# Table of Contents

- USIMS Mission 3
- Executive Summary 4
- Introduction 6
- About USIMS 6
- USIMS Responsibilities 7
- Teaching 8
- Research 12
- Applied Research 18
- Affiliated Staff 20
- Grants & Publications 20
- Outreach 21
- USIMS future initiatives 26
- **Appendix 1** Financial report 27
- **Appendix 2** Grants snapshot 28
- **Appendix 3** Affiliated staff 30
- **Appendix 4** Publications 31
- **Appendix 5** Linked projects/institutes 39
USIMS Mission

• To promote the strength and depth of experience in research and teaching across the wide range of marine science disciplines at the University of Sydney.

• To foster collaboration, across the University, between research units and schools engaged in marine studies.
Executive Summary

The University of Sydney Institute of Marine Science (USIMS) is the public face of marine science at the University of Sydney. It is the place where prospective and current students and community members can go to find out about courses, events, and fascinating scientific exploits and breakthroughs. USIMS gathers the people and stories that explain what Sydney University does, encouraging others to join us.

The multidisciplinary nature of marine science and the interconnectedness of marine processes and systems, lends itself to collaboration. Helping to foster collaboration, USIMS has expanded its network within the university, which now spans four faculties and includes 12 research groups. Part of this forging of new relationships saw Professor Tim Stephens from the Faculty of Law appointed as the Deputy Director of USIMS in 2014.

The approximately 30 USIMS affiliated staff have continued to produce and disseminate high quality science, publishing over 120 articles in international journals, producing reports for industry and government agencies and contributing to national and international reviews and enquiries.

USIMS also continued to strengthen the university’s engagement with external partners, including Macquarie University, the University of NSW and the University of Technology, Sydney through the Sydney Institute of Marine Science (SIMS). One of our activities at SIMS, the Master of Marine Science and Management, jointly offered by the partners, continues to expand, attracting high quality passionate students. In 2014 the University of Sydney had the highest number of enrolments in the programme (up 30% from the previous year), further cementing our place as the premier marine science university in the Sydney region.

In recent years marine science teaching at the University has seen a major overhaul. Units of study have been streamlined to remove duplication and maximize quality by drawing on the research and expertise of staff. In 2014 there were approximately 900 marine science undergraduate students and 100 postgraduate students. Graduate projects covered a diverse range of topics, from understanding potentially catastrophic continental slope failures, looking at the effectiveness of marine protected areas in biodiversity conservation, the effect of ocean acidification on marine biodiversity, to using robots and computers to map coral reefs. USIMS through its research showcase, symposia and other events, continues to build an environment that ensures our teaching reflects our research strengths.

In 2014 USIMS enhanced its communication, with an improved web presence, which included streamlined information on marine science units of study and courses offered, an active facebook page and advertised outreach projects. Not only has USIMS improved its engagement with the marine scientific community and the public at large communication, Sydney marine science students and staff are winning communication prizes. The annual Great Barrier Reef Foundation’s Bommie Awards saw marine biology student,
Kennedy Wolfe win the people’s choice award for his video “Probing sea cucumbers for the answers to climate change”, and Dr Ariell Friedman, a post doctoral research associate in the Faculty of Engineering and IT received a highly commended for his video, titled “Measuring terrain complexity with underwater cameras and robots”, detailing how his research is using robots to advance the way we map the Great Barrier Reef.

Outreach is an area in which USIMS really picked up the pace in 2014. The part-time appointment of Sydney University marine science graduate and qualified teacher, Sarah-Jo Lobwein helped facilitate this. Sarah-Jo organised, on average, one major event per month that showcased some aspect of marine science at the University of Sydney. USIMS is the only academic organisation within NSW which offers a marine science work experience programme. Surveys of former student participants indicate that a high percentage return to the University as undergraduates.

