AIMS@JCU NEWSLETTER

April 2012

VOLUME 8, ISSUE 1

Congratulations!

New AIMS@JCU PhD scholarship awardees for 2012

Mario Espinoza (Endeavour Awardee): Tropic dynamics, movements and habitat use of coastal sharks at Orpheus Island, Australia. Supervised by Colin Simpfendorfer (JCU) and Michelle Heupel (AIMS)

Ian McLeod: Effects of ocean warming on the connectivity of coral reef fish populations. Supervised by Geoff Jones, Phil Munday (JCU), Mark McCormick (JCU) and Tim Clark (AIMS)

Martino Malerba: Employment of autoregressive models to assess the evidence of a GBR in decline. Supervised by Sean Connolly (JCU), Hugh Sweatman (AIMS) and Lyndon Llewellyn (AIMS)

Stefano Montanari: Hybridisation in reef fishes: ecological promoters and evolutionary consequences. Supervised by Lynne van Herwerden (JCU), Morgan Pratchett (JCU) and Line Bay (AIMS)

Chiara Pisapia: Chronic sublethal effects of multiple disturbances on adult coral colonies and their recovery through time. Supervised by Morgan Pratchett (JCU), Naomi Gardner (JCU) and Hugh Sweatman (AIMS)

Daniel Zeh: The use of automated acoustic tracking and GPS/ARGOS tracking to describe and quantify threats to dugongs in Cleveland Bay near Townsville, QLD. Supervised by Helene Marsh (JCU) and Michelle Heupel (AIMS)

Look out for these student profiles in this and future newsletters.

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About the AIMS@JCU Newsletter:

This newsletter is produced quarterly and distributed by e mail to all 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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2012 AIMS@JCU PhD Candidate

Ian McLeod

Effects of ocean warming on the connectivity of coral reef fish populations

Originally from New Zealand, Ian completed his BSc and MSc through the University of Auckland. Ian has worked in 18 countries, including every continent. His previous roles include: Ranger on a small conservation island in NZ, filmmaker in Africa, personal trainer in London, head chef on a super yacht based out of Spain, environmental consultant, contract diver, pollution response officer, research officer in Antarctica, and English teacher in a small village on the foothills of the Himalayas.

Realising that little more consistency in his CV would be a good idea, Ian moved to Townsville to concentrate on building a career in research commencing with a PhD through James Cook University in April 2010. Ian's research focuses on the impacts of sea surface temperatures on the early life history stages of coral reef fish and the consequences on these impacts on the connectivity of reef fish populations. Specifically it addresses: What are the relationships between natural temperature gradients (spatial and temporal) and the early life history traits of coral reef fishes? What are the effects of ocean warming on the early grown, survival and body condition of juvenile reef fish at equatorial regions, where they may already be living at or beyond their thermal optima? What are the interacting impacts of temperature and variable food supply on the performance of reef fish larvae. This research is supervised by Professors Geoffrey Jones, Mark McCormick and Philip Munday from JCU along with Dr Timothy Clark from AIMS.

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2012 AIMS@JCU PhD Candidate

Stefano Montanari

Hybridisation in reef fishes: ecological promoters and evolutionary consequences

Stefano is originally from Italy and has studied at JCU for both his Bachelor (Marine Biology) and Honours. For his PhD project, Stefano will be investigating the ecology and genetics of hybridising reef fishes at the marine suture zone of Christmas Island, Indian Ocean.

Hybridisation has been largely understudied in reef fishes. Recent studies combining ecological and genetic tools have shown that hybridisation is far more common in reef fishes than previously thought. We are only starting to understand the ecological promoters and evolutionary consequences of hybridisation in this highly diverse group. This project aims at investigating the spatial, dietary and reproductive ecology of at least five pairs of hybridising reef fishes and their respective hybrids, across four families. Laboratory work will also be conducted to determine the genetic and fitness consequences of the hybridisation.

Hybridisation has been shown to have important consequences for biodiversity (speciation or reverse-speciation). This study will provide unique insights and contribute to understanding marine evolutionary processes such as barriers to gene flow, insular speciation and the formation of hybrid lineages. Understanding the importance of hybridisation in shaping reef fish community assemblages of Christmas Island will help informed implementation of guidelines for the preservation of the biodiversity at this unique location.

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AIMS@JCU Trip to ICRS

This July, 21 AIMS@JCU student members will be taking advantage of accomodation and/or travel support to attend the International Coral Reef Symposium in Cairns. We look forward to their presentations (18 of our students are presenting their research) which include topics such as coral disease, feeding preferences of coral reef fishes and environmental stress in coral reef sponges. Good luck to all of our students, we hope it is a wonderful and productive event.

