

**APRIL 2024**

VOLUME 20, ISSUE 1

## AIMS@JCU Committee Members

AIMS@JCU is proud to have such high calibre committee members - look out for their bios in future newsletters:

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JCU Dean of College of Science and Engineering – Prof. Ronald White

AIMS@JCU Research Director (non-voting) – Dr. Cherie Motti

AIMS@JCU Science Advisory Committee:

All members of the Executive Committee – as above

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AIMS Research Program Director for A Healthy and Resilient Great Barrier Reef – Dr. Line Bay

AIMS Research Program Director Sustainable Coastal Ecosystems and Industry in Tropical Australia – Dr. Claire Streten

AIMS Executive Director for Strategic Development – Mr. David Mead

AIMS Indigenous Partnerships Program Director – Ms. Libby Evans-Illidge

JCU Discipline Head of Marine Biology/Aquaculture – A/Prof. Mia Hoogenboom

JCU Discipline Head Engineering and Physical Science – Prof. Bouchra Senadji

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JCU Social Science representative within Marine and Aquaculture Sciences or Marine Biology and Aquaculture – A/Prof. Alana Grech

JCU Academic Group Head of Indigenous Science Integration in the Centre of Excellence – Prof. Sean Ulm

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Photographs in this publication were submitted by AIMS@JCU members unless otherwise stated.

We are reducing our carbon footprint by limiting the number of printed copies available. Please let us know if you need a hard copy of this newsletter

### About the AIMS@JCU Newsletter:

This newsletter is produced regularly and distributed by email to AIMS@JCU members, AIMS and JCU staff.

If you'd like to be added to our mailing list, or have a query regarding this newsletter, please contact:

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## 2024 AIMS@JCU PhD Scholarship Recipient

Leo Chiu-Leung

**Project Title:** The soundscapes of the Great Barrier Reef in the face of a changing climate

**Supervisors:** Prof Andrew Hoey (JCU), Dr. Miles Parsons (AIMS)

Leo Chiu-Leung is from Hong Kong but completed his undergraduate study in Marine Science at the University of Queensland. His initial exposure to underwater soundscapes occurred while working and diving in Hong Kong, where he utilized acoustic equipment to track cetacean activity around the Hong Kong International Airport to conduct Environmental Impact Assessments. This experience sparked his interest in the technology used to sense the surrounding underwater environment, a necessity in the challenging visibility conditions of Hong Kong's waters.



Leo is really grateful to have been awarded an AIMS@JCU scholarship under the guidance of Prof Andrew Hoey (JCU) and Dr. Miles Parsons (AIMS). His research focuses on examining the spatial differences of soundscapes across the Great Barrier Reef. Leo aims to gather ecoacoustic and observational data to understand the relationship between soundscapes and their environs. This information could enhance remote sensing efforts to monitor reef health on the Great Barrier Reef, especially in the face of various threats, including climate change, predation, and other human-induced disruptions.

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Ingo Miller

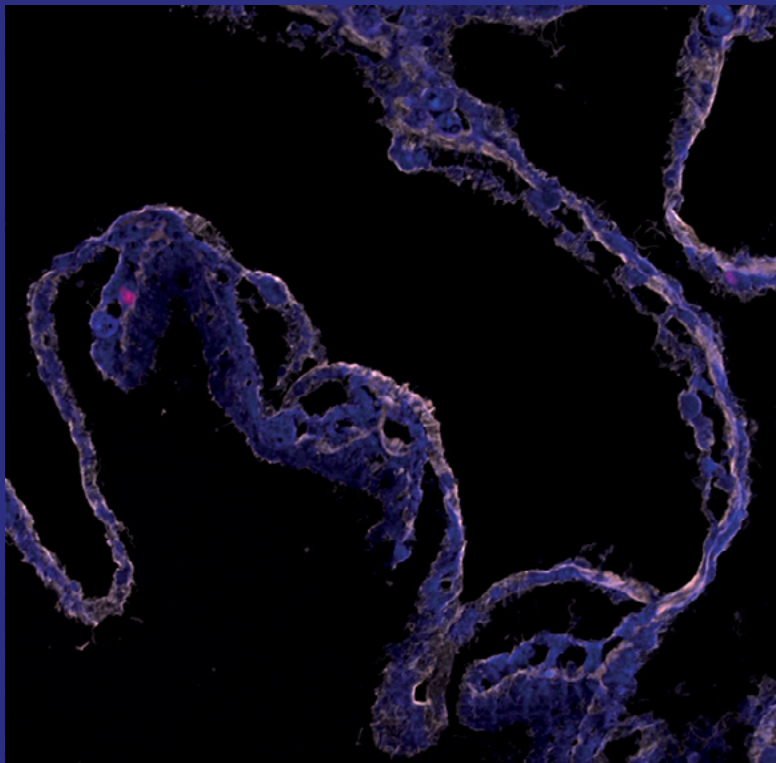
# 2023 Professional Development Award Report

