

# CBCS NEWS

A quarterly newsletter  
**Issue 12** — Summer 2022



Left: Junior Novera doing field work during his PhD project on the island of Bougainville, Papua New Guinea.  
Right: In discussion with community members in customary owned lands in Bougainville, Papua New Guinea.

## Junior Novera wins Allison Sudradjat Prize

CBCS PhD candidate **Junior Novera**, supervised by **Professor Salit Kark** and **Associate Professor Diana Fisher**, has been awarded an Allison Sudradjat Prize.

Each year, six outstanding **Australia Awards** Scholarship recipients (four from Indonesia and two from Papua New Guinea) are awarded this prize. It honours the memory of Allison Sudradjat, who was AUSAID's Minister Counsellor in Indonesia, and her significant contribution to Asia-Pacific cooperation and development, especially between Australia and Indonesia, PNG and Timor Leste. The prize is intended to support scholars to undertake additional activities related to their course of study and their intended contributions in their country.

### Restoring forest in Bougainville

Junior, one of the two Papua New Guinean prize recipients, is using the prize money to support high-priority conservation projects in the Kunua District and Mt Balbi Key Biodiversity Area in the north of the Autonomous Region of Bougainville. One of these projects, a native tree nursery, will restore degraded forest and floodways in these areas, and replanting the rainforest will protect native wildlife from extreme weather conditions and

offer healthy and sustainable food sources for the local people. The native fauna spread seeds, help pollinate plants and feed on insects that destroy crop plants.

By replanting native forests, Junior's team is also protecting native wildlife, plants and habitats from effects of climate change such as inland flooding caused by altered and extreme weather conditions like cyclones and heat waves.

### Protected areas of the future

While Junior's main focus is long-term biodiversity conservation, replanting rainforest will facilitate carbon absorption in forested Bougainville and a reduction in greenhouse gas emissions on the island. Junior and the local communities in Kunua are working together to establish the Kunua Conservation Network, and plan to declare the Kunua Plains and Mt Balbi KBA protected areas by 2030.

This work and additional discussion about "backyard conservation" in customary owned lands is presented in a paper by Junior Novera and Salit Kark that will be the first in a series and a special issue about local and Indigenous ecological knowledge in the journal *Trends in Ecology and Evolution*.

### About CBCS

The Centre for Biodiversity and Conservation Science (CBCS) is a world-leading solution-oriented research centre for biodiversity conservation.

Based at The University of Queensland (UQ) in Brisbane, Australia, CBCS works in partnership with scientists, governments, non-governmental organisations and industry to help solve the most important conservation problems around the world.

[cbcscentre.uq.edu.au](https://cbcscentre.uq.edu.au)

### CBCS tops national field for biodiversity conservation

*The Australian* newspaper's *Research* magazine has named its list of top researchers and top institutions in each field, based on number of citations for papers in top 20 journals over the past five years.

In a wonderful affirmation for all of CBCS, UQ gained #1 ranking for the three categories Biodiversity and Conservation Biology, Ecology and Environmental Sciences nationwide, and **Professor James Watson** was named the country's top researcher for Biodiversity and Conservation Biology.

