

Marxan on Azure



Jennifer McGowan. Photo: Luke McNee, Wildark.org



Brooke Williams. Photo: Emma Williams

Thanks to numerous members of the CBCS community, the future of spatial conservation planning is here.

The Marxan on Azure platform was announced on 6 September 2021 at the IUCN's World Conservation Congress in Marseille, France.

Marxan on Azure is the culmination of two decades of dedication and hard work by members of the Marxan community who have developed, improved and legitimised it, the vast majority of whom have held positions in The University of Queensland's Centre for Biodiversity and Conservation Science (CBCS).

These latest efforts have involved past and present CBCS members including Jennifer McGowan, Hugh Possingham and Brooke Williams as the core Marxan on Azure project team. New partnerships

are forming for publicly available case studies with Elisa Bayraktarov, Michelle Ward and Ruben Venegas through their work with EcoCommons, WWF Australia and The Nature Conservancy, respectively. With an advisory committee and global community comprising world leaders in conservation planning theory and practice, and technology pioneers at Microsoft, Marxan will be well positioned to help combat the global biodiversity and climate crisis over the next decade while remaining a free and open source decision-support tool.

By 2018, the global demand for Marxan to help make smart decisions for climate, biodiversity and sustainable development goals had outpaced the Marxan

About CBCS

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

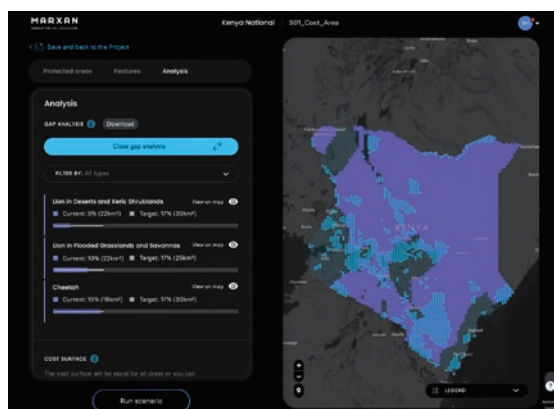
Based at The University of Queensland (UQ) in Brisbane, Australia, CBCS works in partnership with scientists, governments, non-governmental organisations and industry to help solve the most important conservation problems around the world.

cbcs.centre.uq.edu.au

community of practice's ability to provide expert support and training. The vision of "democratising Marxan" began. Through a partnership with the Biodiversity and Protected Areas Management (BIOPAMA) Programme funded by the European Union, the Joint Research Centre worked closely with CBCS and The Nature Conservancy to prototype a web-based Marxan platform that improves accessibility to non-experts and supports our common vision of providing credible tools for evidence-based conservation planning. In 2020, we partnered with Microsoft to bring our platform to the cloud, scaling Marxan's infrastructure for global accessibility and empowering users with the tools and data they need to make smarter decisions for the planet.

Over the past two years the Marxan that we know and love has seen some significant upgrades, and has become the flagship project for Microsoft's Planetary Computer.

Stay tuned, follow Marxan on Twitter at @Marxan_planning and join the growing community.



Marxan v 4 was released in March 2021 after a source-code overhaul by Microsoft's Quantum Team. The latest version includes an improved algorithmic engine for faster processing, conversion to C++ programming language and refactorisation, making it easier for future contributions. Marxan also has a new github repository.

PROFILE

Dr Nathalie Butt

CBCS Deputy Director – Community

For the love of forests

“ I have always loved trees and forests. I spent many childhood hours walking and playing in the woods, or reading a book under a tree, and have been able to focus much of my research work on them. I travelled a lot with my family as a child and grew up in three countries – the UK, Hong Kong and Australia. After school, I headed to university in Melbourne, where I studied literature, philosophy and art. But when I had my two sons soon after, I was motivated to return to academia to put myself in a position where I could make a positive difference to our management of the natural world, and studied ecology. At the same time, I was living a very low-carbon lifestyle – vegan, no car, second-hand or home-made clothes, cloth nappies, living on boats on the Oxford canal – pretty much off-grid. This often entailed studying by candlelight, on more than one occasion with a bowl on the table next to me catching the drips from the leaking roof.

