



Joe Pollock

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### 2015 AIMS@JCU PhD Scholarships

AIMS@JCU is pleased to invite applications for an extra round of PhD scholarships for Quantitative Marine Science (QMS) projects commencing in 2015.

There are three scholarships available, which provide the following:

- Stipend for 4 years, plus tuition fees if applicable.
- Additional funding support for QMS coursework and skill development
- Additional \$5,000 per year as stipend top-up or project costs

The application deadline is 15 June 2015.

For more information, go to <http://www.jcu.edu.au/grs/scholarships/index.htm> or click on 'Support Opportunities' on the AIMS@JCU website (<http://aims.jcu.edu.au>) for more detailed instructions on how to apply.

AIMS@JCU welcomes Samuel Matthews, who has recently moved to Townsville to take up his AIMS@JCU Quantitative Marine Science PhD scholarship.

Read Samuel's profile on the following page

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

### About the AIMS@JCU Newsletter:

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

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## 2015 AIMS@JCU PhD candidate

Samuel Matthews

### Samuel Matthews: Modelling crown-of-thorns starfish (CoTS) outbreak

Samuel completed his Bachelor of Marine Science with Honours in 2013 at the University of Wollongong. His honours research focused on the effects of increasing temperature on the social structure of the invasive fish *Gambusia holbrooki*. During 2014 Samuel worked as the Marine Coordinator at the Archipelagos Institute for Marine Conservation in Greece, focusing mainly on seagrass conservation initiatives and sustainable management strategies for the local artisanal fishing communities.



Samuel has started his PhD under the supervision of Morgan Pratchett (JCU), Julian Caley (AIMS) and Camille Mellin (AIMS). His project will investigate the causative factors behind outbreaks of Crown of Thorn Starfish (COTS) populations, to predict the extent and severity of future outbreaks under a range of climate and land use change scenarios. It aims to combine previous and concurrent research to determine the effect of biophysical parameters (temperature, salinity, turbidity) on the demographics of COTS populations. Combining this knowledge with predictions of changes to the biophysical conditions on the GBR over the next 100 years, we will be able to assess how these changes will affect outbreaks and demography of COTS populations. This research is extremely important in mitigating the effects of COTS outbreaks on the reef and also as a modelling framework for use on other marine pests.

Dr Ian McLeod

# Science Communication report

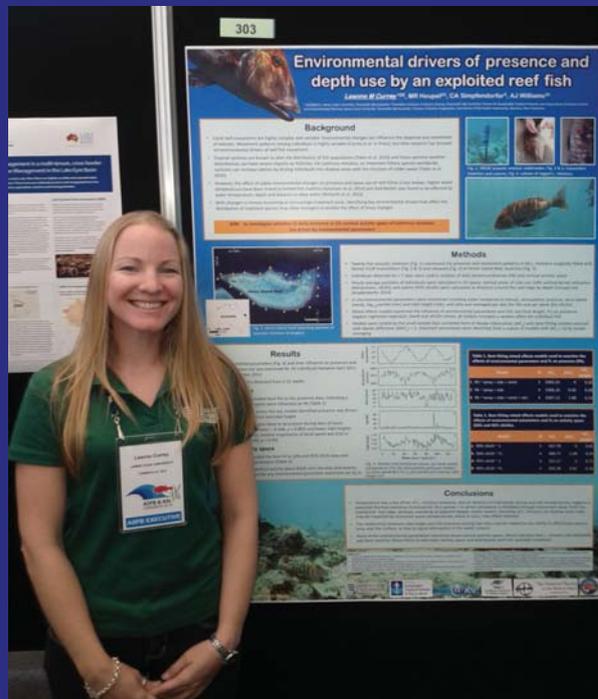
Leanne Currey

The AIMS@JCU Travel Funding Award enabled me to present my PhD research on the movement and ecology of a commercially important tropical fish species in Northern Australia at the Australian Society for Fish Biology (ASFB) & Australian Society for Limnology Joint Congress' in Darwin (30th June - 4th July 2014). AIMS@JCU travel funding significantly contributed to my conference attendance, covering registration and part of the accommodation costs. The opportunity to represent AIMS@JCU at this national audience was extremely beneficial as I received great feedback about my work that I incorporated into my thesis and publications.

