

January 2023

VOLUME 19, ISSUE 1

AIMS@JCU 2022 Student Seminar Day

We are excited to announce the presentation winners from the 2022 AIMS@JCU Student Seminar Day which was held at the Museum of Tropical Queensland on Friday, 2nd December. As always, the quality of the seminars, speed talks, poster presentations and photographs was exceptional. Thank you to everyone who contributed to both the launch of the AIMS@JCU Triennial Plan and to the seminar day itself.

The session chairs embraced the challenge and performed outstandingly; thank you Chris Brunner, Bettina Glasl, Marina Santana and Heidi Luter. It was a hard task for our judges who did an excellent job, thank you to Britta Schaffelke, Sharon Barnwell, Lyndon Llewellyn, Neal Cantin, David Bourne, Katharina Fabricius, Cherie Motti and Libby Evans-Illidge. Special thanks to Yui Sato for his inspiring and entertaining keynote talk entitled 'AIMS@JCU and me'.

Thank you again to Libby Evans-Illidge for her exceptional leadership and dedication to the AIMS@JCU cause over the past decade and a half. A special thanks also for strengthening the alliance between AIMS and JCU and securing the future of AIMS@JCU for the next ten years. It was an honour to accept the Triennial Plan and the mantle of AIMS@JCU Research Director, and to officiate over the AIMS@JCU Seminar Day as my first duty.

Dr Cherie Motti, AIMS@JCU Research Director

Contact: c.motti@aims.gov.au

See next pages for winners and photographs

CONTENTS

AIMS@JCU 2022 Student Seminar Day	<u>2</u>
Pilot Research Award Summaries	<u>5</u>
Science Communication Award Summary	<u>9</u>
AMSA Conference Summaries	<u>10</u>
Research Director report	<u>12</u>

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 quarterly 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:

Editor: Lauren Gregory

Email: aims@jcu.edu.au

Kevin Bairos-Novak Seminar talk winner (\$1,500):

Demographic Drivers of Coral Population Persistence:
An Integral Projection Modelling Approach



Chinenye Ani Seminar talk runner up (\$1,200):

eReefs modelling suggests *Trichodesmium* may be a major
nitrogen source in the Great Barrier Reef

Kevin Bairos-Novak People's Choice seminar joint winner (\$300):

Demographic Drivers of Coral Population Persistence:
An Integral Projection Modelling Approach

Ramona Brunner People's Choice seminar joint winner (\$300):

Which receptors are responsible for settlement of *Acropora
millepora* larvae?

Sarah L.T. Kwong Speed talk winner (\$1,000):

Never ask a starfish its age

Taylor Whitman Speed talk runner up (\$800):

Using environmental predictors of wave energy to
understand the influence of grazing fish on coral survival to
optimise coral seeding

Cecilie R Gotze Poster winner (\$800):

Distribution and Function of Bacterial Aggregates Within
Tissues of the Coral *Acropora loripes*

Marko Terzin Poster runner up (\$600):

Functional signatures of seawater microbes show increased
stress response in degraded reefs

AIMS@JCU 2022 Student Seminar Day

Continued

Photography winners (\$100 each):

Research in Action:

Christopher Brunner

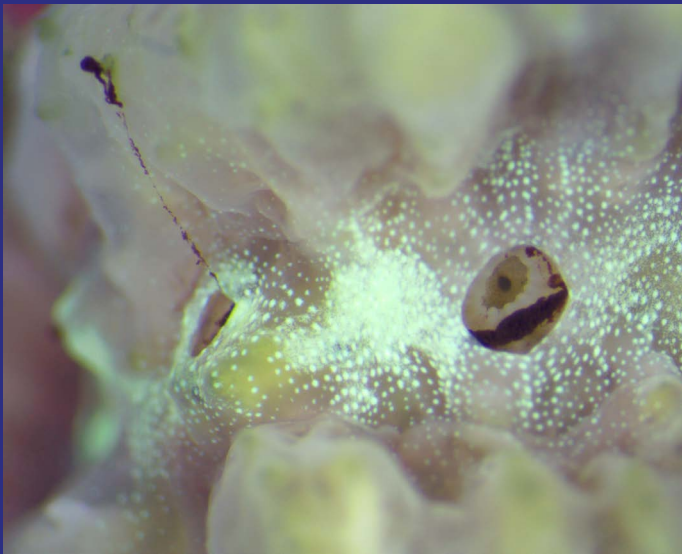
500 samples later and still smiling



People's Choice:

Marine Lechene

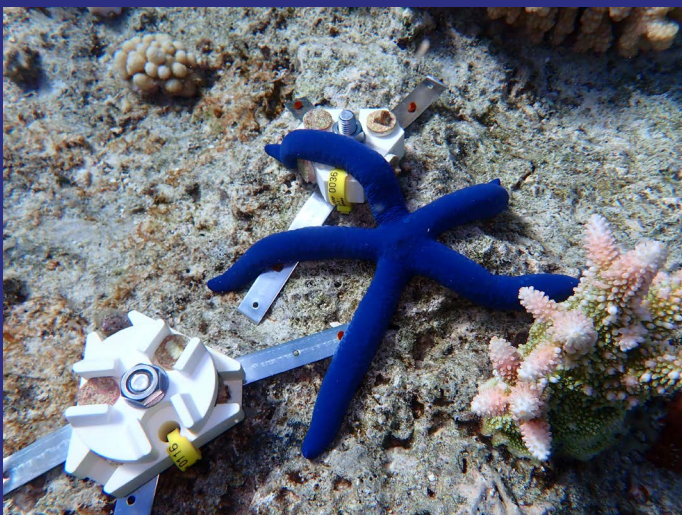
It is a matter of scale



Photomicrograph/
Macro:

Corinne Allen

Coral bleaching in action:
mass symbiont expulsion
from mouths of a *Platygyra*
daedalea fragment



Research Subject:

Taylor Whitman

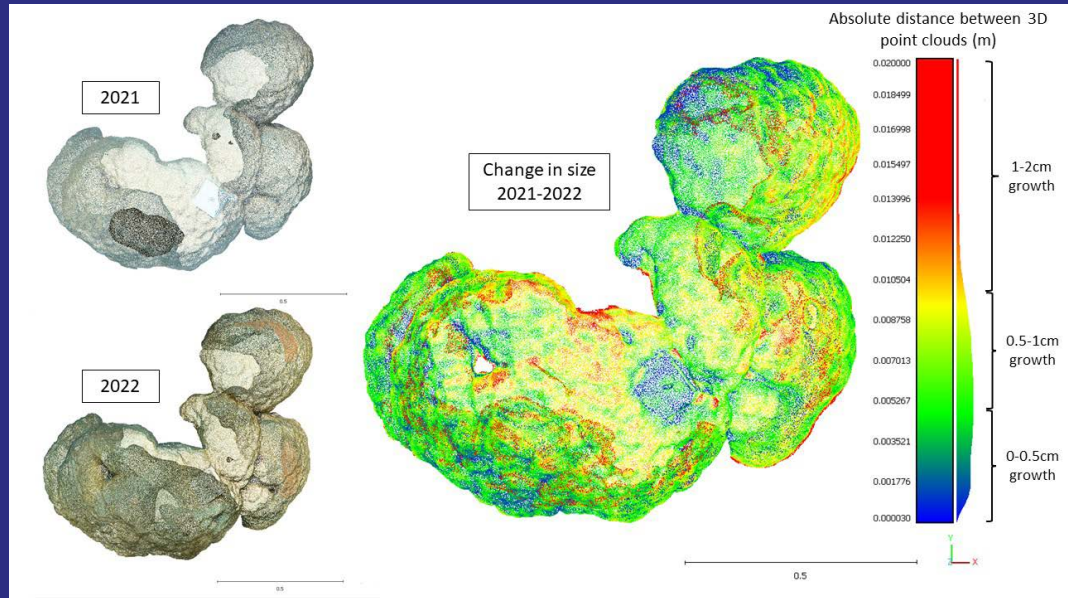
A warm welcome from the
Linckia to the new corals on
the block

Corinne Allen

Quantitative Marine Science:

Marine Lechene

Change in 3D size of a Porites massive colony between 2021 and 2022



Leviathan Student and Postdoc Grants Program 2022

The Leviathan Project is a unique artistic research collaboration led by artist Dr. Shezad Dawood, that draws on scientific research at the intersection of human and marine ecologies, and translates that research into a form communicable to a wider audience, i.e., through exhibitions, accessible publishing and dissemination. Inspired by Professor Madeleine van Oppen's research into coral sustainability, the Leviathan Project has committed to an initial 2 year programme of small grants for doctoral candidates and post-doctoral researchers at AIMS. These grants are designed to further increase the impact of coral research by employing a unique combination of the arts and sciences. Successful candidates will be jointly selected by Shezad (Leviathan Project), Madeleine (AIMS) and Cherie (AIMS@JCU) to further enshrine the potential of collaboration.

