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AIMS@JCU Welcomes Libby Evans-Illidge as Research Director

At the start of 2011, Michelle Heupel left her position as Research Director to begin an ARC Future Fellowship at AIMS. The Management Committee for AIMS@JCU is pleased to announce that Libby Evans-Illidge from the Australian Institute of Marine Science will become the new Research Director for AIMS@JCU.



Since completing a basic degree in marine biology at JCU in 1983, Libby has enjoyed an arguably atypical career in science which has blended the doing of research with policy development, science uptake and commercialisation, stakeholder engagement and collaboration, and research management. Her early

career began at AIMS in the field of reef sponge biology and chemical ecology. However, after a crisis of faith in science she threw that in, ran away to sea and sailed a 14 foot boat to Torres Strait over a 6 month period with future husband Peter. There they bought land and settled on a remote island where they built a house and explored the 'alternative lifestyle' concept. It wasn't long before they again succumbed to the lure of science, and established a small business headquartered in their rustic pole-house with solar power generation, from which they conducted marine science research in Torres Strait for, mostly, government research organisations.

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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.

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AIMS@JCU Welcomes Libby Evans-Illidge as Research Director continued

During this time Libby undertook a wide range of fisheries, seagrass and other benthic research, as well as the Torres Strait Baseline Study which assessed potential contamination of the marine environment and seafood species with heavy metals from mining activities in Papua New Guinea. One of the most satisfying aspects of this period came from the opportunity to work with Torres Strait communities on issues of relevance to Torres Strait islanders.

In 1994 Libby returned to Townsville to take up a position at AIMS, as leader of the marine biology program within a major biodiscovery project funded by Australian pharmaceutical company AMRAD. Libby's job was to lead a team of field biologists and microbiologists, and collect/identify/isolate/extract/curate 1000 macroorganisms and 3000 microorganisms per year from Australia's marine estate, and feed this molecular diversity into the biodiscovery program. Over the years her role has morphed into management of Australia's largest and most comprehensive marine bioresources library, and facilitating wide access to it (under appropriate agreements) for biodiscovery research. She negotiates and manages commercial contracts, as well as benefit sharing agreements with resource management jurisdictions in Australia. She has participated in numerous policy development forums on access and benefit sharing, both nationally and internationally. She has represented the Australian government in work programs of the Convention on Biological Diversity (CBD) and the United Nations Convention on the Law of the Sea (UNCLOS), and participated in the development of new domestic legislation in Australia. She also maintains active research interests in aquaculture as a production method for bioactive compounds and biomaterials, and in 1999 with colleagues at AIMS, JCU and communities, initiated research into bath sponge aquaculture and its environmental impact and management, at Palm Island and in Torres Strait.

Alongside the part-time AIMS@JCU research director role, Libby will continue her role as manager of the AIMS Bioresources library, and hopes to soon begin a new project (funded by the NERP) to develop an e-atlas for Torres Strait. She is thrilled to be part of the AIMS@JCU team, and looks forward to spending more time on campus, meeting all the AIMS@JCU students and developing new and better ways to maximise the synergies and leverage the strengths of the two partner organisations.

AIMS@JCU Student Seminar Day 2011



The 2011 AIMS@JCU Student Seminar Day marked the fifth annual seminar day and it continues to be a well attended and successful event. Thank you to AIMS for hosting us at such a beautiful venue. The day featured thirteen talks by AIMS@JCU students including a variety of research topics ranging from aquaculture to coral disease and coral reef ecology. The presentations were judged by Lyndon Llewellyn and Simon Robson who commended the students for the quality of research presented.

The top two talks were awarded with \$2,500 towards conference travel. This year's winners were Emily Howells and Joe Pollock. Emily's presentation was titled "Adaptation of *Symbiodinium* populations defines the fitness of coral symbioses" and Joe presented his research "A novel assay for the detection of the coral pathogen *Vibrio coralliilyticus*".

