

\$ 3,000 in prizes on offer at student seminar

The second annual AIMS@JCU Student Seminar Day will be held on Friday, 9th November 2007. AIMS@JCU invites all students who are AIMS@JCU Members to participate in the seminar, which will offer **\$3,000 in prize money**.

- Presentations are to be 15 minutes with 5 minutes question time.
- Posters can be new productions or posters previously presented at conferences.
- Prizes are contributions to costs of attending conferences to present a paper.

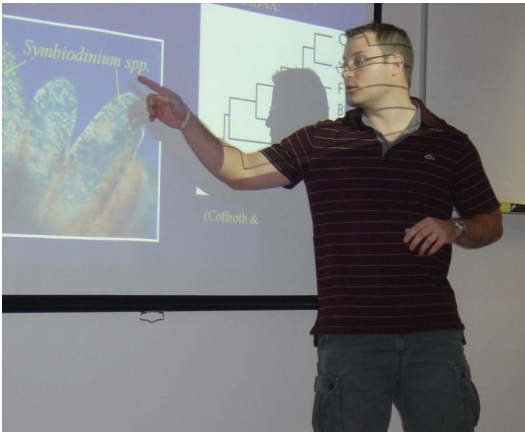
It is hoped that all advanced PhD students (2nd year or above), Masters Students and completed Honours Students would be available to give an oral presentation while other students could present a poster.

Students intending to present a paper or a poster must advise the Communications Officer, Trisha Fielding, by 19th October 2007.

Staff and Students of both AIMS and JCU are invited to attend and should advise the Communications Officer by 26th October 2007 for catering purposes.

This year the seminar will be held in the Endeavour Room at JCU Halls of Residence.

Further details of presenters and talk titles will be published closer to the date of the seminar.



One of last year's winners, Neal Cantin, presents a talk. Photo: T. Fielding

Scholarships for 2008

AIMS@JCU will offer up to three scholarships for PhD students in 2008. Recipients will be jointly supervised by scientists from both institutions, and will undertake projects based in one of the three AIMS@JCU research programs.

For full details go to: <http://aims.jcu.edu.au>

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About AIMS@JCU News:

This newsletter is produced quarterly, and distributed via email to all AIMS and JCU staff.

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Post-doc. profile - Dr Monica Gagliano



AIMS@JCU's new Post-doctoral scientist with the Stress in Tropical Marine Systems Program Monica Gagliano, was 7 years old when she carried out her first experiment (on growth rates of borlotti beans) on the windowsill of her home in northern Italy.

Since then, the breadth of her interests has expanded considerably and she has worked in tropical and temperate marine systems all over the world on a diverse array of topics and taxa.

Monica recently obtained a PhD in Marine Ecology from James Cook University, after completing a BSc. (Hons) in Marine Biology from University of North Wales Bangor and a MSc. degree in Marine & Fisheries Sciences from the University of Aberdeen in collaboration with the University of Cape Town.

Over the last few years, most of Monica's research has examined issues in fish population dynamics and specifically, the links between life history stages of fishes and how events in earlier phases influence subsequent population viability.

As the newly appointed AIMS@JCU Post-doc. within the Stress in Tropical Marine Systems program, Monica's research will focus on the responses of individuals to changing environmental conditions and the proximate factors influencing these responses.

As the impacts of human activities undermine the resilience of our

marine environment at an increasingly fast rate, understanding the mechanisms by which marine populations respond to these changes is a key component in the development of a sustainable Australia.

Although we expect natural populations to adapt (through selection) to future perturbations rather than disappear, our challenge is to determine how they will change and what the consequences are.

Evidence from a number of disciplines have shown that parents can transmit information about environmental variability to their offspring, by adjusting the phenotype of their offspring, thereby strongly influencing how well-suited they are to their environment.

When parents are exposed to highly variable and stressful environments, the quality of parental investment in the future generation is significantly challenged with major repercussions for the number and quality of individuals surviving to the adult population.

This means that environmental stresses will not only impact populations directly, through mortality of adults, but indirectly through their influence on offspring quality.

Yet the role of parental sub-lethal stress in the dynamics of wild fish

populations is largely unknown.

Monica's research addresses the question - can parents prepare their offspring to deal with these changes in marine populations?

Using a multi-disciplinary approach, the research will provide a new understanding of the mechanisms regulating reef fish populations under anticipated environmental changes.