Two grants worth \$5,000 each were won by:

Bede Johnston

Determining the transmission dynamics of expelled heat-evolved symbionts and their implications for coral reef restoration

Marine Lechene

A 3D model is worth a thousand words

Keep an eye out for their write-ups in future editions of our newsletter.

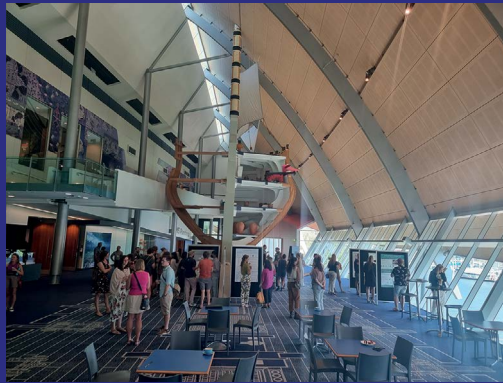
AIMS@JCU 2022 Student Seminar Day

Continued



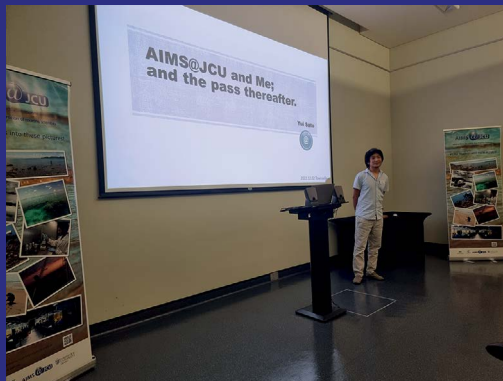
Launch of the AIMS@JCU Triennial Plan 2022-2024 by Libby Evans-Illidge

The beautiful venue at the Museum of Tropical Queensland displaying the AIMS@JCU student poster presentations and photography



The AIMS CEO Dr Paul Hardisty addressing the event

Our Alumni speaker Yui Sato inspiring the current AIMS@JCU students



Libby Evans-Illidge handing over the AIMS@JCU Research Director position to Cherie Motti

Thank you to everyone who presented and attended this fabulous event



Corinne Allen

Pilot Research Award summary

Bethan Lang



B. Lang counting crown-of-thorns starfish settlers under a microscope

In 2021 I was granted an AIMS@JCU Pilot Research Award for my PhD. The funding received contributed towards the costs associated with a project focussed on understanding the impacts of ocean warming on crown-of-thorns starfish (*Acanthaster cf. solaris*; CoTS) larval settlement.

CoTS are notorious for causing substantial damage to coral reefs in the Indo-pacific region, as a result of their tendency to feed on reef-building corals and their propensity to occur at high densities. Another emerging threat to coral reefs is climate change, and an associated increased prevalence and intensity of marine heatwaves. CoTS predation and elevated temperatures will together reduce the resilience of corals on the reef. However, little is known about how further ocean warming will directly impact this coral predator. The process of planktonic larvae settling on benthic substrate and metamorphosing into juveniles is considered a major population bottleneck in the life cycle of many marine invertebrates. The success of settlement and metamorphosis is likely to have a profound influence on population replenishment, thus understanding the vulnerability of these processes to ocean warming is necessary in order to predict the future threat that CoTS will pose to the reef.

In this study we aimed to establish the effect of warming on (1) settlement success (2) metamorphic success, and (3) post-settlement survival in CoTS, while (4) unravelling possible negative effects of elevated temperature on the algal settlement substrate, and hence settlement success.

At AIMS, gametes from CoTS were fertilised, and resulting embryos and subsequent larvae were reared until competent to settle. At this point, larvae were transported to JCU for settlement experiments. Larvae were divided into four temperature treatments (28, 30, 32 and 34 °C) and were then introduced to one of two algal settlement substrate treatments (control and pre-temperature treated). Settlement and metamorphic success, as well as post-settlement survival were assessed at various points in time over eight days. The money provided by the AIMS@JCU Pilot Research Award was used to purchase materials required for the experimental set-up.