This was the first year that the event was hosted by AIMS and attendees were offered the chance to tour the facilities. Lyndon Llewellyn hosted the tour that covered the beautiful grounds and cutting edge laboratories that AIMS has on offer.

This event is an important source of funds for students and an excellent chance for them to showcase their research. We thank everyone who was involved in making it a successful and enjoyable day.



Above (Top) Joe Pollock presenting his research. (Bottom) Emily Howells receiving her award presented by Lyndon Llewellyn.

Left: Lyndon Llewellyn hosting a tour of the AIMS facilities.



AIMS@JCU Scholarships and Awards

Honours Student Support Funding:

Congratulations to the three successful applicants of this year's AIMS@JCU Honours Support Funding: Kristen Anderson, Steven Gamble and Vinay Udyawer. Each student was awarded \$1,000 to support their research and we look forward to hearing of the outcomes of their research. The Honours support will be advertised annually so please watch for advertisements for next year's awards in January 2012.

New AIMS@JCU PhD Scholarship students to begin in 2011:

Welcome to the five successful applicants of this year's AIMS@JCU scholarships Samantha Munroe, Joleah Lamb, Abdul Wahab, Thomas Camus and Leanne Currey. Each student has been awarded a JCUPRS stipend scholarship and an additional stipend top-up or operational expenses award of \$5,000 per year for up to four years. Their profiles are on the following pages.

2012 AIMS@JCU PhD Scholarships:

We are excited to advertise the 2012 AIMS@JCU PhD Scholarships. AIMS@JCU will offer up to five scholarships for domestic or international PhD students commencing in 2012. Scholarships will be competitive and recipients will undertake high quality research in the field of marine science. AIMS@JCU scholarships will include stipends (at the Australian Postgraduate Award level) and \$5,000 per annum for project costs or scholarship top-ups (to be agreed upon by student and supervisors). Projects must be jointly supervised by scientists from both institutions. Fields of research are open but should fall within areas of strength of the two partner institutions. Please see the AIMS@JCU website for a list of staff members and possible research topics.

Interested students are encouraged to contact potential supervisors at AIMS and JCU immediately to meet JCU application deadlines (31 Aug 2011 for international students; 31 October for domestic students). For a list of current AIMS@JCU staff members and research areas please see the AIMS@JCU website (<http://aims.jcu.edu.au/>). When applying students should indicate they are applying for an AIMS@JCU scholarship by writing this information into the list of scholarships applied for.

Information about the partner institutions - James Cook University: <http://www.jcu.edu.au/> Australian Institute of Marine Science: www.aims.gov.au/. For further information on AIMS@JCU go to <http://aims.jcu.edu.au> or contact the AIMS@JCU office at: aims@jcu.edu.au.

Thomas Camus

Thomas grew-up in France and completed a Bachelor of Science in Marine Biology at Hawaii Pacific University in June 2005. He arrived at JCU in February 2006 and started a Master of Applied Science in Aquaculture. While completing the course work component of the MAppSc he became interested in copepods biology and ecology, as well as their potential as live food source for marine hatcheries. He developed the idea of doing research with these fascinating creatures and completed a minor research project investigating the effect of various photoperiod regimes on the productivity and development of *Acartia sinjiensis*, a calanoid copepod. After completing this research Thomas started a Master by Research with supervisors Chaoshu Zeng (JCU) and David McKinnon (AIMS). His research focused on how to culture and storage methods for tropical copepods. Specifically, Thomas was looking for candidate species for aquaculture and assessing their productivity in culture and trying to determine culture protocols. Thomas upgraded to a PhD in 2010 and his PhD research will continue to study candidate species and the influence of a variety of culture parameters on their productivity in culture.