By examining the parent-offspring relationship and their adaptive value in reef fish populations, the research aims to provide important insights into the mechanisms by which stress experienced by parents can affect the quality of their offspring and influence population dynamics.

Specifically, it will be the first assessment of the physiological and developmental mechanisms by which the effects of man-induced stress on reef fishes are transmitted to subsequent generations.

This research will make a significant contribution into areas of conservation biology and evolutionary ecology that are relatively unexplored to date, thereby promoting novel research activities within the STMS program and offering exciting research training opportunities for students.

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Research program update

Stress in Tropical Marine Systems

Student Activity -

Grethe Hillersoy (Hons) successfully completed her honours thesis in August, securing a first-class thesis. **Congratulations Grethe!**

New STMS student members:

Jessica Scannel - Masters of Applied Science

Coral degradation and its influence on fish mortality.

Fishes associated with live coral have been found to decrease in density with the degradation of coral habitat. The mechanism underlying this is poorly understood.

This project will examine the associations of fishes with their coral habitat, how their association changes with the degradation of their coral habitat and whether these behavioural changes influence the intensity and selective nature of mortality.

Supervisors: Mark McCormick, Monica Gagliano, Mark Meekan.

David Jones - Honours student

Effective population size in coral reef fishes.

This project examines the temporal stability and the role of sweepstake recruitment in affecting spatial and temporal genetic population structure in a common coral reef fish.

Using otolith-tagging techniques, *Pomacentrus ambionensis* has been found to have relatively high levels of self-recruitment around Lizard Island.

It is not currently known, however, how such self-recruitment affects the population genetic structure, if levels of self-recruitment are stable in over ecological time scales and if the relative contribution of individuals to this local recruitment varies.



Photo by M. McCormick

This project will use a large number of microsatellite loci to elucidate the population genetic structure in the Lizard Island region and determine its temporal stability by comparing samples collected in 2000 with others collected in 2007.

The role of sweepstake recruitment, where some individuals contribute disproportional to a recruitment pulse will be examined by comparing the population genetic structure among recruitment pulses collected from different places and times around Lizard Island to that of the adult populations.

Supervisors: Line Bay, Mark McCormick, Madeline van Oppen.

Michael Ellison - BZ3000 (2007) and Honours student (2008)

Thermal stress in a coral reef fish.

With global warming, coral reef fishes are likely to experience increasing temperatures that may result in thermal stress.

Understanding the thermal tolerance of organisms and how this may vary among populations is therefore of primary importance in

predicting the response to global warming in natural populations.

This project will examine the thermal tolerance in a common coral reef fish *Acanthochromis polyacanthus* among thermal environments in the northern region of the GBR.

The genetic structure among population in different thermal environments will be determined using microsatellite markers.

A thermal stress experiment will be conducted and the relative levels of stress incurred will be determined using enzymatic assays (Coenzyme Q) and expression of stress related genes (real time PCR).

These data will elucidate the potential for variation in thermal stress in a coral reef fish and the relative roles of local adaptation and acclimatisation in generating these.

Supervisors:

Line Bay, Monica Gagliano, Mark McCormick, Madeleine van Oppen.

Research program update

Coastal Processes & Modelling

Project Activity -

Circulation and mixing in the GBR.

IMOS (Integrated Marine Observing System) has injected significant funding for the GBR Ocean Observing System (GBROOS). Preparations are well advanced for the initial GBROOS moorings array deployment scheduled for September. Mal Heron's ACORN radar was deployed at Tannum Sands earlier in the year and is expected to be fully deployed on Lady Elliot by the end of the year.

Publication:

Yonghong Wang, Peter V. Ridd, Mal L. Heron, Thomas C. Stieglitz and Alan R. Orpin (2007) Flushing time of solutes and pollutants in the central Great Barrier Reef lagoon, Australia. *Marine and Freshwater Research*, 2007, **58**, 778791

Sensor networking for environmental and physical monitoring.

The high speed microwave radio link from AIMS pump house to Davies Reef provides for the first time a means of high capacity, real-time information exchange between the reef and the Australian mainland.

This technology will allow monitoring techniques like video feeds and sensor networks to be deployed on the GBR, and therefore opens the way to a huge array of new experimentation possibilities on the GBR.

The microwave radio link employed in this system uses a novel technique to "bend" the signals around the curvature of the earth to achieve the 78km range needed to reach Davies reef.

In this technique, the change in humidity above the ocean causes the radio signals to bend back into the ocean surface where they are then reflected back into the atmosphere from the ocean surface.