12th International Coral Reef Symposium
9-13 July 2012 • Cairns • Queensland • Australia

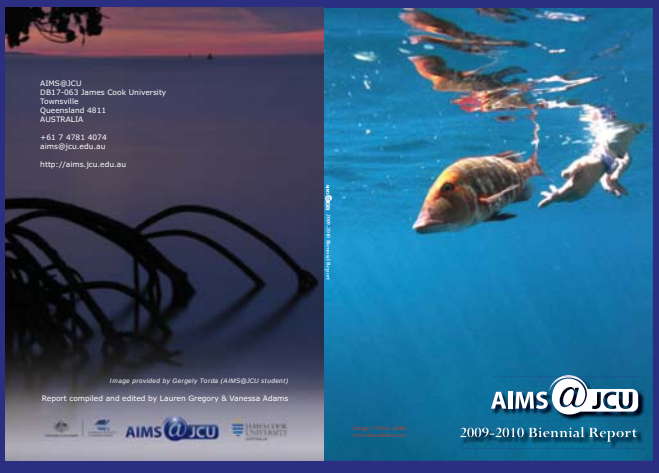
AMSA Memberships

In 2011, four AIMS@JCU student members (Stephen Ban, Vinay Udyawer, Joleah Lamb and Jeroen van de Water) received one year's free membership to the Australian Marine Sciences Association in the name of Joe Baker. Please see http://www.amsa.asn.au/ for more details regarding the benefits of joining AMSA, Australia's major professional association for marine scientists from all disciplines.

AMSA
AUSTRALIAN MARINE SCIENCES ASSOCIATION

AIMS@JCU 2009-2010 Biennial Report

The latest AIMS@JCU report is now available for download at: www.http://aims.jcu.edu.au/AIMS-JCU/research/reports.html. We hope you enjoy reading it and thank you to everyone who had input into this document.



AIMS@JCU Honours Student Profile

Steven Gamble

In 2009 I moved to Townsville to undertake my BSc in Aquaculture at JCU. During this time I developed an interest in domestic seafood demand and the issues associated with the utilisation of wild resources and a rapidly growing global population. In 2011 I subsequently enrolled in an honours degree in Aquaculture which placed a focus on the larvae of new and emerging aquaculture species. Under the supervision of my AIMS@JCU supervisors, David Francis and Mike Hall (AIMS) and Igor Pirozzi and Chaoshu Zeng (JCU), my project investigated the nutritional requirements the larval ornate rock lobster, *Panulirus ornatus*.

The demand for rock lobster in general is particularly high and it is widely accepted that wild populations are increasingly incapable of natural replenishment at a sufficient rate to withstand the onslaught of harvesting effort. The project was of particular interest to me as the development of a robust hatchery technology for the aquaculture of rock lobster is arguably one of the most challenging in biological marine science. Furthermore, I could see that results of my research could offer a practical solution in protecting marine biodiversity by developing a farming technology, rather than wild harvest, to supply growing demand. Major issues include the complexities of the larval cycle of rock lobsters, being amongst the longest of any marine species, and in particular, the larval nutrition requirements to develop a formulated diet and solve a major bottleneck associated with the farming of this high valued species.

My project specifically focussed on the protein nutrition of *P. ornatus* larvae. To date, there is no published data available relative to the nutritional requirements of any larval lobster species, and there are therefore no commercially available feeds available to permit the establishment of closed-cycle aquaculture. In consideration of the rudimentary digestive system of larval lobsters, the first component of my study focussed on the effects of the structural nature of proteins on the growth and survival of larval *P. ornatus* over an intensive five week rearing period. I then subsequently determined the impact of protein structure on the retention and transit time through the digestive system.

The results of this honours project will represent the first published account concerning the ability of larval *P. ornatus* to assimilate dietary protein. This research will greatly assist in the development of artificial feeds, ultimately permitting the aquaculture of this species while concurrently reducing the pressures placed on wild supplies.

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AIMS@JCU 2012 Honours Students

Congratulations!

AIMS@JCU has supported three new honours students with each receiving $1,000 of project funding. Congratulations to these new students and look out for their bios in future issues of our newsletter.

Shaun Bochow in the School of Veterinary and Biomedical Sciences, supervised by Leigh Owens (JCU) and Lone Hoj (AIMS).

Project title: Silencing the adenine methyltransferase gene of the bacteriophage *Vibrio harveyi* Myovirus Like (VHML) and its affect on the VHML lifecycle.

Lauren Davy in the School of Earth and Environmental Science, supervised by Colin Simpfendorfer (JCU) and Michelle Heupel (AIMS).