Muhammad Azmi Abdul Wahab



Muhammad moved from Singapore to Australia in 2006 to pursue a Bachelor degree in Aquaculture at James Cook University. Upon completion, he worked as a research assistant for Prof. Rocky de Nys and Dr. Nicholas Paul developing methods to extend the shelf-life of *Caulerpa lentillifera*, more commonly known as "green caviar". In November 2010, Muhammad completed his honours year in which he studied reproduction, larval behaviour, settlement cues, and post-settlement processes (i.e. survival and growth) in the commercial bath sponge *Coscinoderma matthewsi* under the supervision of Prof. Rocky de

Nys and Dr. Steve Whalan. In March this year, Muhammad commenced his PhD. His PhD research focuses on the intertidal dictyoceratid sponge *Carteriospongia sp.* which occurs in sheltered, shallow, intertidal zones where they can be exposed to air at extreme low tides. The intertidal environment is considered to be stressful to sponges due to high temperature and salinity fluctuations, high level of sedimentation and susceptibility to desiccation. Interestingly, *Carteriospongia sp.* has not been found in exposed shorelines (high energy) or on deeper reef slopes. He is interested in understanding processes that contribute to the distribution of this sponge and how it manages to cope in living in this stressful environment. Using a combination of field and laboratory experiments, Muhammad will investigate the contributions of sexual and asexual reproduction for the supply of recruits to the population. Additionally, he will look at larval behaviour and settlement processes to understand dispersal potential for this species. He will also investigate post-settlement success in both juveniles and adults in the intertidal and sub-tidal zones. He is also interested in understanding sponge-microbe symbiotic associations and sponge gene regulation processes under stressful conditions such as that experienced in the intertidal zone.

Leanne Currey

Leanne moved to Townsville for undergraduate study and completed her BSc (honours) degree in 2003 at James Cook University. After a contract at the Northern Fisheries Centre (DEEDI) she has worked on a number of fishery projects with the Fishing & Fisheries Research Centre at JCU during the past six years. In March this year, Leanne commenced her PhD. After focussing on the life histories of a number of fishery important species, Leanne's PhD project will investigate the movement of redthroat emperor (*Lethrinus miniatus*) on the Great Barrier Reef (GBR).



Little information is available regarding the spatial use and movement patterns of this species, as previous conventional tag recapture studies report limited success. The few recaptures of externally tagged individuals indicate small-scale movement from release locations, yet two individuals travelled over 200km across deep water. It is uncertain whether large scale movements are typical for adult *L. miniatus* or whether northerly shifts in distribution (e.g. caused by tropical cyclones) are a direct response to changes in the environment. Information on fish movement is therefore important to management of the GBR fishery, as the only stock assessment reported for *L. miniatus* assumes no movement among reefs (due to lack of data). However, if movement among reefs does occur, efficacy of marine park areas for this species may be reduced or alternatively *L. miniatus* may benefit from multiple MPAs.

Leanne will use acoustic telemetry to track individuals in the Capricorn Bunker region of the GBR, and as this region comprises different management zones, it will allow testing of movement of *L. miniatus* among reefs and management zones. Acoustic transmitters equipped with pressure sensors will enable the presence and depth of individual fish to be detected by underwater receivers. The sex of each tracked individual will be differentiated by plasma hormone levels to determine any sex-specific movement patterns. These data will be used to describe the short- and long-term movements of *L. miniatus* to address fundamental knowledge gaps in the ecology of this species.

With larger, older *L. miniatus* typically found at the northern end of their distribution, a net movement or northerly migration has been hypothesised for this species. In combination with the acoustic tracking investigating reef-scale movement, broader GBR-scale movement will be analysed using otolith microchemistry of samples collected along the Queensland coast.

Leanne's PhD research aims to describe movement patterns (area and depth utilisation) of *L. miniatus* in the Capricorn Bunker region in relation to the efficacy of MPAs and environmental changes, identify any sex-specific movement patterns and use otolith microchemistry to determine the direction of net movement of *L. miniatus* on the Great Barrier Reef.

Samantha Munroe



Sam graduated with a BSCh in Biology from Acadia University, Canada in 2010. Her honours research looked at the ectoparasitic assemblages of Atlantic sturgeon (*Acipenser oxyrinchus*) found in the coastal waters of Atlantic Canada. After graduation, Sam worked for several environmental non-profit organizations, including the Sierra Club of Canada, where her work focused on marine management and urban water conservation. Before accepting her AIMS@JCU scholarship in March, she spent three months volunteering work at the Bimini Biological Field Station, a shark research laboratory based in the Bahamas.