In 2014 the marine environment contributed $47 billion to the Australian economy, a figure equal to the gross value of Australia’s agricultural production. As marine economic activity is predicted to grow to $100 billion by 2025, USIMS’ focus in 2015 will be on continuing to reach out to secure the top academic achievers and support the University in training the marine scientists of the future.
Introduction

The oceans cover nearly three quarters of the earth’s surface and play a crucial role in sustaining life on our planet. Australia is a marine nation with the third largest ocean territory on Earth. We derive enormous economic, social and environmental benefits from the marine environment, through marine industries, coastal ecosystem services and marine biodiversity. In 2014 the Australian Government estimated the “blue” economy to be worth $47 million.


About USIMS

USIMS has been the face of Marine Science at the University of Sydney since 2002 – promoting marine science, coordinating teaching and fostering interdisciplinary research. USIMS brings together the University’s marine science capabilities, which cover a diverse range of teaching and research fields.

Students can pursue individual units within various degree programmes or a specialized programme in marine biology or marine geology. Undergraduate degrees majoring in Marine Science include the Bachelor of Science, the Bachelor of Science (Advanced Science), the Bachelor of Environmental Science, the Bachelor of Environmental Science (Advanced Science) and several combined degree programs. Students have the opportunity to undertake studies at the tropical One Tree Island Research Station, Crommelin Field Station at Pearl Beach and the temperate research station at Chowder Bay on Sydney Harbour. There are also a range of postgraduate programs in marine science, including the cross-institutional SIMS Master of Marine Science and Management.

USIMS is amongst the largest marine research and education centres in Australia - the university hosts many nationally and internationally recognised research groups, currently spanning 10 disciplines, with more than 30 academic staff and over 100 postgraduate students.

The marine network within the university includes:

- The Coastal and Marine Ecosystem Group (CMEG),
- The Ocean Technology Group (OTG),
- The Geocoastal Research Group (GRG),
- The Georeef Laboratory,
- The Byrne Laboratory,
- The Australian Centre for Field Robotics,
- The Sydney Law School,
- The Australian Centre for Climate and Environmental Law (ACCEL),
- The Sydney Centre in Geomechanics and Mining Materials (SciGEM),
- The Centre for Wind, Waves and Water,
- The Charles Perkin Centre,
- The Vibrational Spectroscopy Core Facility
USIMS Responsibilities

USIMS aims to support the University’s marine activities across the Science, Law and Engineering and IT faculties by promoting innovative world-class teaching, research and community engagement.

During 2014 USIMS followed the strategy, developed in 2013, by continuing to:

• Strengthen its support for marine science teaching and interdisciplinary research across the university;
• Encourage prospective students to pursue a career in marine science through study at the university;
• Publicise marine science in the wider community, especially highlighting the breakthroughs and achievements of University of Sydney staff and students;
• Increase participation and collaboration with Sydney Institute of Marine Science and other national and international organisations
Teaching

USIMS markets and coordinates the undergraduate and postgraduate degrees in marine science at the university, providing an administrative point of contact for prospective and current students. USIMS aims to enhance the student experience by promoting relevant seminars across the faculties, bringing together the universities undergraduate and postgraduate students in interdisciplinary learning. USIMS also organizes many extracurricular marine related events and activities.

