward to that next step, but I’ll always be coming back to Cairns and TI.”

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“We hope the results will inform planning for climate change events, ensuring that emergency management policies and mitigation strategies are appropriate and equitable.”
Ode to a cockroach

Cockroaches! A mere mention of the word causes many of us to recoil in horror or reach for a shoe.

But only a small number of Australia’s hundreds of species of cockroaches [or blattodeans as they are known to their scientific friends] give the group a bad name. The book reveals their diversity and beauty, looks in detail at their morphology, habitats and ecology, and explains how to collect and preserve them. Importantly, it will allow pest controllers, students and researchers to reliably identify all common pest species as well as the non-pest cockroaches.

It will also, perhaps, go some way towards elevating the reputation of these much-maligned insects, and promote further study of them.

David Rentz AM specialises in katydids, crickets and other members of the suborder Ensifera. He is an Adjunct Professor at James Cook University and an Honorary Fellow of the California Academy of Sciences. His Guide to the Katydids of Australia won a Whitley Award commendation for best field guide.

A Guide to the Cockroaches of Australia

By David Rentz
CSIRO Publishing
ISBN: 9780643103207

At the same time, the south’s conservation sector would like to see much of the north preserved as iconic wilderness.

Conservation and resource development interests alike are often at odds with the interests of the north’s traditional owners, many of whom remain trapped in welfare dependency and poverty.

Indeed, to the ire of northern Australians, the past 50 years of their region’s history have been characterized by these national-scale conflicts being played out in regional and local communities.

In this book Associate Professor Allan Dale, a research leader at The Cairns Institute at JCU, explores these conflicts as well as the many emerging opportunities facing the development of the north.

He suggests that a strong cultural divide exists between northern and southern Australia – one that needs to be reconciled if the nation as a whole is to benefit from northern development.

Beyond the North-South Culture Wars

By Allan Dale
Springer
ISBN: 978-3-319-05597-8

Increasingly, Australia’s agriculturalists are looking to the nation’s north to escape the decline in southern water and soil resources. Booming mineral and gas developments are also helping to drive the nation’s economic success.

A global effort

Scholars spanning six continents and 15 countries have contributed to the International Handbook of Research on Environmental Education.

The Handbook is aimed at educators, researchers, policy makers, and students to help create better understanding of environmental issues.

Edited by The Cairns Institute’s Professor Bob Stevenson and colleagues, it reviews and synthesizes the knowledge base of the environmental education field.

The purpose of the handbook is to illuminate the most important understandings that have been developed by environmental education research.

It also critically examines the ways in which the field has changed over the decades, the current debates and controversies, what is still missing from the environmental education research agenda, and where that agenda might be headed in the future.


“A comprehensive volume on research in environmental education could not come at a better time, when the world is fast realising how essential it is to expand education and enhance literacy about the environment,” observed AERA Executive Director Felice J. Levine.

“This cross-disciplinary volume identifies the scholarship that can and should undergird debate of environmental issues such as climate change, conservation, and sustainability.”

International Handbook of Research on Environmental Education

Edited by Robert B. Stevenson, Michael Brody, Justin Dillon, Arjen E.J. Wals
Routledge/American Educational Research Association
ISBN: 978-0-4158-9239-1

By Allan Dale
Springer
ISBN: 978-3-319-05597-8

Beyond the North-South Culture Wars
Reconciling Northern Australia’s Recent Past With Its Future
TEDxJCUCairns, held in October and now online, was the first such event to be held in far north Queensland.

TEDxJCUCairns was titled *Torrid talks – why Aristotle was wrong.*

“We’re excited to be sharing ideas, expertise and inspiration from the tropics, a region where Aristotle mistakenly believed humans could not possibly thrive,” Deputy Vice Chancellor Robyn McGuiggan said.

To see the talks online look for TEDxJCUCairns on YouTube.

The presenters included dengue expert Scott Ritchie, musician David Hudson, reef researcher Jodie Rummer, architect Shaneen Fantin, schoolboy Charlie Cooper, public health researcher David MacLaren, and artist and performer Bernard Lee Singleton.

“What all the speakers have in common is that they are living resourcefully and creatively in the tropics, and they have ideas worth spreading,” Professor McGuiggan said.
James Cook University:
Highest cited research institution in the world for coral reef science.*