Callaway Thatcher

Callaway is the first student to receive our newest type of student award, the Professional Development award.

## Melbourne FISH workshop

Thanks to the AIMS@JCU professional development award and contributing funds from the Reef Restoration and Adaptation program I was able to spend a month in Melbourne undergoing training in a molecular technique known as Fluorescence in situ hybridization (FISH). The first week was spent learning both the laboratory techniques as well as the elaborate setup and function of their Nikon Eclipse microscope. In the remaining three weeks Dr. Katarina Damjanovic and I were able to process coral recruits obtained from two different experiments and species. The quality and quantity of data we obtained from this trip, as well as the time spent with the coral microbial experts at The University of Melbourne was invaluable. I was able to discuss our findings at length with the Melbourne team thanks to the professional relationship I now have with them.



Further, we obtained novel FISH findings for one of our coral species! Our novel findings will be published later this year and supports the worth while investment in reef restoration projects such as mine and the value of collaboration and professional development with other universities.

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Ingo Miller

# 2023 Science Communication Award Report

Katrina Kaposi

In June I was fortunate enough to travel to Singapore and attend the 5th Asia Pacific Coral Reef Symposium in Singapore. This opportunity was only made possible due to the financial support from AIMS@JCU through the provision of the Science Communication Award.

As it was to be my very first international conference, I was very nervous about attending APCRS. I can wholeheartedly say though that I needn't have worried. It was such an incredible experience. It did not matter where they were in their career, everyone was so lovely, welcoming, encouraging, and supportive. I made the most of trying to talk to as many people as possible, broadening my network, and reconnect with people that I have meet previously.

The value of this conference was made even more important in that I am a Cairns based student. As there is not a large focus on marine research here in Cairns, I often feel isolated from my peers and find it difficult to share experiences and learn techniques from others. I certainly made the most of the opportunity that APCRS provided in being able to talk to as many researchers from a broad range of research areas as possible.



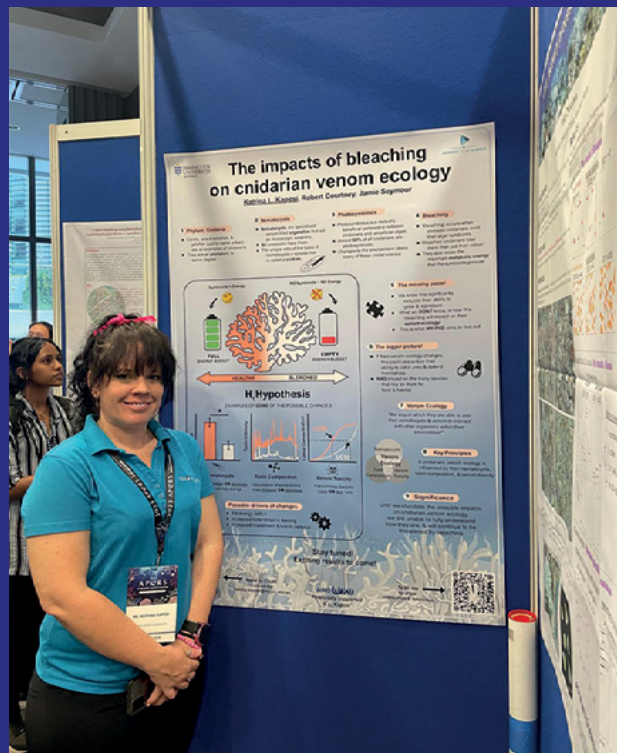
A warm and special shout out and thank you to AIMS's very own Dr Carly Randall for generously taking time out of her busy conference schedule to sit down with me over juice and just give me some great PhD/career advice. I can not express enough how much it meant to me to have the opportunity to catch up with her. (Thanks Carly!!)