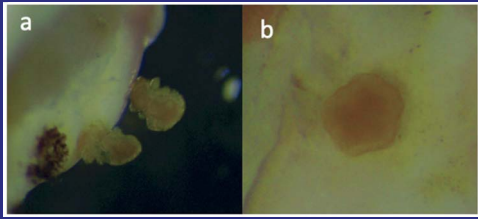


A crown-of-thorns starfish on the reef

Preliminary results of these experiments indicate

Pilot Research Award summary

continued



Settled crown-of-thorns starfish a. larvae and b. metamorphosed juveniles on crustose coralline algae

that cumulative effects of ocean warming on CoTS larvae and their settlement substrate may impact recruitment success in the near future, leading to negative impacts on adult population densities.

I would like to thank AIMS@JCU for the Award that has allowed me to successfully conduct my research.

Contact: bethan.lang@my.jcu.edu.au

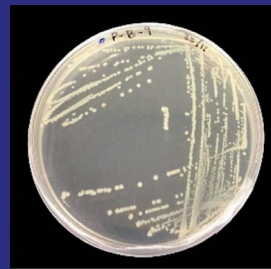
Pilot Research Award summary

Callaway Thatcher

Thanks to the AIMS@JCU pilot research study award I was able to fund additional 16S amplicon sequencing of bacteria isolated during the 2021 spawning event.

Coral microbiomes contain a plethora of bacterial members, each likely playing a unique role as part of the metaorganism. Here we aimed to isolate and identify as many unique bacterial members associated with various coral species at early life-stages. Some of these bacterial members are hypothesized to have beneficial traits, some of which we hope to uncover. However, we first have to gain a clearer picture of the bacterial communities associated with our corals. To accomplish this we used several selective strategies to target individual bacterial species. For example, we plated egg/sperm bundles collected from three different corals on selective medias such as R2A and MMA. From plating egg/sperm bundles we obtained 45 isolates from *A. tenuis*, 69 from *A. millepora*, and 54 from *P. daedalea*. All of which have been sent for 16S rRNA gene sequencing.

The scale of this research was made possible by the generous pilot research study grant and the support of AIMS@JCU.



Top left: Callaway Thatcher checking for the release of coral spawn using red light.
Middle: Egg and sperm bundles on a cell strainer prior to plating on selective medias.
Right: An example of a bacterial growth obtained by plating homogenized egg and sperm bundles from the coral *Platygyra daedalea*

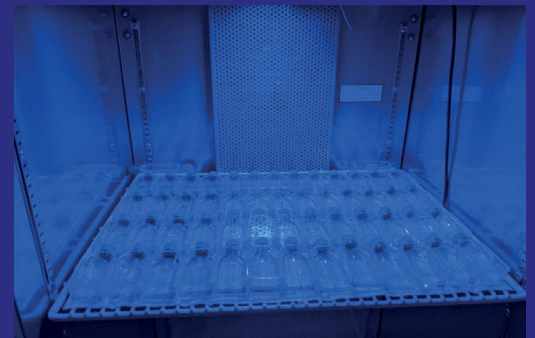
Contact: callaway.thatcher@my.jcu.edu.au

Chris Brunner

Pilot Research Award summary

Kevin Bairos-Novak

I was fortunate to be awarded the AIMS@JCU Pilot Research Award, which I used to set up a mini coral symbiont culturing lab at JCU in collaboration with my AIMS supervisor Professor Madeleine van Oppen. I am interested in studying coral and symbiont (i.e. Symbiodiniaceae or the algae-like cells that give corals their colour) tolerance to thermal stress, and how this is related to their genetics and acclimation potential. I set up a symbiont experiment at JCU to inform my eco-evolutionary models of coral population dynamics and simulate more realistic populations of corals into the future. I used symbionts originally cultured at AIMS that can withstand high temperatures and tested their acclimation abilities to see if artificially evolved symbionts would have increased, reduced, or similar acclimation abilities.



Growing symbionts in a new facility is a challenging endeavour, and so I am very thankful for the invaluable aid and expertise of AIMS' Carlos Alvarez Roa, who helped me get set up and going at JCU. Along the way, equipment failure, covid-related lab shut-downs, delays in equipment shipping, and a major knee surgery slowed me down, but the symbionts don't care about that, they just care about their biweekly replenishment of nutrients. In the end, I was able to mass produce many happy symbionts for my research in the end, filling over 3 incubators!