UNDERGRADUATE

Units of Study

<table>
<thead>
<tr>
<th>Marine Science Related Units</th>
<th>No. enrolled 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL2024 Ecology and Conservation</td>
<td>176</td>
</tr>
<tr>
<td>BIOL2924 Ecology and Conservation (Advanced)</td>
<td>16</td>
</tr>
<tr>
<td>GEOS2115 Oceans, Coasts and Climate Change</td>
<td>119</td>
</tr>
<tr>
<td>GEOS2915 Oceans, Coasts and Climate Change (Adv)</td>
<td>3</td>
</tr>
<tr>
<td>BIOL3007 Ecology</td>
<td>91</td>
</tr>
<tr>
<td>BIOL3907 Ecology (Advanced)</td>
<td>18</td>
</tr>
<tr>
<td>BIOL3013 Marine Biology</td>
<td>85</td>
</tr>
<tr>
<td>BIOL3913 Marine Biology (Advanced)</td>
<td>10</td>
</tr>
<tr>
<td>BIOL3016 Coral Reef Biology</td>
<td>24</td>
</tr>
<tr>
<td>BIOL3916 Coral Reef Biology (Advanced)</td>
<td>6</td>
</tr>
<tr>
<td>BIOL3045 Animal Ecological Physiology</td>
<td>64</td>
</tr>
<tr>
<td>BIOL3945 Animal Ecological Physiology (Advanced)</td>
<td>12</td>
</tr>
<tr>
<td>BIOL3046 Animal Behaviour</td>
<td>83</td>
</tr>
<tr>
<td>BIOL3946 Animal Behaviour (Advanced)</td>
<td>15</td>
</tr>
<tr>
<td>GEOS3009 Coastal Environments and Processes</td>
<td>46</td>
</tr>
<tr>
<td>GEOS3909 Coastal Environments and Processes (Adv)</td>
<td>2</td>
</tr>
<tr>
<td>GEOS3014 GIS in Coastal Management</td>
<td>58</td>
</tr>
<tr>
<td>GEOS3914 GIS in Coastal Management (Advanced)</td>
<td>5</td>
</tr>
<tr>
<td>GEOS3103 Environmental and Sedimentary Geology</td>
<td>39</td>
</tr>
<tr>
<td>GEOS3803 Environmental &amp; Sedimentary Geology(Adv)</td>
<td>1</td>
</tr>
<tr>
<td>GEOS3104 Geophysical Methods</td>
<td>11</td>
</tr>
<tr>
<td>GEOS3804 Geophysical Methods (Advanced)</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>885</strong></td>
</tr>
</tbody>
</table>
POSTGRADUATE

In 2014 there were more than 100 postgraduate students engaged in marine science related research across the Faculties of Science, Engineering, Veterinary Science, IT and Law. Apart from higher degree research PhD and Masters programs, students can also undertake the coursework Master of Marine Science, Graduate Diploma in marine Science and Management, and Graduate Certificate in Marine Science and Management.

Units of Study

<table>
<thead>
<tr>
<th>Marine Science Related Units</th>
<th>No. enrolled 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENVI5501 Environmental Research Project</td>
<td>3</td>
</tr>
<tr>
<td>MARS 5001 Coastal Processes and Systems</td>
<td>30</td>
</tr>
<tr>
<td>MARS 5005 Coastal Management Project</td>
<td>1</td>
</tr>
<tr>
<td>MARS 5007 Coral Reefs and Climate Change</td>
<td>11</td>
</tr>
<tr>
<td>MARS5009 Topics in Australian Marine Science</td>
<td>16</td>
</tr>
<tr>
<td>MARS5006 Coral Reefs, Science and Management</td>
<td>15</td>
</tr>
<tr>
<td>GEOG 5004 Environmental Mapping and Monitoring</td>
<td>27</td>
</tr>
<tr>
<td>RESP5001 Integrated Research Practice</td>
<td>30</td>
</tr>
<tr>
<td>LAWS6061 International Environmental Law</td>
<td>24</td>
</tr>
<tr>
<td>LAWS6047 Law of the Sea</td>
<td>24</td>
</tr>
<tr>
<td>LAWS6314 Coastal and Marine Law</td>
<td>11</td>
</tr>
<tr>
<td>CIVL5670 Reservoir, Stream and Coastal Engineering</td>
<td>25</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>217</strong></td>
</tr>
</tbody>
</table>

Master of Marine Science and Management

USIMS is a partner in the Sydney Institute of Marine Science (SIMS), a consortium involving all of the prominent universities in the Sydney, Newcastle and Wollongong region, state marine agencies and one federal agency. SIMS headquarters is at Chowder Bay, near Taronga Zoo on the North Shore of Sydney Harbour. The Master of Marine Science and Management is a collaborative effort by the Sydney Institute of Marine Science, USIMS, the University of Technology Sydney, Macquarie University and the University of New South Wales.