Taylor Whitman

# 2023 Science Communication Award Report

continued

It was not all fun and games though. I also presented a poster and a talk while I was there. My poster, titled: "The impacts of bleaching on cnidarian venom ecology" was an opportunity for me to start discussions and showcase the broader theme of my PhD. I am pleased to say it was well received. Whilst my talk, titled: "Influence of temperature and salinity on photosymbiosis within a tropical sea anemone" was an opportunity to present some preliminary results from one of my data chapters. While I was hoping to get some thoughts on some of the unusual results that we had noticed, something better happened. In a very coral-centric atmosphere, the most unlikely thing happened. I met probably the only other two people in the world that work with my little unknown species of sea anemone. We have since exchanged details and now swap our stories and experiences and are talking about possible collaborative ideas. All in all, this really sums up what conferences are all about.



Once again, I cannot thank AIMS@JCU enough for allowing me to participate in this amazing conference. It truly has been one of the major highlights of my PhD thus far.

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Corinne Allen

# Quantitative Marine Science report

Marko Terzin

Name of Supervisors: AIMS supervisor: Dr. Patrick Laffy; JCU supervisor: Prof David Bourne

Details on the research placement:

Host: A/Prof Kim-Anh Lê Cao

Host Institute: Melbourne Integrative Genomics Center (MIG) and School of Mathematics and Statistics, Building 184, Royal Parade, University of Melbourne, Parkville 3010, Victoria, Australia

Time of visit: 7th April - 2nd July 2023

## **How has this visit assisted my PhD (and future employment):**

A/Prof Kim-Anh Lê Cao is a renowned statistician who specialises in analysis of om-ics data, and has developed the mixOmics R package, currently the most widely utilised bioinformatics tool for integration of biological 'omics data - transcriptomics, proteomics, metabolomics etc., as well as microbiome, metagenomics, single cell transcriptomics and multi-omics (see [Rohart et al. 2017](#)). Statistical integration within mixOmics focuses on multivariate and dimension reduction methodologies to select features of biomarkers in large omics data sets. This aligns perfectly with my PhD which aims to utilise microbial taxa/genes as biomarkers of degraded reef health. My PhD forms part of a large sequence-based effort to characterise/monitor free-living seawater microbes in the Great Barrier Reef (GBR) - an initiative that will generate two pieces of Queensland research infrastructure within Australia's Integrated Marine Observing System (IMOS): (1) the IMOS Microbial Genomics Database (MGD), and (2) the IMOS Microbial Observatory (MO) stations. Metagenomic and metatranscriptomic data within my PhD was collected alongside the AIMS Long-term Monitoring Program (LTMP) surveys, hence our molecular data is matched with measurements on water quality and benthic community cover. In my PhD, I aim to integrate the extensive metagenomic and metatranscriptomic data (obtained within IMOS-MGD and IMOS-MO infrastructures) with LTMP environmental measurements on water quality and benthic cover, to identify how microbial activity is changing with shifting environmental parameters on the GBR, on an unprecedented scale.

Integrating these complex datasets is challenging and from all the tools I tested, mixOmics proved to be most beneficial. To learn more about mixOmics, I utilised funding through the AIMS@JCU Quantitative Marine Science (QMS) plan to attend the online course '[mixOmics R Essentials for Biological Data Integration](#)', which took place in November 2022, however this mixOmics

Taylor Whitman

# Quantitative Marine Science report

continued

course only covered only 6 out of 19 omics-integration methods developed by the mixOmics team. Hence I reached out to A/Prof Kim-Anh Lê Cao and she agreed to host me in her laboratory to conduct a 3-month internship and work on my data along her side, and this internship was made possible due to the AIMS@JCU QMS funding opportunity, which has partially covered travel and accommodation costs in Melbourne during my 3-month integration with the mixOmics team.