This processes repeats so the signals tend to hop along the ocean surface. The effectiveness of this technique depends on the prevailing weather conditions so that under adverse conditions of low wind speed and low temperature the link may disappear. Experience with the link so far shows that this only tends to occur during the colder mornings.

This project has required a close collaboration between JCU and AIMS staff. AIMS facilities like the Davies reef tower and the pump house site have been crucial to the success of this project while JCU Electrical Engineering and IT divisions have supplied the expertise to make it all happen. This project is also fortunate to have had the financial backing of government and industry groups including the Queensland Cyber Infrastructure Foundation (QCIF), Dataset Acquisition accessibility & annotation e-Research Technologies (DART) and emSolutions.

Yongala's Halo of Holes - see page five of this newsletter.

Student Activity -

Lachlan McKinna (PhD) attended an international conference in Finland in July on optical spectral methods and analysis relevant to remote sensing, then visited ocean colour specialists in Plymouth UK and University of Wales. He also discussed issues with researchers from Belgium.

Lachlan travelled to Curtin University in Perth to calibrate the Dalec sea surface spectrometer and learn more about ocean optics from Curtin University group.

Jasmine Jaffrés (PhD)

Publication:

Jaffrés, J. B. D., Shields, G. A. and Wallmann, K. (2007) The oxygen isotope evolution of seawater: A critical review of a long-standing controversy and an improved geological water cycle model for the past 3.4 billion years. *Earth-Science Reviews* 83, 83-122

Marie Magnusson (PhD) is currently preparing two manuscripts for publication that will be submitted to peer-reviewed journals in 2007. Marie also presented at two international conferences:

Magnusson, M., Heimann, K., Negri, A., and Ridd, M. 2007. Comparative effects of herbicides on photosynthesis and growth of the tropical microalga *Nephroselmis pyriformis*. *Phycological Society of America / International Society of Protistologists meeting 2007*, Providence, Rhode Island, USA, August 5-10, p. 56 (abstract, oral)

Magnusson, M., Heimann, K., Negri, A., and Ridd, M. 2007. Chronic and acute toxicity of PSII inhibiting herbicides to *Nephroselmis pyriformis* (Chlorophyta, Prasinophyceae). *4th European Phycological Congress, Advances in Phycology: From Genes to Global Ecology and Beyond*, Oviedo, Spain, July 22-27, p. (abstract, oral)

Ron Hoeke (PhD) spent six weeks working at JCU, during which time he made significant progress in model refinement and analysis and interpretation of in-situ data.

Ron also completed his PhD confirmation seminar on 28th August.

Welcome to new CP&M member Tom Bridge (PhD)

Thesis title: *Drowned shelf edge reefs as present day substrates and communities.*

Project update - 'Yongala's Halo of Holes'

Yongala Progress Report
(June - September 2007)
from Coastal Processes & Modelling
Post-doc. Dr Thomas Stieglitz.

In late July, we remapped the Yongala's halo of holes from the AIMS vessel *RV Lady Basten*.

We found a similar distribution of holes to that found in 2005, with some new holes on the outer rim.

This suggests that the holes are more or less stable features on the seafloor.

On the same cruise, we calibrated and deployed VEMCO VR2 acoustic receivers on loan from CSIRO Marine (Dr Alistair Hobday) around the wreck.

This array of receivers will track rays that are tagged with acoustic transmitters. From these observations we hope

to get some insight into the habitat usage patterns of these animals.

In July, the Ian Potter Foundation generously announced financial support for the tracking study, which has enabled us to purchase acoustic tags.

In addition, 'AQUA SPORTS and dive' kindly provided us with a Pelaj speargun, which we equipped with an applicator for HALLPRINT fisheries tags.

The tagging was made difficult by logistical constraints and the adverse weather conditions over the last few months.

We made numerous attempts to tag animals, and were finally successful in early September.

We tagged seven animals, which took two days, four trips, three different boats, and 12 divers.

Since then, the animals' movements have been monitored continuously.

The tagging was a team effort by AIMS, JCU, GBRMPA staff, members from a dive club and dive tour operators.

In and above water were (in no particular order):

Paul Crocombe from Adrenalin Dive and Heather Batrick from Yongala Dive.