I am very thankful to AIMS@JCU for providing funding for this award, which allowed me to purchase new LED lights that provide a more consistent lighting with less residual heat and thus helped me to grow the symbionts in vitro. I also sincerely thank Madeleine and Carlos for supporting me with this project!

Contact: kevin.bairosnovak@my.jcu.edu.au

Chris Brunner

Science Communication Award summary

Hugo Scharfenstein

After two years of delay due to Covid-19, the 15th International Coral Reef Symposium was finally held in July 2022 over in Bremen, Germany. This was the first international conference I was able to attend in-person, which proved to be a great formative experience. My attendance at this conference was made possible thanks to the financial support provided by AIMS@JCU through a Science Communication Award, which covered the conference registration fees and some of the travel costs.



At the 15th ICRS, I presented a study in which our team assessed the thermal tolerance of microalgal symbionts from corals (*Symbiodiniaceae*) after being exposed to increased temperatures over multiple years. Given the limited number of studies in the field of experimental evolution with *Symbiodiniaceae* and their significance to coral restoration efforts, this conference was an ideal platform to promote our group's latest findings.

Presenting my work there allowed me to receive constructive feedback on our experiments from experts in the field, which is proving highly valuable in the design of upcoming work in my PhD. I also attended a workshop on *Symbiodiniaceae* research that was held as part of the 15th ICRS. This proved to be a great opportunity to meet other early career and established researchers in the field, but also to discuss the latest advances and best practices in this field of research.



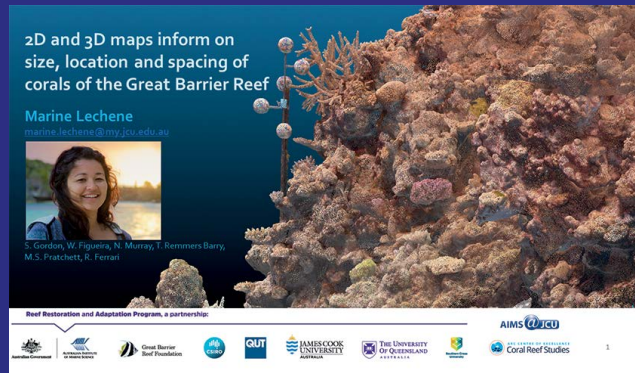
Chris Brunner

Contact: hugo.scharfenstein@gmail.com

AMSA Conference Experiences

Marine Lechene

I am very grateful for the AIMS@JCU Science Communication Award I received to attend in person the well renowned Australian Marine Science Association conference in Cairns. This conference was an incredible networking opportunity for me, especially after being held online for the past two years due to the pandemic. The AIMS@JCU Award significantly contributed to the cost of conference registration and accommodation.



My presentation titled "2D and 3D maps inform on size, location and spacing of corals of the Great Barrier Reef" provided an insight into two of my PhD chapters looking at the spatial variation of coral colony size, growth and arrangement using 2D orthomosaics and 3D models of reef. The novelty and aesthetic aspects of 3D models are always generating lots of interest, and this resulted in very engaging conversations with my peers. Addressing the need for coral demography through accurate measurements is essential to better understand reef trajectories and inform on where and how to implement active restoration actions. I am proud I could present at this conference this early in my PhD and I am looking forward to attending more of these events throughout my candidature.



Josephine
Nielsen

Contact: marine.lechene@my.jcu.edu.au

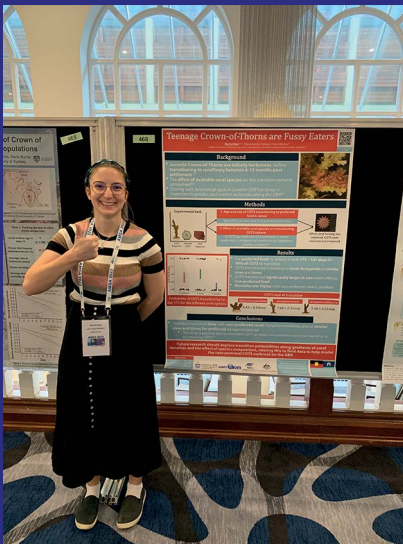
AMSA Conference Experiences

Rachel Neil

This August I was lucky enough to attend the Australian Marine Sciences Association's 2022 conference in Cairns. The majority of my conference costs were kindly covered thanks to an AIMS@JCU science communication grant. This was the first conference I attended during my PhD, and as it was the first in-person AMSA conference since the start of the COVID pandemic, had a larger than average number of students and researchers attending.