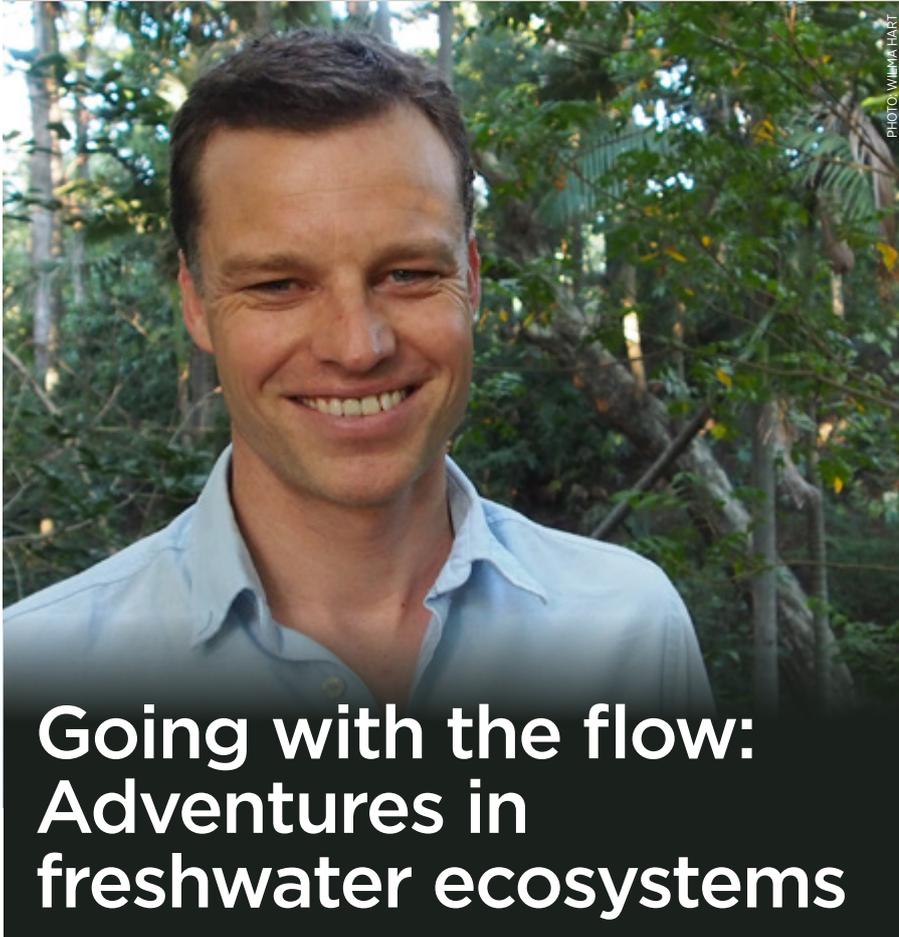


Read the full list of top researchers and institutions in all categories at the end of this story in *The Australian* about their top-named researcher in the field of Zoology Jodi Rowley's work on the citizen science FrogID project [here](#).

## PROFILE

Dr Simon Hart

Lecturer in Quantitative Biology, School of Biological Sciences



# Going with the flow: Adventures in freshwater ecosystems

A picture of an elephant seal is responsible. I think I was about 10 or 12 or something and I was obsessed with Antarctica and saw a picture of a scientist working on an elephant seal on a subantarctic island. That was what I was going to be when I grew up...

## Possums, pinnipeds and *Parascyllium*

During my science degree at The University of Melbourne, I began working as a research assistant on a project to understand the population dynamics of ringtail possums. At the same time, I was developing an interest in marine ecology after an internship at CSIRO Marine in Hobart together with a newfound love of diving. But my world was shaken when my dad passed away at the end of my undergraduate degree. I needed some space, and so I went travelling in South America where, among other things, I spent a memorable two months reading the Patagonia, Tierra del Fuego, and Chiloe chapters of *The Voyage of the Beagle* while in those very locations. After a year off, I did my Honours research with Professor Mick Keough, who taught me the power of experiments and statistical

modelling for understanding how the world works, and with whom I shared one of those rare and exciting moments when a new finding – no matter how trivial – becomes clear. I was hooked, but in hindsight I didn't quite know it yet. And I wasn't ready to ignore the lure of more exciting field work.

So, I lived a “micro-version” of my pinniped dream. I spent some time on Kanowna Island assisting with a study on the Australian fur seal. What I remember most about this work was not so much the research but helping to remove fishing nets from around seals' necks. But the biggest opportunities over the next few years were all underwater. Working for a small environmental consulting company,

“Freshwater ecosystems remain underexplored, underappreciated and under threat

I had the enormous privilege of being involved in the first formal surveys of each of Victoria's 24 new marine protected areas. This is probably the first time I was immersed (seriously – no pun intended) in a single ecosystem type for a long enough period to really start to “notice” things. And it was amazing. I spent hours, day after day, swimming over and crawling under lush canopies of swirling kelp identifying and counting every vertebrate, mobile invertebrate and macroalgal species I could find. There were surprises around every corner and in every crack and crevice, and plenty of moments that had my heart racing; the secretive, crevice-loving, eel-like *Parascyllium variolatum* was responsible for a few of those.



*Parascyllium variolatum* making itself known.