My visit to MIG has been immensely beneficial as I finalised the analysis for my PhD Chapter 2 entitled: 'Seawater Microbial Function Outperforms Microbial Taxonomy in Predicting Water Chemistry Fluctuations in the Great Barrier Reef'. This internship was also beneficial to the mixOmics team as I was the first user that applied one of their methods (MINT sPLS - Multivariate Integrative Sparse Partial Least Squares) on an environmental dataset. Since their methods have primarily been tested and validated on datasets generated in human medical research, demonstrating that mixOmics tools can also be applied in the field of environmental microbiology has been of interest and our dataset may be used as an example dataset in mixOmics publication on MINT sPLS, which is yet to be written.

Further, this integration within the mixOmics team also allowed me to (1) expand my collaborative network and share data analysis ideas with Vinicius Salazar, a PhD student who works with Kim-Anh on integration of marine and environmental data; (2) obtain a more in-depth understanding of the statistics behind omics integration; and (3) discuss appropriate multi-omics integration and network methods to combine IMOS-MO metagenomic and metatranscriptomic data to explore how microbial activity shifts with changing environment (water quality and benthic cover data), across space (inshore vs. offshore reefs) and time (wet vs. dry season). Lastly, apart from direct benefits for multiple chapters in my PhD, this internship may also benefit my future employment by allowing me to move beyond microbial ecology towards developing broader computational statistics of complex biology data streams. Learning key concepts in multivariate statistics for omics data integration will hone my quantitative skills to analyse a wider array of molecular datasets.

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Corinne Allen

## Research Director Report

Wow, where has the year gone? We have already seen a quarter of the year pass, and what has AIMS@JCU been doing???.....we've been busy celebrating!

We ended 2023 with a bang, literally, with the end of year Barefoot Bowling function seeing many a clash. In the inaugural (and possibly only) bowls challenge, it was the students who reigned supreme. It was a fun afternoon with plenty of sledging – the staff definitely won that battle!

We have continued the celebrations, attending the 18th December 2023 JCU College of Public Health, Tropical and Veterinary Sciences Graduation and the 27th March 2024 JCU College of Science and Engineering Graduation to cheer on our AIMS@JCU students as they graced the stage. This year was particularly poignant with Prof. Selina Stead (AIMS CEO) giving the Occasional Address and meeting with the graduates after for a photo opportunity! It is with great pride that we congratulate our newest AIMS@JCU Drs: Dr. Josephine Nielsen, Dr. Kevin Bairos-Novak, Dr. Bethan Lang, Dr. Chinenye Ani, Dr. Peter Doll, Dr. Alexandra Gulizia, and graduating in absentee, Dr. Emma Marangon and Dr. Eoghan Aston. Further congratulations to our graduate Masters, Honours and Work Integrated Learning (WIL) students. We would also like to recognise and congratulate Ms. Courtney Burns, who is the first graduating AIMS@JCU student member to have also completed the AIMS@JCU Indigenous Internship.



As we say 'best of luck and stay in touch' to our newest graduates, we would also like to extend a warm welcome to our four newest AIMS@JCU PhD Scholarship students, Bambang Hermanto, Sarah Ghobish, Leo Chieu-Leung and Crystle Wee. For all existing student members, don't forget, we like to support you as much as possible, the winners of the first round of AIMS@JCU awards will be announced shortly.

We are always keen to chat, whether it's over a coffee at our monthly morning teas where you can all kinds of people – thanks Selina for coming along to the March function – or in our office at AIMS (South Wing Office 13) or JCU (Building 17 rooms 145-147), but do send through an email first, as the JCU office will be relocating in the next few months.

**Cherie Motti, AIMS@JCU Research Director ([c.motti@aims.gov.au](mailto:c.motti@aims.gov.au))**

Josephine Nielsen