Global conservation science

After the Bachelor of Science, I worked as a research assistant in the Environmental Change Institute at the University of Oxford for five years on a range of projects looking at how climate change was impacting, and likely to impact, species' distributions, using climate projections, species data and artificial neural network modelling. That led me on to a PhD, or DPhil as they call it at Oxford (because they are special), that examined climate and biodiversity interactions, or how rainfall and radiation determined forest composition and dynamics in the western Amazon. I headed to Peru for some PhD fieldwork,

and spent several weeks in the Amazon recording solar radiation data and measuring trees. Following this, I did some postdoctoral work in temperate broadleaf forest, in Wytham Woods near Oxford, setting up a long-term forest monitoring plot as part of the Smithsonian Institution's Global Earth Observatory, which also involved a trip to Panama where I was able to visit one of modern ecology's Holy Grails – Barro Colorado Island.

I then took on a Research Directorship role with the NGO Earthwatch, which enabled me to work with citizen scientists from all over Europe, training them in forest ecology fieldwork methods and teaching them climate change science. The next adventure was a postdoc with Hugh Possingham at The University of Queensland, which allowed me to work across many of my fields of interest, including expanding both my human-nature interaction research and South American forest expertise with a Guyanese project, as well as global analyses of climate and forest interactions, eucalyptus species and ecosystem distribution modelling, and the importance of species traits in conservation research and practice.

More travel – and valued colleagues worldwide

What a privilege, to have eight years (including the DECRA I was fortunate

enough to be awarded in 2014) working on pretty much whatever I chose! During this time, I have also been lucky to travel and work at other universities and with a wide range of fantastic colleagues, nationally and globally, including a stint living and working at UC Davies in California.

I'm encouraged that my work has had some influence on conservation planning and policy, and hope that I can continue to contribute in this way, in addition to my newly appointed role as a Deputy Director of the Centre for Biodiversity and Conservation Science, which allows me to contribute to guiding the development of this great centre. One of the best things about working in this kind of research is the people we get to work with and befriend and, for me, CBCS absolutely embodies that dynamic and I hope to remain part of it for a while yet to come.

”



PhD (DPhil) fieldwork in Tambopata, Peru, with my trusty machete (in case of jaguars). Photo: Rebecca Macintosh

At the top of a 65 metre forest canopy tower in Manaus, Brazil, with local colleague Fabrizio. Photo: Kate Halladay



Measuring trees in Wytham Woods, Oxford. Winter fieldwork is awful. Photo: Sam Armenta Butt





Understanding ecological grief: Dr Claudia Benham wins DECRA

Dr Claudia Benham has been awarded a coveted ARC Discovery Early Career Researcher Award (DECRA) to pursue her research interest in ecological grief.

Climate change and biodiversity loss are global concerns, but their impacts are experienced most acutely at the local scale, where people live, work and form identities and attachments to the environment. In some cases, environmental losses can evoke feelings of ecological grief among local communities – emotional distress associated with losing important species, ecosystems or places. Ecological grief has recently been identified in a range of contexts, including among communities in the Great Barrier Reef. It appears most likely to occur when environmental losses happen quickly, or when species or ecosystems of high social or cultural importance are affected.

Claudia's DECRA project aims to understand how communities in the Reef experience and cope with environmental grief. The Reef is an iconic ecosystem, but climate change and other stressors threaten its resilience. Communities along the Reef coast are often highly dependent on and connected with local marine ecosystems, and are also experiencing an array of other rapid social and economic changes such as the increasingly urgent need to transition away from resource-dependent industries.