I was fortunately able to present both a poster and a 12-min seminar during my time there. My poster, "Teenage COTS are Fussy Eaters", presented results from a collaboration between myself, Sven Uthicke and Maria Gomez-Cabrera, which led to some interesting conversations with other COTS-adjacent researchers. My seminar, "Size matters: microherbivores have a big impact in coral aquaculture", presented the first results from my PhD, and formed part of the "Restoration and adaptation of Australia's coral reefs" symposium. I was excited to present these results to a wider audience, and to hear the perspectives of other researchers on the applicability of this work.

During the conference, I also attended the many social and networking events that had been organised; it was great to have the opportunity finally meet other researchers in-person, as during the first two years of the pandemic many such events were cancelled. As a result of my own presentations, and attending other researchers' seminars, I found several new opportunities to collaborate, opportunities I doubt would have been possible without attending this conference. Finally, it was a delight to see my fellow JCU students present their research to the Australian Marine Science community, and to see several of them win well-deserved awards in recognition for their hard work!



Kevin Bairos-
Novak

Contact: rachel.c.neil@gmail.com

Research Director Report

Welcome to the first AIMS@JCU Newsletter for 2023. AIMS@JCU is welcoming in the new year with a new Triennial Plan, presented at the 2022 AIMS@JCU Student Seminar Day! We would like to take the opportunity to (re)introduce to you the AIMS@JCU office staff: Dr Cherie Motti (AIMS@JCU Research Director; based at JCU on Monday and AIMS Tuesday - Friday), Lauren Gregory (based at JCU) and Darin Gaw (based at AIMS).

We would also like to introduce members of the AIMS@JCU Executive Committee (EC): Dr Lyndon Llewellyn (AIMS), Prof Ron White (JCU), Dr Cherie Motti (AIMS@JCU); and the AIMS@JCU Science Advisory Committee (SAC): EC members, Dr Line Bay (AIMS), Dr Claire Streten (AIMS), David Mead (AIMS), A/Prof Mia Hoogenboom (JCU), Daniel Christie (JCU), Prof Damien Burrows (JCU) and Prof Tiffany Morrison (JCU).

All AIMS, JCU and AIMS@JCU staff have a vested interest in the training of junior scientists – from undergraduate students through to Post-doctoral fellows. We are here to assist you where we can.

It's a pleasure to start off the new year by congratulating our newest AIMS@JCU Drs, Dr Chris Brunner, Dr Michaela Miller and Dr Sam Noonan. This is a fantastic achievement! All have already secured positions and we wish them all the best in their new endeavours. The JCU Graduation Ceremony will be held at the Townsville Entertainment and Convention Centre on the 30th March 2023, we encourage all supervisors to attend and support our graduating students.

After a competitive process, two AIMS@JCU scholarships have been awarded to Fazel Fatemi (Masters) and Daniel Croul (PhD). Both candidates will be starting in the next couple of months, so please make them feel welcome!

AIMS@JCU sponsored five AIMS@JCU student members to attend the Apply Safe Car Driving Behaviours Day Course, provided by The Advanced Driver Training Centre. The course, which is a combination of theory and practical, gave the students the opportunity to enhance their driving skills. The practical was conducted using one of the AIMS@JCU vehicles. The feedback we received from the students who participated was overwhelmingly positive and we are keen to add this training to our calendar. If you are interested in attending this course please contact the AIMS@JCU office.

In the post-COVID era, working remotely (i.e., off campus) has become the norm. It is important that when you work remotely you do so in a safe manner. For those who are based primarily at AIMS, there is a dedicated office on the JCU Townsville campus (Room 146, Building 17), for those primarily based at JCU, there are hot desks available on the AIMS site, and a room or desk can be booked in the JCU City Campus. All three sites are AIMS@JCU approved workspaces. Should you require more information about how to access these workspaces please contact the AIMS@JCU office.

Please check the AIMS@JCU website aims.jcu.edu.au for important dates.

Cherie Motti, AIMS@JCU Research Director (c.motti@aims.gov.au)

Bede Johnston