Project title: Spatial ecology of two ray species in a flat reef ecosystem.

Dennis Heinrich in the School of Marine & Tropical Biology, supervised by Philip Munday, Colin Simpfendorfer and Jodie Rummer (JCU) and Michelle Heupel (AIMS).

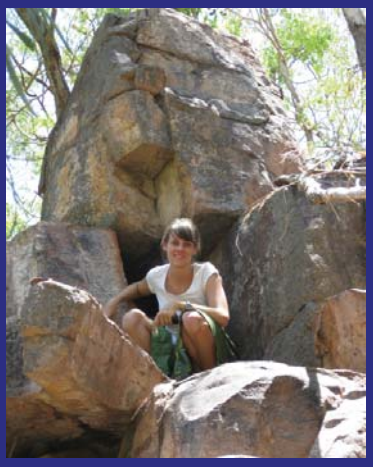
Project title: Ocean acidification and elasmobranchs.

Mid-year opportunity for AIMS@JCU project support for Honours and Masters students

This year, AIMS@JCU will offer up to three additional $1,000 awards for project support, to Honours and Masters (with a research component) students commencing mid-year 2012. As always, awards will be contestable and merit-based, with the major eligibility criteria being supervisors from both AIMS and JCU, and a project proposal with strong strategic alignment with the focus of both AIMS and JCU. Look out for more information on these awards on the AIMS@JCU website.

Where are they now?

Vanessa Adams, former AIMS@JCU Administrative Assistant



In October I said farewell to Townsville and my time at AIMS@JCU to begin a postdoctoral fellowship at Charles Darwin University researching the social and economic constraints of natural resource management and how they can be explicitly integrated into decision making processes. While I've left the Great Barrier Reef for new adventures in the Top End, I've maintained my connection to JCU as an adjunct staff member and still make it back to visit and work with collaborators.

A key component of my research is done in collaboration with Prof Bob Pressey at JCU, developing an integrated catchment- to- coast conservation plan for the Daly Catchment. The catchment has many conservation values and is home to several famous national parks including Litchfield and Katherine Gorge (Nitmiluk). The integrated approach aims to help natural resource managers in the catchment to balance the local (within-catchment) benefits arising from their actions with the downstream benefits for freshwater and marine systems. In some cases, large benefits for local objectives (e.g. retaining terrestrial biodiversity) and downstream objectives (e.g. reducing soil loss) will be obtainable in the same places but, very frequently, different benefits will not be spatially congruent and difficult choices will be necessary.

We will be collecting existing data for biodiversity and ecosystem services and developing models of likely expansion of extractive activities and impacts on freshwater flows and downstream effects. The project will result in an integrated plan that explicitly assesses trade-offs in conservation actions as well as feasibility and effectiveness of alternative policy tools. This research extends my PhD research in the Daly Catchment and I feel lucky to be building upon my existing relationships with conservation agencies and local landholders with the hopes of influencing on-ground conservation decision making.

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Research Director's Report

Dear all,

Hearty congratulations to the following AIMS@JCU students who were awarded their PhD at JCU's graduation ceremony on Saturday 14th April 2012: Vanessa Adams, Emmanuelle Botte, Thomas Bridge, Severine Choukroun, Vivian Cumbo, Ronald Hoeke, Jasmine Jaffres and Heidi Luter.

Congratulations also to the following AIMS@JCU students who were awarded their PhD at the ceremony in Absentia: Nicola Browne, Emily Howells, Raechel Littman, Eneour Puill-Stephan, Nicholas Romano and Vasiliki Tziouveli.

I wish all of our graduates every success for their future. Please keep in touch!

I had the privilege of representing AIMS@JCU in the academic procession at the graduation ceremony, which was a great honour. Considering the significant proportion of AIMS@JCU students out of the total PhD's awarded at the ceremony (which covered both the Faculty of Science and Engineering and the Faculty of Medicine, Health and Molecular Sciences), and as I heard their linkage to AIMS@JCU read out as each of our students was presented to the Chancellor, I was struck by the contribution and impact AIMS@JCU has achieved in training the next generation of marine scientists, as well as generating their related science outputs. So, congratulations and many thanks to all involved in supervision and support of AIMS@JCU students – you can all feel very justifiably proud of their achievement and success!

While we say farewell to our graduates, I also warmly welcome the new AIMS@JCU student members – both those congratulated in this newsletter for being awarded AIMS@JCU scholarships, as well as those who may chose to join AIMS@JCU to take advantage of the benefits membership offers you. I look forward to meeting you all soon.

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Photographs in this publication were submitted by AIMS@JCU students/ staff themselves, with all design based photographs by Gergely Torda