The program covers a wide diversity of disciplines including climate change science and mitigation, marine biology, coastal management and engineering, oceanography, marine ecology and geosciences. It allows students to customize the degree to suit their personal interest and goals.

Within the course emphasis is placed on new approaches to marine science and management, such as geographic information systems, remote sensing data analyses and habitat mapping. The capstone unit Topics in Australian Marine Science utilises the marine data provided by the national facility IMOS (Integrated Marine Observing System), which has deployed a range of instruments to measure Australia’s coast and oceans.
Master of Marine Science and Management degree; co-taught by Geosciences. This new degree, delivered through SIMS, is experiencing excellent growth in Geo-marine offerings as we are the only recognised provider.
The multicultural class evolves into a close knit community, dedicated to learning about
the coastline, oceans and the organisms it sustains. Field trips that are in essence adven-
tures, vary from remote islands to beaches, thriving in marine life and physical processes,
forming experiences to broaden your horizons and saturate your dreams for a lifetime.
Teaching staff are highly regarded in their respective field of study and are a pleasure to
learn from, whether it be in the field or in lectures.
Mohamed Nishath Mohamed Nizar,
Masters in Marine Science and Management student (2014)

One Tree Island

One Tree Island Research station, a facility of the University of Sydney, provides a unique
opportunity for long-term field studies in a site known to be free of other human disturbances.
The research station provides easy access to study sites within the lagoon at any stage of the
tide.

The island is a rubble cay about 4 hectares in area, situated at the seaward (south-east) end of
a coral reef which is about 5.5km by 3.5km in size. It lies in the centre of the Capricorn Group at
the southern end of the Great Barrier Reef, about 20km east of Heron Island and about 100km off
the Queensland coast. The nearest mainland port is Gladstone. The reef is an excellent example
of the rich reef development characteristic of the southern Great Barrier Reef.

One Tree Island Research Station (OTIRS) is managed by The University of Sydney. Dr Ana Vila
Concejo is the current Director of OTIRS, Prof Maria Byrne is Deputy Director.

One tree island research station
Research

Every year USIMS organises a research showcase day to highlight the marine research occurring at the university and to foster collaboration across the faculties. An outcome from 2014 is the planned UNEP sponsored publication on climate change entitled – "Changing Ocean Chemistry," which will draw on the research of Professor Maria Byrne from the School of Biological Science, Associate Professor Tim Stephens from the Faculty of Law and Professor Elaine Baker from the School of Geosciences.

Sydney coastal risk assessment project wins major NSW State and Federal Disaster prizes!

In 2014, Dr Filippo Dall’Osso and Associate Professor Dale Dominey-Howes from the Asia-Pacific Natural Hazards Research Group, School of Geosciences completed a two-year coastal risk assessment project.

The project entitled “COastal VuInERability to Multiple inundAtion souRces (COVERMAR),” was undertaken in partnership with the Sydney Coastal Councils Group was funded by the NSW Ministry for Police and Emergency Services under the Natural Disaster Resilience Program. COVERMAR developed and tested a multi-hazard tool to assess the vulnerability of buildings and critical infrastructure in Sydney to inundation from storm surges and tsunamis.

The COVERMAR project has already generated two major publications and several more are in review with high impact journals. Two significant papers include:


In addition, the COVERMAR project was awarded two significant prizes.

Details of the project can be found at the webpage: http://www.sydneycoastalcouncils.com.au/covermar

NSW State and Australian Federal Government 2014 Disaster Resilience Prizes

On 16 October 2014, the NSW Minister for Police and Emergency Services, the Hon. Stuart Ayres, MP awarded the COVERMAR team with the NSW State Government “Resilient Australia Award” (in the category of Local Government).