The project will examine how social factors such as place attachment and environmental values interact with broader environmental and institutional changes to shape community experiences of ecological grief and loss. It will also examine how community-based deliberation and decision-making processes help communities cope with ecological grief. This will be the first comprehensive, interdisciplinary study to understand how ecological grief influences community wellbeing and identify adaptive local responses.

Read more [here](#).



Dr Amelia Wenger nominated for Pritzker Award

Dr Amelia Wenger has been nominated for the UCLA Institute of the Environment and Sustainability (IoES) Pritzker Emerging Environmental Genius Award.

The USD100,000 award is given annually to a scientist, entrepreneur, engineer, activist or artist under the age of 40 who stands poised to make a game-changing difference. A committee of 20 distinguished entrepreneurs, science, business and environmental leaders provide one nomination each. Candidates may come from anywhere in the world, from a broad range of fields including engineering, climate research, the arts or business. They should have demonstrated talent and be poised to address serious environmental concerns.

Funds for the award are made possible as part of a USD20 million gift to UCLA from the Anthony and Jeanne Pritzker Family Foundation. As part of the nomination, all Pritzker Award candidates will be provided ongoing support and networking opportunities by the UCLA IoES, in an effort to boost their careers as champions for the environment.

Amelia was nominated by Dr Stephanie Wear, a marine ecologist, conservation strategy advisor and global spokesperson at The Nature Conservancy. Dr Wear is also a visiting scientist at the UCLA Institute of the Environment and Sustainability and the Duke University Marine Lab. Amelia and Stephanie have worked closely together over the past two years on the development of the Ocean Sewage Alliance, where they now serve as members of the Steering Committee. The **Ocean Sewage Alliance** is a newly formed collective of organisations and academic scientists committed to reducing the threat of sewage and other wastewater pollution in our oceans, while increasing the health and wellbeing of both humans and nature.

Amelia and Dr Wear are also co-Principal Investigators on a **Science for Nature and People Partnership** grant awarded this year.

CBCS Small Grant Scheme awardees announced

The Centre for Biodiversity and Conservation Science annually runs the CBCS small grant scheme for supporting activities to promote research collaboration, inclusion, mentorship, leadership and teamwork.

We had to halt the scheme in 2020, due to restrictions related to the COVID-19 pandemic, but we are happy to have opened this year's call on 6 July 2021. By the deadline on 23 July, we had received a total of 20 applications proposing a variety of exciting activities, over half of which were primarily led by early career researchers or HDR students. We carefully assessed each proposal based on pre-defined quantitative selection criteria (e.g., whether each proposal will generate a new initiative; includes leading roles for ECRs/HDR students; will provide career development opportunities; and will facilitate engagement with Queensland communities) and decided to support 12 proposals requesting \$40,000 in total.

We are extremely excited to see a wide range of activities planned

in those 12 proposals, such as workshops on infographic design; connecting culture and conservation; conservation and disease risk; ecological grief; collaboration between Indigenous and non-Indigenous communities; programming in R; satellite Earth observation; and communicating conservation through children's books. All activities will be organised by the end of 2021, with details to be disseminated on relevant CBCS mailing lists.

We would like to thank everyone who applied for this round of the scheme. Congratulations to the applicants who were successful this year, and encouragement to those who were not. We plan to run another small grant scheme in early 2022 and look forward to everyone proposing exciting ideas again. The successful lead applicants and their activities for 2021 were:

Brief presentations of planned activities can be seen [here](#).

Anazélia Tedesco – Workshop: Social factors as a bridge between restoration planning and implementation

Caitie Kuempel – Workshop: Coral reef and watershed management

Chris O'Bryan – Workshop: Biodiversity conservation and disease risk

Chris Roelfsema – Workshop: Satellite Earth observation for coastal and marine conservation

Clair Hume – Workshop/Training: Communicating conservation research through non-fiction children's books with UQP

Claudia Benham – Workshop: Ecological grief

Diana Fisher – Workshop: Australia's goals and priorities for *ex-situ* conservation of mammals

Karlina Indraswari – Workshop: Infographic design

Laura Sonter – Workshop: Compiling a list of conservation courses at UQ

Manuela Mendiolar – Training: Statistical computing and programming in R

Mercedes McLean – Workshop: Connecting culture and conservation

Robyn Boldy – Workshop/Seminar: Collaboration with Wik/Wik Waya Traditional Owners.