## Distracted by biology

After a few more digressions I started a PhD at The University of Queensland, where I began working on tight experimental systems and developed an interest in using statistical model fitting to formally link mathematical theory to ecological data. The field work was no longer fun but immersing (no pun at all this time) myself in biological problems certainly was. I then spent a year exploring the US while doing a postdoc at Washington University, after which I moved to ETH Zürich in Switzerland, where I met my future wife, Wilma, in the photocopy room (yep.) on my very first day at work. My time in Switzerland was incredible. I had the opportunity to work with a wonderful group of friends, and a lot of freedom to explore how stochasticity, environmental variation and rapid evolution influence the rise and fall of species in ecological communities. But during this time I could never shake the sense that as much as I was enjoying myself, I was somewhat “distracted by biology” even as many of its wonders and the “services” it provides were under threat.



PHOTO: DR. SIMON HART

Touring across the rapidly retreating Aletsch Glacier, Berner Oberland, Switzerland. Seeing glaciers literally retreat during my time in Switzerland was both shocking and depressing.

## Basic and applied (freshwater) quantitative biology at UQ

Flying through Singapore as COVID-19 hit hardly felt like the right time to be thinking about making the most of new opportunities. But I was just about to begin my position as a Lecturer at UQ, and I was thinking hard about what to do next. Besides helping to develop a new Master of Quantitative Biology, I also knew that I could no longer “look away” from what the science clearly indicates is a geologically significant (!) – and desperately sad and consequential – global extinction event.

In her own research designed to understand how to best meet conservation, climate and food production goals in West Africa, Wilma was showing me how genuinely useful science can be for solving big problems (“Well, duh”, I hear you all say). So, in my new position at UQ I have decided to turn my attention to a relatively understudied system and a big conservation problem. Freshwater ecosystems are, per unit area, one of the most species-rich and phylogenetically diverse ecosystems on the planet, and yet they remain underexplored, underappreciated and under threat. Indeed, the evidence suggests that population declines and extinctions of species living in freshwater habitats far exceed those occurring in terrestrial and marine habitats. So, tentatively and somewhat naively – and together with many of you I hope – I am now focusing on problems of biology and conservation in freshwater ecosystems, in the hope that my future work can go some way to redressing these issues.



PHOTO: DR. ANABEL SMITH

Getting to know freshwater ecosystems in south-east Queensland.



Associate Professor Justine Bell-James (centre) accepting the Research Impact Award on behalf of the blue carbon team at Customs House, Brisbane, Tuesday 13 September 2022, with MC John Paitaridis and UQ's Vice-Chancellor Professor Deborah Terry AO.

# CBCS blue carbon team takes out Research Impact Award

A team of CBCS researchers has won The University of Queensland's Research Impact Award.

Led by [Associate Professor Justine Bell-James](#) (Law School, BEL Faculty), the team also includes [Professor Catherine Lovelock](#) and [Dr Valerie Hagger](#) (Biological Sciences) and [Dr Nicole Shumway](#) (Centre for Policy Futures). The award was one of several honours presented at UQ's Research Partnerships and Translation Awards, held in Research and Innovation Week 2022 on Tuesday 13 September. This award recognised the team's work on the Blue Carbon Methodology, and their partnerships with collaborators at the Clean Energy Regulator, Queensland State Government, CSIRO and The Nature Conservancy.

## Blue carbon into law

The carbon market is rigorous, and carbon sequestered can only be credited where abatement can be proven and legally secured. Before 2022, blue carbon ecosystems were not included in Australia's key climate change mitigation framework, the Emissions Reduction Fund (ERF), due to uncertainties in the science and law. But earlier this year, the Australian Government passed into law a "Blue Carbon methodology" that allows proponents of certain coastal restoration projects to become accredited and receive carbon credits.

During the years of method development, Justine was engaged

as a legal consultant and presented her research at numerous method development workshops, providing advice on legal permitting processes, liability issues, land tenure concerns and carbon ownership rights. Cath led the multi-institution science team tasked with development of the method, and Cath and Valerie's research on the economic feasibility of coastal wetland restoration of sugarcane and grazing land in Queensland informed development of the Blue Carbon method and led to collaboration with CSIRO to provide expert advice to the Australian Government Department of Climate Change, Energy, the Environment and Water's blue carbon ecosystem restoration grant program guidelines.