Then on the 24th November 2014, the team and project also won the national Federal Resilient Australia Prize (in the Local Government category). COVERMAR was assessed at the Federal level by the Australia Attorney’s General Department, against a number of projects in the field of natural disasters undertaken throughout Australia. COVERMAR was judged the best local government resilience project in Australia for 2014, and Dr. Dall’Osso, Prof. Dominey-Howes and Stephen Summerhayes received the award from the Minister for Justice, the Hon Michael Keenan MP at the official ceremony in Canberra, held on the 24 November 2014.
The University of Sydney’s Asia – Pacific Natural Hazard and Disaster Risk Research Group received the 2014 National Australia Award for the project COVERMAR. From left to right: Dr Filippo Dall’Osso (University of Sydney), the Australia Minister for Justice Hon Michael Keenan MP, Prof Dale Dominey-Howes (University of Sydney), and Stephen Summerhays (Sydney Coastal Councils Group)

Effects of climate change on sea creatures and the knock on effect to the surrounding ecosystem

Professor Maria Byrne, School of Biological Sciences (from Science’s online news)
Radiocarbon dating reveals past fall in sea level linked to changes on the Great Barrier Reef

PhD student, Dan Harris (now completed), a recipient of an Australian Institute of Nuclear Science and Engineering (AINSE) Post Graduate Research Award for the study of reef evolution on One Tree Reef, collected carbonate material from One Tree Island.

Radiocarbon dating of the samples by accelerator mass spectrometry (AMS) provided the evidence for a recent paper by Harris, Hua, and four other collaborators, published in the journal Geology in January 2015. The researchers aimed to examine reef evolution during the Holocene (~11,500 years ago to the present). Understanding how the Great Barrier Reef responded to changes in environmental conditions in the past could be helpful in predicting how the reef might respond to future climate variability.

"Reefs grow vertically during rising sea level. Once at sea level, reefs expand laterally by lagoonal infilling through sand accretion. One of the most interesting findings of this study is that it challenges the current conceptual model of continuous infilling of sediment over the past 6000 years," said Hua.

The paper authors point out that the majority of lagoon infilling occurred between 6000 and 2000 years ago, when sea level was at highstand (a time during which sea level is at its highest), and was almost turned off by a relatively small sea level fall of ~1m during the past 2000 years.

The Great Barrier Reef
Using Kites to map the coastal zone

Dr. Mitch Bryson and other researchers at the University of Sydney have recently been using Kite Aerial Photography (KAP) for building high-resolution maps in coastal and marine science applications. The technique combines consumer-grade cameras and a simple data collection process with state-of-the-art post-processing techniques to produce multi-spectral, 3D photographic maps over hundreds of meters of intertidal landscape with a spatial resolution of 5mm per pixel. Conventional remote sensing tools (such as satellite and aircraft imaging) provide data at limited spatial and temporal resolutions and relatively high costs for small-scale study sites in coastal environments. Cheap tethered platforms such as kites and balloons offer an alternative means of collecting the same information in small-scale sites and with a much higher resolution.

In collaboration with Aline Martinez and Prof. Ross Coleman at the Coastal and Marine Ecosystems Group, the technique has been used in conjunction with ground-based photos to build high-resolution maps of microhabitats on rocky shores in the study of the homing behavior of the starfish Parvulastra exigua. In collaboration with Steph Duce and Dr. Jody Webster at the Geocoastal Research Group, KAP is being used to build repeated high resolution topographic maps for tracking shorelines changes of a coral rubble atoll at One Tree Island and to measure the distribution of coarse coral rubble particle sizes over time. Mitch is also currently developing automatic imagery classification algorithms that use kite-based multispectral imagery to automatically classify different types of macroalgae to study spatial and temporal variations in coverage at scales not available using existing remote sensing technologies.