From the North Queensland Underwater Explorers Club, S. Penprase, P. Davies, A. Davies;

From AIMS, the crew of *RV Lady Basten*, C. McLean, B. Bennett, M. Jonker, C. Robertson, R. Boyes, T. Cooper, E. Matson, J. Gioffre, C. Steinberg;

From JCU, G. Winstanley, O. O'Shea, R. Schroeder, E. Eriksson, G. Bressan;

From GBRMPA, G. Suosaari and A. Lochard.



Bullray tagged with acoustic transmitter

(photo: Giles Winstanley, www.snaq.net/)

Staff news

AIMS@JCU's Executive Officer, Brett Dinsdale had his last day with the joint venture on 31st July.

Brett has taken up a position as the Divisional Executive Officer, Information and Corporate Services Division, within JCU.

We'd like to take this opportunity to thank Brett for his efforts over the past couple of years, in getting AIMS@JCU up and running. Good luck Brett!

The Communications Officer, Trisha Fielding, has been kept busy keeping things running since Brett's departure.

It is envisaged that the vacancy will be advertised shortly.

In the meantime, if you have any queries regarding AIMS@JCU, please don't hesitate to contact Trisha on telephone 47814074 or email Trisha.Fielding@jcu.edu.au

Research program update

Tropical Aquaculture

The AIMS@ JCU Tropical Aquaculture students have made good progress in previous months.

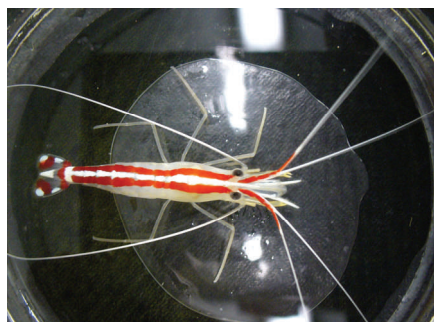
Highlights of student activity over this period include **May-Helen Holme's** attendance at the World Aquaculture Society Conference in Hanoi, Vietnam in August where she gave an oral presentation on her research towards formulated diet development for mud crab, *Scylla serrata* larvae. Her paper was well received.

May-Helen is now nearing completion of her PhD and is striving towards thesis completion. She has recently had another two manuscripts accepted for publication in the journal *Aquaculture* and has another three manuscripts in preparation (sitting on her Supervisor's desks!!).

A highlight of **Vasiliki Tziouveli's** research was to achieve metamorphosis and completion of the larval cycle in cultured ornamental cleaner shrimp, *Lysmata amboinensis*.

Vasiliki's project focuses on developing techniques for artificial propagation of this species. This milestone reflects positive

developments in other aspects of her research relating to the holding; conditioning and feeding of shrimp broodstock, larval culture methods and tank design. Well done Vasiliki!



Lysmata amboinensis, photo V. Tziouveli

Jerome Genodepa arrived in August to take up his AIMS@JCU scholarship. Jerome undertook his Masters at JCU where his research focused on the development of formulated food particles for larval mud crabs.

He subsequently ran both government and private mud crab hatcheries in the Philippines and has brought this experience back to AIMS@JCU to undertake more detailed study of the nutritional requirements of the larvae of tropical crustaceans.

Since arriving he has established a scaled-up larval culture system within the MARFU complex at JCU, a system that is now capable of successful high-density larval culture.

One batch of larvae has been reared through the system and Jerome will soon begin his first experiments.

Xugan Wu will arrive at JCU in November from China to begin his PhD research into nutritional aspects of culture of tropical rock lobsters and mud crabs.

Xugan recently completed his Masters at Shanghai Fisheries University which focused on fatty acid nutrition of the Chinese mitten crab. Xugan's research will address comparative studies of lipid nutrition of two commercial tropical crustaceans, the blue swimmer crab, *Portunus pelagicus*, and the rock lobster, *Panulirus ornatus*. Specifically, he will be looking to determine dietary lipid requirements of broodstock and larvae with a view to fine-tuning formulated diets used for broodstock and larvae in hatchery culture.

New Members...

Seven new AIMS@JCU members were approved at the recent AIMS@JCU Board meeting, on 20th September, 2007. Welcome to:

- Monica Gagliano, STMS Program, AIMS@JCU Post-doc.
- Nicholas Romano, STMS Program, JCU MSc.
- Kim Palmer, TA Program, JCU
- Tom Bridge, CP&M Program, JCU PhD
- Jessica Scannel, STMS Program, JCU MSc.
- David Jones, STMS Program, JCU Hons.
- Michael Ellison, STMS Program, JCU Hons.

Photos in this publication were submitted by the students/staff themselves, unless otherwise captioned.