Sharks exhibit a wide range of behavioural adaptations in the majority of marine environments and have a large impact on community structure. A growing body of literature is attempting to quantify shark movements and diet to better understand their role in their communities. Data is also being used to create better management solutions for endangered populations and ecosystems as a whole. However, for the majority of shark species there is little information on habitat use or diet, limiting our ability to create comprehensive management solutions. Sam's work will isolate potential interactions between the diet and spatial distribution of sharks residing in Cleveland Bay, Townsville. This study will lead to a better understanding of their role and develop a more comprehensive picture of food web dynamics in this coastal environment.

Stomach content analysis is a common method for evaluating the diet of an organism, however it is time consuming, labour intensive, and specimens do not always produce data. Stable isotope analysis is a less demanding method now being used to quantify animal diets. Traditional isotope analysis determines the composition of heavy carbon and nitrogen isotopes in an animal's tissues. Carbon concentrations indicate the primary producer of the system within which the animal feeds and can be used to determine the food sources for organisms. Nitrogen concentrations increase at predictable increments with each trophic level and can be used to estimate trophic position in a food web. Limited variation in carbon and nitrogen values among individuals would indicate a selective possibly specialized diet, whereas high levels of variation indicate a broad generalized diet. By sampling blood and muscle tissues of different shark species, Sam will quantify the carbon and nitrogen isotope levels. Using this information in combination with passive tracking data of the same individuals, dietary breadth of a given population can be compared with its distribution.

The combination of these techniques will hopefully provide new insights into the foraging behaviours of these species, understand how these species effect marine ecosystems, and create better management policies in coastal communities.

Joleah Lamb

Joleah completed a B.S. in Neurobiology at the University of Oregon in the USA in 2005. During her undergraduate study she assisted in the investigation of *Drosophila* central nervous system development for cancer research at the University of Oregon Institute of Neuroscience and Molecular Biology. Her interest in disease research led her to the Oregon Center for Clinical Investigations where she coordinated clinical pharmaceutical studies for the treatment of neurological diseases and disorders.



After learning that disease was recognized as a major factor in the accelerating degradation of coral reefs in many regions of the world, Joleah soon relocated to Australia and completed her MAppSci in Tropical Marine Ecology and Fisheries Biology at JCU in 2009. Her research focused on using coral disease prevalence to assess the effect of concentrating tourism activities on offshore reefs in the Great Barrier Reef Marine Park (GBRMP). In 2011, she was awarded an AIMS@JCU research scholarship to undertake her PhD under the supervision of Bette Willis (JCU), Britta Schaffelke (AIMS) and Garry Russ (JCU).

Joleah's PhD aims to identify the effects of reef-based recreation and tourism on coral health. Currently, outdoor recreation, including tourism, are focusing more and more on the world's remaining natural marine areas. Although first-hand experience of coral reefs is one of the best ways to promote public awareness of conservation issues, achieving the dual objectives of providing recreational opportunities and preserving natural environments is challenging. To date, the effects of various visitor management strategies on coral health have not been evaluated in marine environments. Joleah plans on examining the effects of both spatial and temporal visitor management strategies on coral disease prevalence in Australia and overseas. In addition, a major tool of recreation management of the GBRMP is spatial zoning for multiple-use. While it has been suggested that marine protected areas could enhance the resilience of coral reefs, their utility in mitigating disease in coral populations has not been assessed in Australia. Joleah's research aims to evaluate whether current management practices associated with recreation activities are useful for mitigating coral disease on reef corals by assessing the efficacy of marine reserves on the Great Barrier Reef.

Unless otherwise stated photographs in this publication were submitted by AIMS@JCU students/staff or have been sourced from the AIMS Long Term Monitoring Team.