Kite Aerial Photography (KAP) derived map of Two Tree Island Cay, on the Great Barrier Reef. Shown are both colour imagery mosaics and a colour-coded topographic map of the cay, processed from imagery collected in October 2013. The high spatial resolution available using KAP allows for the distinction of individual coral rubble fragments, the movement of which is important in the development of the physical structural of surrounding reef and island.
Using the National Marine Facility – the Southern Surveyor

Associate Professors Tom Hubble and Jody Webster of the University of Sydney’s School of Geosciences led a seventeen day voyage onboard the RV Southern Surveyor in January 2013 that mapped approximately five thousand square kilometres of the seafloor located offshore Fraser Island and collected geological samples from fifty-four sites located on the eastern Australian continental margin between Yamba in northern New South Wales and Indian Head on Fraser Island in southern Queensland.

The initial results of this work confirms previous work indicating that the eastern Australian continental margin is in an erosional phase dominated by large-scale canyon incision; downslope movements of fluidised sediment; and slab-sliding of large sediment blocks. The majority of the material eroded from the margin by these processes has probably been transported to the abyssal plain sea-floor of the adjacent Tasman Sea. Several of the submarine landslide features sampled during the cruise are geologically young and were potentially capable of generating problematic tsunami. The geological samples collected will greatly advance the investigation of all the identified erosional processes and enable the frequency of submarine landslide occurrence to be assessed for this region of the Australian seaboard which will also assist in quantifying the associated tsunami hazard faced by coastal communities onshore.

Scientific achievements of this voyage include the collection of detailed bathymetric data for the continental slope offshore Fraser Island, the identification of giant submarine landslides and submarine canyon complexes offshore Wide Bay, detailed core sampling of the Yamba and Byron Slides, and sub-bottom profiling of the Barwon Bank shelf deposit. Another highlight of the voyage was confirmation of the location of the MV Limerick, which was sunk by a Japanese submarine offshore Ballina in 1943. The enthusiasm, support and hard work of ship’s master John Barr, the ship’s crew and the CSIRO support team led by Tara Martin and Aaron Shorthouse ensure the success of this productive and harmonious voyage.
Using robots to explore the ocean

The University of Sydney’s Australian Centre for Field Robotics is leading Australia’s Integrated Marine Observing System (IMOS) Autonomous Underwater Vehicle (AUV) facility. This facility is providing precisely navigated time series measurements of water column parameters and benthic imagery using AUVs at selected reference stations on Australia’s shelf using the AUV Sirius, shown in the photo. AUV systems have recently been shown to be effective tools for rapidly and cost-effectively delivering high-resolution, accurately geo-referenced, and precisely targeted optical and acoustic imagery of the seafloor. This capability makes AUVs ideally suited to undertaking repeat surveys that will be necessary to monitor changes in the benthos, particularly beyond diver depths.

Over the course of the past eight years we have conducted hundreds of dives at sites located around Australia, in the process collecting millions of seafloor images. The map below shows a summary of the dive locations visited during this period. The focus of the sustained observing program has been on the establishment of benthic reference sites on both the east and west coasts along the full latitudinal range of the continent. The symbols on the figure designate the location of the survey sites and are colour coded by dominant habitat and sized proportional to the number of images currently available in the IMOS AUV Facility image archive.
Applied Research

USIMS people support applied research, involving the practical application of marine research for government and business decision-making. High profile examples from 2014 include:

UNEP Shelf Programme

A major accomplishment in 2014 was the joint-submission by seven West African States to the United Nations Commission on the Limits of the Continental Shelf to claim areas of continental shelf beyond 200 nautical miles. Professor Elaine Baker and colleagues from GRID-Arendal have worked with national experts and partners from the Norwegian Petroleum Directorate for over six years to realize the West African Continental Shelf Initiative.

In an historic moment, the seven West African States, represented by the Permanent Representative of Cabo Verde to the United Nations, Mr Fernando Jorge Wahnon Ferreira, lodged their submission to claim areas of continental shelf beyond 200 nautical miles in New York on 25 September 2014.