I discussed my PhD research which used acoustic telemetry and conventional tagging of redthroat emperor (*Lethrinus miniatus*) to investigate individual space use and the influence of environmental conditions on their movement patterns. My oral presentation revealed that this species displays characteristics of both mobile and sedentary lifestyles and varied depth use. For example, one monitored individual travelled over

160 km, while many displayed high site fidelity with reef slope activity spaces of  $< 4 \text{ km}^2$ . My poster reported less redthroat emperor presence on the reef slope during days of warmer water temperature, implying a shift into cooler deeper adjacent habitats for refuge. Thus, my research suggests that this species may respond to increases in temperature caused by a changing climate may by dispersal into cooler deeper areas, and that variability observed in movement among individuals indicates that spatial closures that cover individual reefs ( $> 4 \text{ km}^2$ ) could provide protection from fishing for the more resident proportion of the population.

I shared this new knowledge with many scientists, particularly with those undergoing similar research who use a range of



Poster presentation

Dr Ian McLeod

## Science Communication report

continued

techniques to answer questions about both marine and freshwater fishes. A variety of exciting and cutting-edge project results were presented at ASFB/ASL, and the combination with ASL provided an interesting freshwater influence.

Not only did the Darwin conference provide a great opportunity to gain feedback from delegates and judges on my research, but I met new colleagues and reconnected with other ASFB members and the executive committee (I have a continuing position as Qld representative). Being 6 months before the end of my PhD, the conference provided a fantastic opportunity to seek future career positions and opportunities, which have since resulted in sample sharing and potential collaborations in the future.



Myself and Elodie Lédée at a conference function

Through my attendance at this conference I was very fortunate to receive the ASFB John Lake Senior Poster Award. This award, in combination with an AIMS@JCU photography prize from the AIMS@JCU Seminar Day, assisted me with travel to France for the Bio-Logging Symposium (in September 2014) where I presented my research and networked with an international audience.

AIMS@JCU's generosity has enabled me to build new national and international networks, essential to the progression of my career, and I sincerely thank AIMS@JCU for their support.

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## Pilot Research Award report

Joseph Kelly

After completing my undergraduate degree at the University of Miami, I decided to take my education one step further in the MSc program at James Cook University. Through my coursework I was introduced to the study of sponges by Muhammad Abdul Wahab. Our conversations led to my decision to break away from the coral and fish-dominated research at JCU and pursue a new interest in sponge phylogeography and ecology.

Under the supervision of Dr. Lynne van Herwerden (JCU) and Dr. Nikos Andreakis (AIMS) I conducted a phylogenetic survey of Australian irciniid sponges using the nuclear Internal Transcribed Spacer 2 region (ITS2) and the mitochondrial gene *cytochrome oxidase* subunit 1 (cox1 or COI) molecular markers. This study was designed to complement other efforts to disentangle the taxonomic inconsistencies of keratose sponges. Our results are largely in agreement with previous irciniid phylogenies and support the idea that at least two genera, *Ircinia* and *Psammocinia*, require taxonomic reorganization.



In addition to the guidance I received from Muhammad Abdul Wahab, I would especially like to acknowledge my two academic supervisors, Dr. Nikos Andreakis and Dr. Lynne van Herwerden, who contributed enormously to the design of the study and spent many of their own resources teaching me the analytical and laboratory techniques necessary to complete the analysis. Additionally, a great deal of support was provided by Ms. Libby Evans-Illidge,

particularly in the facilitation of AIMS@JCU communications and resource coordination i.e. the AIMS@JCU Pilot Research Grant. This grant proved to be of great importance to my project as it covered costly DNA sequencing expenses, allowing me critical financial leeway to develop a quality of research that has conditioned me for an eventual doctoral candidacy.

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Dr Ian McLeod

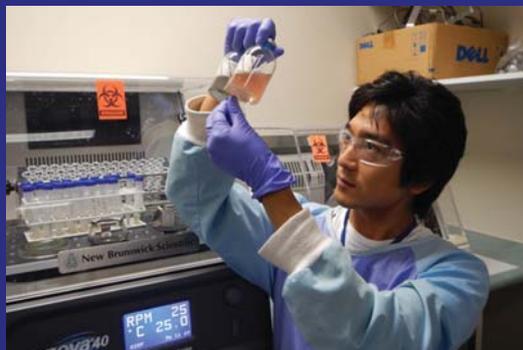
## Where are they now?