## Restoration and rehabilitation

The Blue Carbon methodology is both the culmination of the team's collaborative efforts and the beginning of a new program of work delivering on-the-ground restoration projects and developing future blue carbon methodologies for other types of restoration activities. Valerie led a project for the Australian Government's National Environmental Science Program (NESP). This featured several research collaborators and end-users, including Indigenous groups and Traditional Owners, and developed a values-based

approach to select sites for coastal wetland restoration for blue carbon across Australia. This identified key research gaps, specifically the need for other blue carbon methods to improve the condition of degraded wetlands, potentially benefiting Indigenous landholders and managers in northern Australia.

In collaboration with CSIRO, Valerie, Justine and Cath are currently contributing to developing a framework for evaluating biodiversity co-benefits in blue carbon projects, and undertaking a feasibility analysis of a proposed blue carbon method for rehabilitation of coastal wetlands from removal of non-native ungulates. Cath, Justine and Nicole have also collaborated with The Nature Conservancy to improve restoration policy in Australia for the benefit of blue carbon and to consider how to legally secure coastal wetland projects under sea-level rise and climate change, proposing a "rolling covenants" model that can be used in conjunction with the Blue Carbon methodology to ensure that carbon benefits are retained as sea levels rise.

At an awards event dominated by biotech and medical advances, it was gratifying to see CBCS researchers recognised for their outstanding work on an environmental project.



The symposium attracted more than 150 attendees from more than 32 institutions



Symposium attendees enjoying networking at UQ's Customs House.

## Saving the Reef with social science

The Social Science Community for the Reef (SSCR) held its second annual symposium on Friday 4 November at The University of Queensland's historic venue, Customs House. This year's timely theme was "Inspire and influence: Collectively shaping a future for the Reef".

### People for the Reef

With climate change – and associated coral bleaching events and coral mortality – being the major threat to the Great Barrier Reef, it has never been more important to come together to ensure a future for the Reef and the [Reef 2050 Long Term Sustainability Plan's](#) vision of "Healthy Reef, Healthy People". The event was hosted by UQ and CBCS's [Dr Angela Dean](#), with support from CBCS, the Great Barrier Reef Marine Park Authority (GBRMPA), CSIRO, the Queensland Government (Office of the GBR, Department of Environment and Science), UQ's Social Change Lab, UQ's Place, Nature & Society research group, and a wonderful organising committee.

The symposium brought together more than 150 researchers, decision-makers and practitioners from more than 32 institutions. In addition to

UQ and CBCS, these included Traditional Owner groups, Australian Government bodies, Queensland Government, local governments, research institutions and diverse practitioner and advocacy groups.

### Bringing together diverse perspectives

The day began with two keynotes. First, John Tapim, Director Traditional Use of Marine Resources Agreements at GBRMPA, spoke about the history and future of Sea Country co-management. GBRMPA's Indigenous Land and Sea Country Partnerships Program integrates modern marine park management and Traditional Knowledge to protect the Reef and World Heritage Area. The successes of these programs have led to a growth of these joint partnerships, representing diverse Traditional Owner groups.

Presenters for the session "Social science for innovative solutions" including Dr Nicole Shumway (centre) from CBCS.



PHOTO: MATT CURNOCK, CSIRO

John was followed by historian Dr Rohan Lloyd, from James Cook University and Ignatius Park College. Rohan spoke about the social history of the Reef and shifts in how the Reef contributes to our national consciousness. He argued that learning from previous campaigns allows us to bring hope and optimism to our current endeavours and scrutinise what "saving the Reef" really means.

The three sessions of the day were "Social science for Reef and climate stewardship", "Social science for monitoring and decision-making" and "Social science for innovative solutions". CBCS was well represented, with CBCS presenters including [Dr Claudia Benham](#) (Understanding ecological grief), [Emma Church](#) (Reef citizen science), Dr Angela Dean (Hope, optimism and conservation engagement), [Dr Nicole Shumway](#) (Adaptive and resilient restoration policies) and [Yolanda Waters](#) (Reef tourism experiences and climate action). Recordings of the presentations will be made available on the Social Science Community for the Reef [LinkedIn page](#). This year, we also added a workshop day to the program, with great participation in three workshops on Traditional Owner engagement, translating social science to management, and applying values frameworks to Reef management.