At its recent 11th Conference of the States Parties, member states of the Abidjan Convention unanimously recognized the contribution of the Government of Norway and the UNEP Shelf Programme for assistance provided to West, Central and Southern African nations for the delineation of the outer limits of the continental shelf.

Extended continental shelf of seven West African coastal states. This map is taken from the Executive Summary of the joint submission by the seven West African countries (Cabo Verde, The Gambia, Guinea, Guinea-Bissau, Mauritania, Senegal and Sierra Leone) to the CLCS. The map shows the area outside the coast of the seven states, where the purple line marks the Exclusive Economic Zone (EEZ), and the red line indicates the outer limits of the extended continental shelf (ECS).
United Nations World Ocean Assessment

The first World Ocean Assessment is now due to be completed in 2015. Professor Baker is on the Group of Experts representing states in the Europe and non-aligned group (which includes Australia). She is the lead author of the Assessment of Marine Extractive Industries.

Following the 2002 World Summit on Sustainable Development in Johannesburg, South Africa, the United Nations set up a regular process to review the environmental, economic and social aspects of the world’s oceans and seas – the three pillars of sustainable development. This is the “Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socioeconomic Aspects”. The outputs will be a series of World Ocean Assessments. The aim is to provide a sound, scientific basis for decisions at the global level on the world’s oceans and seas, and a framework for national and regional assessments and management decisions.

*Promotional video:* [https://youtu.be/doiR8Tqm5s](https://youtu.be/doiR8Tqm5s)
Affiliated Staff
Grants & Publications

In 2014 UNIMS affiliated staff obtained almost $3 million in marine related research grants (see Appendix 2). In addition a number of staff are associated with multidisciplinary large-scale international projects. For example, Associate Professor Jodi Webster leads the University of Sydney’s involvement in the International Ocean Drilling Programme, one of the world’s biggest marine research initiatives; Associate Professor Doug Cato heads up the world’s largest study on acoustics and whales – BRAHSS (Behavioural Response of Australian Humpback whales to Seismic Surveys) project. BRAHSS is a multi-million dollar project funded by the international oil and gas industry; and Professor Elaine Baker is part of the multi agency Enhancing Pacific Ocean Governance project. The project is being implemented with regional agencies in fourteen Pacific Islands States.

In 2014 USIMS affiliated staff published 132 research papers and reports (see Appendix 4 for listing).

Publications

Polar Oceans Governance in an Era of Environmental Change
Edward Elgar Publishing, 2014
Stephens, T., VanderZwaag, D.
An examination of the way the Arctic and Southern oceans are being managed in this age of conflicting priorities, namely; environmental, political and economic. An important document which will help inform and drive the debate on the future of polar ocean governance.

Publications

The Shelf Programme: A decade of successfully helping to secure the sovereign maritime rights of developing Coastal States
GRID - Arendal, 2015
Thygesen K. and Baker E.
The difficulties faced by developing nations in meeting the 10 year UN deadline for defining their limits on the continental shelf have been largely mitigated by the timely intervention of the Norwegian based Shelf Programme.
Outreach

Work Experience

The University of Sydney has run a successful Marine Science high school work-experience program for the past 5 years in collaboration with SIMS. The program has grown from modest beginnings to the current selective process due to overwhelming response from potential marine science graduates.

Over 50 applications were received in 2014 from the greater metropolitan area as well as the Central coast, Blue mountains and Southern coast/highlands.

Such a high level of interest from this broad educational community demonstrates the value and uniqueness of this program. Monitoring of enrolled students has shown the success of the program in recruiting into the University of Sydney’s marine science programs.

The 2014 work-experience week concluded with 14 year ten students leaving the program successfully armed with a suite of new skills and a re-evaluated passion for the marine world.

Testimonials from attendees directly and on social media proves the efficacy of the work-experience program.