Yui Sato



Dr. Yui Sato finished his AIMS@JCU PhD studies in 2012, on the ecology and microbiology of coral disease, specifically 'black band disease'. In his study, Yui monitored outbreaks of black band disease in coral communities around Orpheus Island in the inshore central Great Barrier Reef. Coral disease outbreaks observed from 2006 resulted in localised population mortalities at the study sites. Upon the establishment of a research program funded by Mitsubishi Corporation and Earthwatch

Australia based on this study, he was employed as a postdoctoral research scientist to continue on a new set of studies with Dr. David Bourne at AIMS.



Current research at AIMS using microbial cultures of coral disease pathogens.



A coral disease experiment with Earthwatch volunteers at Orpheus Island Research Station.

In his new program at AIMS, Yui leads a research team of volunteers from the general public, to conduct biannual field trips to Orpheus Island Research Station. These 'citizen scientists' are recruited through the Earthwatch program "Recovery of the Great Barrier Reef". The program's key focuses are to (1) document the recovery of coral communities at the study site around Orpheus and Pelorus Island, which were devastated by severe tropical cyclone Yasi in 2011; and (2) understand the etiology of black band disease through microbial and molecular approaches, including its potential roles during the recovery phase of coral populations. These field trips have provided excellent opportunities to reach out to a wider audience and communicate Science and the effort

Nicko Barrett

## Where are they now?

continued

needed to sustainably interact with our iconic Great Barrier Reef. A short documentary video highlighting these Earthwatch activities can be found in this link - <https://www.youtube.com/watch?v=koImaDf1NJ4>.

During his postdoctoral position at AIMS, Yui has also been privileged to visit Vienna for four months to collaborate with world-leading researchers at the University of Vienna. In Vienna, Yui worked with Prof. Christa Schleper to learn how to apply anoxic microbial culture techniques to grow a novel type of Archaea (Life's third Domain) which was found specifically associated with lesions of black band disease in coral. It is phylogenetically very distant from any cultured archaea or even uncultured environmental archaea known only from DNA information. Characterising the functions of this unique archaeon and its role in the development of disease may hold a novel key to understanding the mechanisms of this coral disease. You can find more about the discovery of this mysterious Archaea in Yui's initial report (<http://dx.doi.org/10.1111/1462-2920.12256>).



During Yui's scientific collaboration visit to Vienna.



AIMS field trip with Earthwatch volunteers.

While in Vienna, Yui also worked with Prof. Thomas Rattei and enjoyed bioinformatics analysis training on large scale sequence datasets. Yui is currently using these bioinformatic tools to study functions of entire microbial communities associated with the development of the coral disease. These metagenomic and metatranscriptomic approaches represent powerful tools to resolve complex microbial interactions within ecosystems such as coral disease lesions within the natural environment. His experience in Vienna has further developed Yui's research focus beyond the foundation that he established in his AIMS@JCU studies, and facilitated the diversification of his research career in his postdoctoral appointment at AIMS.

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Nicko Barrett

## Research Director report

Hearty congratulations to 10 new AIMS@JCU PhD's! Kimberley Lema and Xugan Wu were awarded their PhD's in absentia, and the following eight students were awarded their degree at JCU's graduation ceremony on 17th March: Muhammad Abdul Wahab, Marnie Freckelton, Joleah Lamb, Ian McLeod, Samantha Munroe, Allison Paley, Jeroen van de Water, and James White. At the ceremony and while everyone was looking so splendid in their academic dress, we took the opportunity for a group photo of these graduates along with available supervisors and members of the AIMS@JCU Management Committee.



Back row L-R: Joleah Lamb, Rocky de Nys, James White, Ian McLeod, Jamie Oliver, Jeroen van de Water, Muhammad Abdul Wahub.

Front row L-R: Helene Marsh, Samantha Munroe, Marnie Freckelton, Libby Evans-Illidge, Line Bay, Nicole Webster, Allison Paley

It was great to see AIMS staff Drs Jamie Oliver, Nicole Webster and Line Bay participate in the academic procession and in doing so, symbolically demonstrate the link between AIMS and JCU which is AIMS@JCU.

The total number of PhD's awarded at this JCU ceremony was 31. With almost one quarter of them being AIMS@JCU graduates, this ceremony was a very tangible reminder of the contribution and impact AIMS@JCU is making in training the next generation of marine scientists, while at the same time, doing high priority marine research. So, congratulations to all students, their supervisors and everyone else who has helped support the work of AIMS@JCU over the years. And to our most recent alumni members - good luck in your future careers, and please keep in touch.

I would like to wish all members and their families a happy and safe Easter Break.

Libby Evans-Illidge, AIMS@JCU Research Director

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Nicko Barrett