*SSCR brings together social science practitioners and academics working in the Great Barrier Reef Region. We collaborate, share knowledge and provide a platform for improving understanding of social science for the Reef, both research and applied outcomes. The SSCR is an initiative of the GBRMPA in collaboration with CSIRO, Office of the Great Barrier Reef (DES, Queensland), JCU, the Cairns Institute, QUT and UQ. To join the SSCR or for more information please contact [science@gbrmpa.gov.au](mailto:science@gbrmpa.gov.au).*

Dr Angela Dean opening the 2022 Symposium.



PHOTO: MATT CURNOCK, CSIRO



Lunch with a view at Bare Rock.

# CBCS Gondwana rainforest hike

**On a glorious Sunday in September, we went on the second social hike organised by the CBCS community committee.**

The bus took us to Main Range National Park in the Gondwana Rainforests of Australia World Heritage Area and we walked 12.4 km up Mt Cordeaux and Bare Rock.

We were rewarded with spectacular views over Brisbane Valley, flowering giant spear lilies, and superb lyrebird sightings and calls. It was great to have so many keen conservationists come along, including students and family and friends of CBCSers.

We enjoyed having lunch together at the top, and didn't want to leave, but the bus was waiting to take us back home again.



Breaking for morning tea at Mt Cordeaux.

## A note from Professor Hugh Possingham

“Over the past 20 years, I have been squirrelling away various funds, mainly from my consulting, to create an endowed fund for CBCS. More recently, people, knowing of the impact CBCS researchers have had in saving biodiversity, have started to donate. So far, the funds have been just growing, but the plan over the next few years is to create an independent alumni/friends group to grow the fund further and disperse it to support CBCS research, especially student research, that has impact for nature conservation. I have inserted the link to the donation page in my email signature.”

**You can donate to the CBCS endowment fund here:**

[donations.uq.edu.au/Centre-for-Biodiversity-and-Conservation-Science](https://donations.uq.edu.au/Centre-for-Biodiversity-and-Conservation-Science)



# Defying the trends: Large Asian animals thriving alongside humans

New research led by CBCS PhD candidate [Zachary Amir](#) reveals that populations of Asian megafauna, including tigers, Asian elephants, wild boars and clouded leopards, are thriving in tropical Asia next to human infrastructure.



A Sumatran tiger photographed on a camera trap in Bukit Barisan Selatan National Park, a narrow tropical rainforest confined to mountain peaks surrounded by villages in South Sumatra. Zachary Amir and colleagues compiled data from 21 camera trap surveys and found that tigers showed higher abundance in areas with higher human population density. This result is likely due to intense anti-poaching efforts in protected areas such as Bukit Barisan Selatan National Park.

PHOTO: MATTHEW LUSKIN

## Abundance of Asian megafauna

Zachary and fellow CBCSers [Dr Matthew Luskin](#) and [Dr Pablo Negret Torres](#) together with UK colleague Jonathan Moore looked at paleontological records to compare historic and present-day distributions of 14 of Asia's largest mammals. They found that some of these species are bucking extinction trends and avoiding extinction.

The counterintuitive finding challenges notions that megafauna and humans can't successfully co-exist. On the contrary, under the right conditions, these large and charismatic species can defy the

extinction trends of the past 12,000 years and thrive in small habitats alongside human settlements – as long as they are not being hunted.

The global trend over the period has been towards trophic downgrading, or the disproportionate loss of the largest animals in ecosystems, and it has generally been most pronounced near human settlements, because hunters target these larger species. But Zachary and his colleagues have found that in tropical Asia, some megafauna populations are actually higher near human infrastructure.

This may be attributed to tough anti-poaching efforts in national parks, which tend to be closer to human settlements and attractive to tourists keen to see megafauna species in the wild. However, the study also found that deforestation was still impacting populations of large mammals, with the clouded leopard, in particular, seeing a strong decline due to loss of habitat.