Life on the Brink: CBCS Masters graduates telling conservation stories

Life on the Brink is a new podcast telling stories of species on the brink of extinction and the people dedicated to saving them. Gabe Porritt fills us in.



Gabriel Porritt and Alexander Bezzina, the two CBCS Masters of Conservation Science graduates behind *Life on the Brink*.



Alex Bezzina and I both undertook The University of Queensland's Masters of Conservation Science over 2019–20. On day one, a member of the outgoing cohort offhandedly mentioned that the biggest thing we would take away from the Masters would be the impact of science communication.

At the time, I was running a little science show called "Know Idea" on local community radio station 4ZZZ and Alex was diving into the world of wildlife photography. While we already shared an interest in science communication, by the end of our Masters that interest had developed into a fully-fledged passion for communicating about conservation. What we noticed, though, is there's barely any platform in Australia where conservation stories are being told.

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So, after a few months of planning and practising, on Monday 9 August we launched *Life On The Brink* with the release of our first two episodes. We interviewed CBCS-er Dr Daniella Teixeira on her work studying and protecting the tiny population of Kangaroo Island glossy black-cockatoos, and featured the research and film-making of former CBCS-er Dr Alexander Braczkowski on tree-climbing lions.

Those two episodes, and all upcoming ones, are available on every podcast app we could get our hands on, as well as our website lifeonthebrinkpodcast.com, where you can use the contact form to get in touch with us. We would love to hear from CBCS community members who have feedback of any kind or who might be interested in featuring on the podcast to talk about the conservation of a particular species and the human element of working to save them.

We'd also like to say a quick thanks for all the lovely support we've had from those of you who have already found the podcast. It really does mean a lot!



Global recognition for Dr Zunyi Xie: The Xiaowen Li Remote Sensing Award

CBCS Postdoctoral Research Fellow Dr Zunyi Xie has been awarded the Xiaowen Li Remote Sensing Award.

This is one of the most prestigious remote sensing awards in China, given every two years in memory of Xiaowen Li, a Fellow of the Chinese Academy of Sciences and pioneer of remote sensing in China and globally. The award is bestowed on five remote sensing researchers and five students, selected from thousands of Chinese candidates. It aims to reward outstanding Chinese scientific researchers and students who have shown essential innovation in remote sensing scientific theories and methods as well as making significant contributions to the scientific and technological progress of the remote sensing industry, and confers global recognition of their work.

Professor Xiaowen Li was a great man and globally recognised scientist who

passed away six years ago. He was one of the pioneers of bi-directional reflectance distribution function (BRDF) measurement and correction. Without BRDF, the global remote sensing community would not have fully corrected time series and seamless mosaics from satellite and airborne image data sets with which to map and measure environmental changes.

The award was issued in the fifth Quantitative Remote Sensing Forum in Wuhan, which is the most important remote sensing conference in China, held every two years and attracting more than 2000 attendees.

We were fortunate that Dr Chunyue Niu, a recent PhD graduate from Professor Stuart Phinn's team in the School of Earth and Environmental Sciences, was able to receive the award on behalf of Zunyi at the conference. Chunyue is in the middle of the group of award recipients in the photo above – the tallest person in the white shirt.