**It is in our human hands to reverse extinction trends for large mammals in Asia**



PHOTO: MATTHEW LUSKIN

Left: A young sambar deer browses on leaves in Singapore's last remaining primary forest, Bukit Timah Nature Reserve. This species was over-hunted to local extinction in Singapore during the post-WWII period, but considerable anti-poaching regulation and reforestation measures have facilitated the re-colonisation of this previously extirpated species. The centre of origin for the reintroduction of this species is currently under investigation in CBCS's **Ecological Cascades Lab**.

Below: Zachary Amir sets a camera trap in the lowland tropical rainforests of Daintree National Park in far north Queensland. Zachary is currently conducting camera trap surveys across the Wet Tropics World Heritage Area to collect data to understand how multiple interacting threats affect wildlife communities. Zachary's particular interest is to understand interactions between invasive species, such as feral cats, and native species, such as musky rat kangaroos, to better inform invasive species management across the region.

## Singapore leads

One of the study sites was Singapore, where poaching has been eliminated and forest restoration efforts are considerable. In an urban forest on the tiny island, Bukit Timah Nature Reserve, rewilding of sambar deer and wild boars native to South-East Asia means their populations are recovering well. If these protection efforts can be repeated in other countries and larger and more remote forests, the recovery of other tropical Asian megafauna may well follow suit.

The key, however, will be to limit or eliminate poaching.

## Shaping the future

Despite the good news the study brings, namely, that it is in our human hands to reverse extinction trends for large mammals in Asia, the study did detect strong declines in some species: tapirs, Sumatran rhinoceros, sun bears, guar and others.

The study looked at trends for many species across tropical Asia, and tested for whether all species showed consistent trends, and if similar parks retained similar groups or assemblages of species. The finding is that no two forests of the present day have the same species or

groups of species that they had thousands of years ago.

But the results have left the researchers hopeful that new conservation strategies for unexpected places close to cities can be restored to provide good habitat for forest wildlife across tropical Asia.

Amir, Z., Moore, J., Negret, P. J., Luskin, M. S. (2022). Megafauna extinctions produce idiosyncratic Anthropocene assemblages. *Science Advances* 8, eabq2307

Read some of the media this work has garnered [here](#) and [here](#).



PHOTO: TOM BRUCE

# Social research supporting Moreton Bay conservation and management



PHOTO: CARISSA KLEIN

The survey went through an extensive testing phase to ensure that the questions, survey platform and mobile devices were clear and user-friendly. The testing phase also validated the values framework used in the research, which was based on Stephen Kellert's work on human values of nature and has over two decades of research and development. Several new value types were identified and incorporated into the survey, and the researchers are looking forward to examining the utility of this exciting finding once the results are analysed.

Vicki and her team of 10 research assistants travelled to boating locations across the region, from Caloundra in the north to the Gold Coast seaway in the south, over a seven-week period to do in-person surveys with recreational boaters. The research assistants included Australian and international Masters and PhD students, and the fieldwork provided them with valuable skills and experience in conducting data collection for social research. The survey was also promoted through various other channels including emails, social media and survey cards. Whitworths Marine & Leisure put up signs and survey cards in their south-east Queensland stores.

## Recreational boating has been increasing in south-east Queensland, particularly since the pandemic.

The Sustainable Urban Seascapes team (led by [Associate Professor Carissa Klein](#), [Professor Catherine Lovelock](#), and Professor John Pandolfi), a large interdisciplinary group of researchers focusing on management and conservation research priorities within Moreton Bay, identified a need to learn more about how people use and value the Moreton Bay Marine Park. They selected motorised vessels as a priority user group for further research.

## Surveying Bay boaters

[Dr Vicki Martin](#), a marine social scientist and postdoctoral fellow on the team, developed a study of recreational boaters to answer this question. The Moreton Bay Foundation supported this field work, providing essential funds to cover costs including mobile devices and research assistants. Using the ArcGIS Survey123 platform, Vicki and CBCS Masters student [Bridey Crowe](#) designed a map-based survey to enable boaters to locate their favourite boating locations in Moreton Bay and describe their activities, perceptions of the area, and express the reasons why they value the location.

*“We set out to learn more about how people use and value the Moreton Bay Marine Park*

Above: The research team at Pelican Park boat ramp, Clontarf. Left to right: Carissa Klein, Evelyn Gomez Juarez, Katherine Gamez Zeballos, Vicki Martin, Fedra Herman.

Main image: The Tangalooma wrecks on Moreton Island, a magnet for boaters.