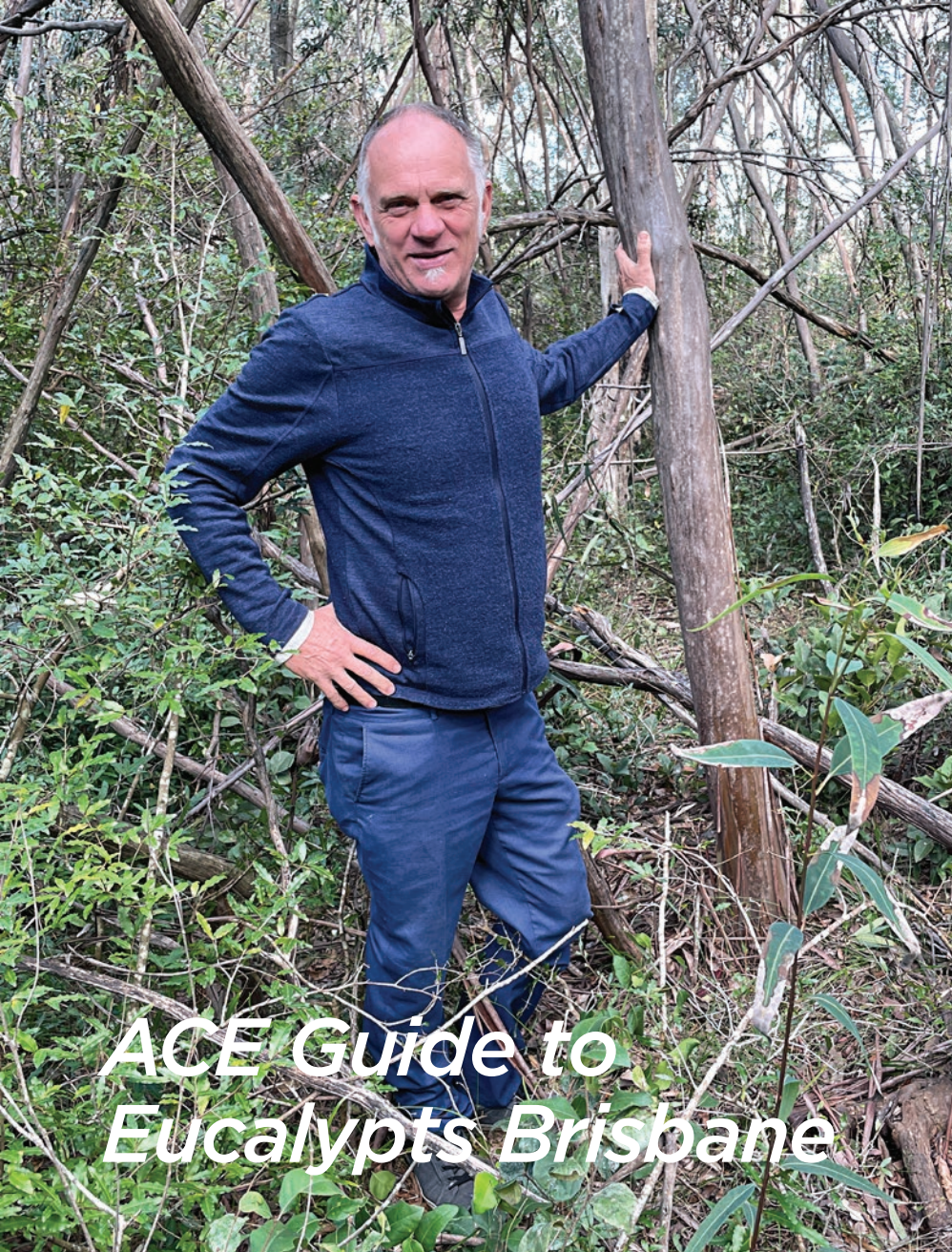


Translation:

Dr Zunyi Xie:

In review of your important achievements in the field of remote sensing, you are awarded the "Li Xiaowen Remote Sensing Award".

*Li Xiaowen Foundation
Bojie Fu (Academician)
May 2021*



ACE Guide to Eucalypts Brisbane

Rod in a Brisbane reserve with the rare plunkett mallee (*Eucalyptus curtisii*). Photo: Mike Crisp

CBCS's **Associate Professor Rod Fensham** was stuck close to home during the pandemic, and to avoid going mad needed a project. He decided to get to know the bushlands in the city where he has made his home for nearly 30 years.

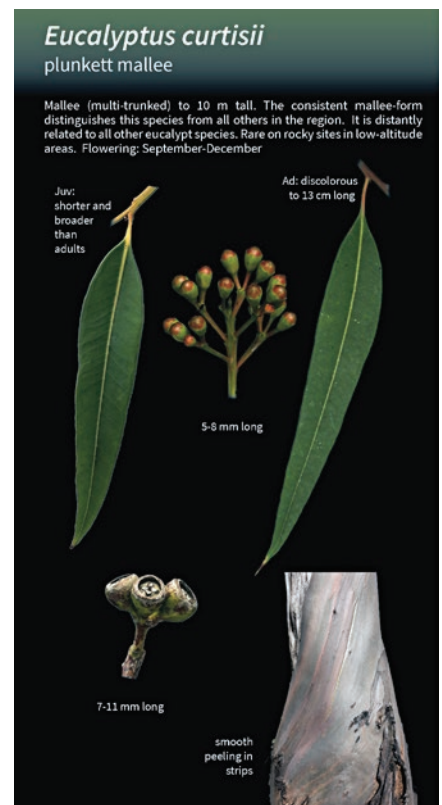
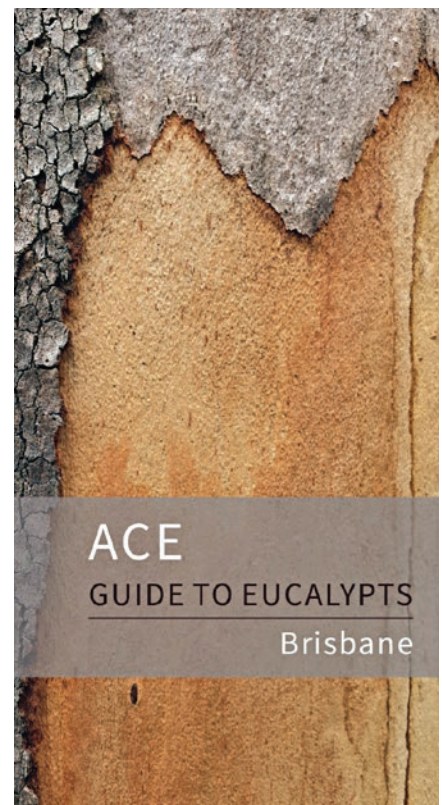
Eucalypts are the dominant trees throughout the bushland reserves of the Brisbane area, and the result of Rod's project, the *ACE Guide to Eucalypts Brisbane*, is a user-friendly way to get to know the local gum trees.

The book includes an introduction to the environments of Brisbane and presents all 37 eucalypt species including those we know as *Angophora*, *Corymbia* and *Eucalyptus*. This is more species than occur in all of Tasmania. They can be tricky to identify, but this guide is designed to make it as easy as possible. It includes spectacular life-size images of the leaves, buds and fruit of every species.

The book also includes the koala preferences of each species and is thus a very useful guide for finding koalas. There is a comprehensive map of the bushlands

around Brisbane and a list of the eucalypts that occur in them.

A critical part of the book is the unearthing of the Aboriginal names for the trees and their uses for them. In 2007, Rod edited and published *The Leichhardt Diaries*, recording the German scientist Ludwig Leichhardt's time in and around Brisbane in 1843. Leichhardt travelled with Aboriginal guides who provided a lexicon for the trees in their multiple languages. Rod's challenge was to associate the Indigenous names with the modern species concepts using Leichhardt's notes as clues. The puzzle was a remarkable success, thanks to Leichhardt's detailed and precise observations. Extra information was gleaned from interviews with Gaiarbau, a Wakka-speaking man with a deep cultural knowledge.