PHOTO: MEL CAMPBELL



PHOTO: VICKI MARTIN



PHOTO: VICKI MARTIN



PHOTO: VICKI MARTIN

**Day on the Bay**

The survey team were invited to The Moreton Bay Foundation’s annual Day on the Bay event, held on 15 October at the Little Ship club at Dunwich, on Minjerribah/North Stradbroke Island. This was a fantastic opportunity for Vicki to give a brief presentation about the project, and the research team was able to ask the audience (many of whom enjoy boating on the Bay) to also take the survey. This year, the Day on the Bay was a lovely, relaxed event with eight speakers talking about research, engagement and education activities happening in Moreton Bay. While on the island, the enthusiastic research team headed to other locations to survey local boaters, and spotted some thrilling wildlife interactions on the way. It was a fabulous end to a productive series of field trips.

**Social data, ecological data**

In total, 342 people completed the survey. The survey closed on 17 October, and the prize draw for the survey incentives took place on the 21 October. The researchers are looking forward to getting stuck into cleaning and analysing the data, and presenting the results through various channels in the near future. Bridey Crowe is incorporating the data into her research project, with the aim of showing how incorporating social data with ecological data can help with planning and management for the Moreton Bay Marine Park. Vicki also presented this work at the ESA-SCBO conference held in Wollongong at the end of November.

Further research updates will be available on the project website: <https://bit.ly/MoretonBayStudy>.

Top: The research team at a boat ramp in Caloundra. Left to right: Sophie Rawson, Hayley Waller and Mercedes McLean.

Bottom left: Members of the Moreton Bay Boat Club provided valuable contributions to the research.

Bottom right: Day on the Bay at the Little Ship Inn club at Dunwich on Minjerribah. Guests enjoyed a range of talks by researchers and educators working in Moreton Bay.

# 25 YEARS



The finalists and winners at the 25th annual Women in Technology awards.

PHOTO: WIT ORGANISING COMMITTEE



PHOTO: DR CLAUDIA BENHAM

## WiT 2022: Brooke Williams takes out Emerging Achiever Science Award

CBCS was represented again at the Women in Technology (WiT) awards for 2022, held in September at the Royal International Convention Centre in Bowen Hills. Dr Brooke Williams won her category, the Emerging Achiever Science Award, and Dr Claudia Benham was a finalist in the Rising Star category.

### The what and why of WiT

WiT is one of Australia's most respected and active technology industry associations. For 25 years, WiT has been unlocking the potential of women across all fields of science, technology, engineering and mathematics (STEM) through advocacy and networking, professional development, mentoring and collaboration opportunities in a safe, supportive and inclusive environment. WiT helps women find the inspiration and support to achieve their aspirations and, in doing so, empowers its community to take full advantage of the outstanding talent,

diverse perspectives and capacity they bring to our emerging digital economy and flourishing STEM industry.

The awards process involved essay-style answers to questions relating to technical and professional experience, leadership and drive, and community/industry impact and engagement followed by an interview process.

### Brooke and Claudia's science

Brooke's award-winning research focuses on finding innovative solutions to conservation problems at the environment-human interface. Balancing conservation with human needs is an increasingly important area of science and she addresses these challenges in two ways. The first is through strategic planning, where she designs tools to effectively allocate conservation action, largely through mathematical optimisation. The second is by developing metrics and assessments to quantify how human activities impact biodiversity and ecosystem services (the services that nature provides to people, such as fresh drinking water) and how to improve outcomes. In her postdoctoral research position, Brooke is focusing on

Brooke accepting her Emerging Achiever Science Award, Royal International Convention Centre, 16 September 2022.

the development of new tools to improve outcomes for ecosystem services that are impacted by global trade, and to help guide koala conservation on private lands.

Claudia is a Lecturer and Australian Research Council DECRA Fellow who studies climate grief – emotional responses to the loss of important ecosystems or places due to climate change. Her world-leading research examines how communities in the Great Barrier Reef are experiencing and responding to climate grief after events such as coral bleaching, and translates this into policy guidance. Claudia's research interests have been shaped by her previous role as an environmental policy professional in the Australian Government, where she worked across a range of projects, including monitoring of the Queensland Coal Seam Gas industry.

# Leading the way in ecological engineering

Spending most of my childhood exploring the bush and wetlands near our home really nurtured my passion for the environment. After high school, I pursued environmental engineering because I reasoned that as I enjoyed maths and physics, I had a responsibility to do the jobs needed to protect the environment on a large scale. However, after graduation I worked as a Water Resources Engineer in drainage for six years until I became Lead Detailed Design Engineer for a major Bruce Highway upgrade. For this project, I went out to site to get an idea of the proposed alignment and found myself standing in the bush, looking across a beautiful wetland, just like the one I grew up near. I will never forget my manager saying, "No, Alice, we're filling in the wetland, this is where the highway will be. The birds will just fly away anyway". I felt sick.

I submitted my resignation a few months later and embarked on my PhD journey.

## Climbing every mountain

Now, what a lot of people don't know about me is that when I was 25 years old, without ever having walked in snow in my life I decided to try mountaineering. In 2015, I claimed the fastest female ascent for the season of Mont Blanc in the Italian Alps, and fell in love with ice climbing. I continued to pursue this new hobby and travelled to Switzerland, Italy and New Zealand undertaking mountaineering courses, gaining skills in glacier, alpine and

Climbing Hochstetter Dome, Aoraki National Park, New Zealand.



PHOTO: SUPPLIED

vertical rescue, which on one occasion actually saved my life. I would have become a mountain guide if Queensland wasn't 5 km from the sun but instead, during my PhD, I became an indoor rock-climbing coach and an outdoor guide.

## Bridging nature-based gaps

Now I work as an Ecological Engineer, a role not recognised by industry, striving to bridge the gaps between engineering and marine science for the design and restoration of coastal wetlands. My particular niche is that I work in coastal ecology and restoration, but with the perspective of an engineer. I understand how projects get approved and are undertaken, and I am acutely aware of the flaws and barriers to restoration when it comes to design guidelines. In Queensland, engineers are personally accountable if designs fail, so an engineer is less likely pursue designs without well-established technical guidelines such as nature-based solutions for coastal protection, which currently have no guidelines. Paper by paper, I am slowly building up the literature on nature-based solutions for coastal protection and, in October this year, I published the first paper that compares the physical design and predictability of a coastal ecosystem (seagrass) to an engineering structure (see reference below).

I am attempting to pioneer this new field of ecological engineering, as it is feasible that design guidelines could be developed for nature-based solutions. They just need to be very interdisciplinary.

## Pioneering spirit awarded

Outside my academic research, this year I made a big step towards pioneering the field of ecological engineering. I was nominated for the Young Professional Engineer of Australia for 2022 and was awarded a finalist for Queensland and additionally awarded Highly Commended (2nd place). I introduced myself as an Ecological Engineer and used the spotlight to explain this field and the work that I am currently undertaking. I feel I need to be successful not only for my personal career goals, but so that real change can be made. Following this path, I believe it's

## PROFILE

Dr Alice Twomey  
CBCS ECR Representative -  
Research and Teaching



PHOTO: MIRANDA FITTOCK  
MIRANDA.FITTOCK.COM

Seagrass transects at Nudgee Beach.

*I could help change the face of environmental engineering in Australia, one wetland at a time*

not inconceivable that I could help change the face of environmental engineering in Australia, even if it's just one wetland at a time.

In another achievement outside academia, to share my love of the outdoors with others, this year I published with co-author Miranda Fittock the first guide to overnight (multi-day) hikes in our region:

## Overnight Hikes South East Queensland.

Twomey, A. J., Callaghan, D. P., O'Brien, K. R. and Saunders, M. I. (2022). Contextualising shoreline protection by seagrass using lessons from submerged breakwaters. *Estuarine, Coastal and Shelf Science*, p.108011.

## Centre for Biodiversity and Conservation Science

Director: Dr Daniel Dunn  
[daniel.dunn@uq.edu.au](mailto:daniel.dunn@uq.edu.au)

CBCS News Editor: Kate Donnelly

E [cbc-info@uq.edu.au](mailto:cbc-info@uq.edu.au)

T +61 7 334 60879

W [cbc.centre.uq.edu.au](http://cbc.centre.uq.edu.au)

CRICOS Provider 00025B • TEQSA PRV12080