The *ACE Guide to Eucalypts Brisbane* was launched in West End on the 23 August, with a dedication to Aboriginal elder John Long who taught Rod how to find and eat jooberah, the larvae of the world's largest moth.

To obtain your copy of the *ACE Guide* visit aceguidetoecalypts.com or pick one up directly from Rod by arrangement at rod.fensham@des.qld.gov.au.

NEWS IN BRIEF



Dr Sally Wasef talks about ancient DNA at the 2019 Soapbox Science event at Surfers Paradise. Photo: Ella Wickins

Soapbox Science 2021 rescheduled

Soapbox Science 2021 has been rescheduled for Saturday 23 October. Due to the recent lockdown and continuing restrictions, we were unable to proceed with the event on the original date of 14 August, the first day of National Science Week. The location, Sisters Green at the Queensland Museum, remains the same. The event will run from 10.30am to 1.30pm. Enquiries may be directed to [Dr Nathalie Butt](mailto:n.butt@uq.edu.au) at n.butt@uq.edu.au.

Congratulations to CBCS 2021 WiT Awards finalists: Eve McDonald-Madden and Michelle Ward

The Women in Technology (WiT) Awards are the biggest and longest-running celebration of women in science and technology in Australia. For more than two decades, WiT have celebrated outstanding women in STEM and the organisations who support them by providing a well-deserved platform for recognition. The awards highlight the outstanding talent of our women in STEM and the important contribution they make to our research, policy and economic and social development across a range of categories.

Two CBCS women have made it to the [WiT finals](#). Congratulations to [Associate Professor Eve McDonald-Madden](#) for her work as a Research Leader in Science and [Michelle Ward](#) as an Emerging Achiever in Science.

Winners will be announced in October at a gala dinner.

Poor data stewardship hinders global genetic diversity surveillance

Species' capacities for evolutionary resilience rely on genetic biodiversity, with its preservation a central tenet of the Convention on Biological Diversity. Can published data establish genetic biodiversity baselines and support monitoring programs? Unfortunately not: analyses of archived genomic datasets by CBCS's [Professor Cynthia Riginos](#) and international collaborators show that most public records lack the spatiotemporal metadata necessary for genetic biodiversity surveillance. Without improved metadata deposition policies, irreplaceable records of today's genetic biodiversity are being lost. Read the paper [here](#).

Ten tips for overcoming language barriers in science

The [translatE project](#), led by CBCS Chief Investigator [Dr Tatsuya Amano](#), has been showing that language barriers have multiple major consequences for scientists, the advancement of science and its impact on societies. In a new *Nature Human Behaviour* comment article, he led collaboration with a group of scientists in diverse disciplines and compiled a list of 10 simple tips to help everyone in STEM start tackling and solving this issue. Read the paper [here](#) (with summaries available in French, Japanese and Spanish).

HDR placement at UNEP-WCMC

CBCS PhD candidate [Divya Narain](#) has secured an HDR placement project with Cambridge-based [UNEP-WCMC](#), the specialist biodiversity assessment arm of the United Nations Environment Programme. HDR placements are facilitated by the UQ Graduate School's Career Development Framework and allow students to gain valuable industry experience. As a part of her project, Divya will be developing a decision-making framework for ascertaining the area of influence of site-based business operations. The project outcome – a briefing note – will aid screening and management of biodiversity risks in high-footprint industries such as mining, oil and gas, and infrastructure.

Opening Pandora's Box: Aerial view of a bauxite mine and associated ancillary infrastructure in Ciudad Guayana, Venezuela. Image: apomares /E+ Getty Images



Chasing butterflies



Meadow argus, *Junonia villida*. Photo: Shawan Chowdhury

“Shawan, you can never pass the 10th Standard!” I still remember people saying that. As a boy who preferred to run around in the lush nature of Bangladesh, and who played cricket, soccer and many other sports, education seemed a nightmare. Ultimately, I failed eight out of 12 subjects in Class Seven and became the last boy of the village school. Everyone concluded that I would neither gain a proper education nor enjoy a delightful future. My parents sent me to my mother’s family in India, where I stayed for 1.5 years, but nothing changed. After I returned, I decided not to go back to India by any means, so my only option was to start studying. That was a major turning point in my life.

The beauty of biology

Although my passion for nature had started in my childhood days when I preferred roaming around forests and open fields to study, I never considered becoming an ecologist before the final year of my undergraduate degree.

In Bangladesh, there is little chance for students to decide which subjects they are going to study; everything depends on their university admission test score. Somehow, I got Zoology. I decided to retake the university admission test and

waited another year, yet still I was selected for Zoology. I obtained very low scores in Biology, but I started working hard to understand the basics. I realised I was incapable of learning in large groups – and that changed my life. From then on, instead of attending long, boring classes, I started watching YouTube videos and reading blog posts. Finally, I grasped the beauty of the subject.

Discovering butterflies

On 20 December 2013, I attended a butterfly photography walk organised by a Facebook group – and spotted over 50 species in just a few hours. I was fascinated to observe numerous colourful butterflies in a small urban green space. I went back the following day and spotted many more species, and then and there I decided to work on insect conservation. Over the next three years, I surveyed that park and two other green spaces weekly. I discovered that Dhaka, one of the world’s most polluted and densely populated cities, harbours over 45% of the national butterflies of Bangladesh, of which 40% are nationally threatened.

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PROFILE

Shawan Chowdhury
CBCS PhD candidate

Insect migration

During my field surveys, I noticed that some butterfly species (e.g., *Vanessa cardui*) were discretely recorded in different parts of Bangladesh. Going through published studies, I learned about their fascinating migratory movement. I decided to work on the ecology and conservation of migratory butterflies as a PhD project. I am so

fortunate to have Professors Rich Fuller and Myron Zalucki as my PhD advisors.

While 12% of vertebrates are migratory, the migration of insects is much less understood, despite its potentially huge importance to ecological resource flows and ecosystem services globally. My PhD reveals that migration is much more widespread in butterflies

than previously realised, extending far beyond the well-known examples of the monarch and the painted lady.

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Using climatic niche models, I estimate that most migratory butterflies undergo strong seasonal variation in their distribution and that such seasonal switching in habitat suitability is most prominent at lower latitudes and in the warmer parts of the world. Sadly, one in seven migratory butterflies could be at an elevated risk of extinction.

My PhD also investigates one of the most remarkable range expansions of recent decades, that of the tawny coster *Acraea terpsicore*. I show that, while it is expanding naturally, the tawny coster butterfly is maintaining its native climatic niche. This butterfly is expanding its range in Australia by 135 kilometres per year.

Insect conservation

My PhD delves into the protected area performance of Bangladeshi butterflies, too. I reveal that only a tiny fraction, less than 1.5%, of the geographic range of butterflies in Bangladesh overlaps with protected areas. Despite the minimal protected area coverage overall, overlap with protected areas was slightly higher for threatened butterflies, especially in the case of the Critically Endangered and Endangered species.

Finally, I assess the conservation status of about 100,000 insect species in protected areas. I discover that the overall protected area coverage is less than 20% for insects; however, one in three species have less than 10% coverage, and nearly 2000 species have no coverage at all. Three-quarters of insect species are inadequately covered by protected areas.

Overall, this research has helped to improve our understanding of the prevalence and characteristics of migration in insects and highlight some of the major shortfalls in global conservation efforts for insects in a changing world. Not a bad achievement for a boy for whom education was once a nightmare!



Left, top: Shawan photographing a spider during a nature walk in Canberra. Photo: Asif Ratul

Left, below: Keen photographer Shawan taking a picture of a lizard during a nature walk in Malaysia. Main photo: Enamul Mazid Khan Siddique; inset photo: Shawan Chowdhury



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