“

I believe that those adventures I had during work experience had impact in my decision to return to Sydney University to undertake a Bachelor of Science (Advanced) after graduating year 12, specifically with the intent to double major in Biology and Geology

Tamara Potter 2014

”

University Info & Open days – Taste of Marine Science Tent

The USIMS ‘Taste of Marine Science’ tent was a twofold success. USIMS students interacted with the enquiring public with the aid of handouts and infographics to provide in-depth information and advice on how to study marine science at the university, while the exhibits included hands on displays of marine geoscience (petrology – viewing sedimentary rocks under microscope), biology and microscope techniques (aging fish via analysing scales and otoliths) and changing ocean chemistry (ocean acidification combined with global warming shell experiment demonstration).
2014 AMSA conference at the National Convention Centre

USIMS teaching and research staff presented and co-authored talks at the AMSA2014 National Convention Centre. It was the 51st annual conference of the Australian Marine Sciences Association (AMSA), and the first time the conference has been held in our nation’s capital for several decades. The theme for AMSA2014 was Investigating our Marine Nation and the conference showcased the latest findings and experiences from Australia’s marine research, management and policy capabilities.

Michelle Blewitt and Eleanor Bruce were co-conveners for the two day marine mega fauna symposium at AMSA with over 20 talks on whales, dolphins, turtles, sharks and dugongs.

Other presentations were delivered by USIMS members including Tim Stephens, Michelle Blewitt, Eleanor Bruce, Doug Cato, Will Figueira, Ross Coleman, Tom Bridge, Renata Ferrari, Rebecca Morris and Inke Falkner (SIMS).

USIMS Public SciTech Exhibition and Open Night

This exhibition was presented by the staff and students of USIMS, and organised in collaboration with the SciTech Library, Byrne Lab, University of Sydney Biology and Geoscience Departments and supported the fundraising activities of ‘Friends of San Juanillo’ organisation.

USIMS celebrated the opening of these exhibitions on the 10 April with a ‘meet and sea’ event for USIMS staff, undergraduate and postgraduate students and organisations that coordinate events with USIMS over the year.

Speakers included USIMS Deputy Director Dr Tim Stephens, Dr Jody Webster (USIMS Geology), Dr Will Figueira (AMSA and USIMS Biology), Dr Eleanor Bruce (postgraduate studies) Fiona Johnson (AMOS), Ulysse Bove (SIMS), Michael Girgis (ISV NSW), Dr Michelle Blewitt and Edwina Tanner.

World Parks Congress - Mock International Case on Marine Issues

At the World Parks Congress, held at Sydney Olympic Park in November 2014, USIMS supported the Australian Centre for Climate and Environmental Law at Sydney Law School in conducting a mock case on marine issues as part of the IUCN Environmental Law Programme series of Congress events.

Based on a hypothetical request for an Advisory Opinion from the International Court of Justice, the case examined the legal and scientific issues concerning the protection of the world’s most iconic reefs from human-induced climate change and ocean acidification.

The case was heard by Justice Nicola Pain (NSW Land and Environment Court), Justice Rachel Pepper (NSW Land and Environment Court) and Professor Tim Stephens (Sydney Law School/USIMS). The advocates were senior students from Sydney Law School (Elizabeth Pearson, Eric Shi and John Tsousidis).

Expert evidence was given by Dr Paul Marshall (University of Queensland), an expert in applied conservation science and a specialist on the impacts of climate change on coral reefs.
In 2014 USIMS held a careers seminar to showcase careers in marine science. This event was initiated for our graduating 2014 domestic and international Marine Science and Management Course students keen for advice and inspiration but was open to all students, staff and public interested in Marine Science Careers!

The session included a University of Sydney Careers Centre presentation by Donna Denyer on Networking, Application and Effective National/International Job Search plus special guest speakers from marine related industries and employment who explained their education, experience and careers steps in and out of academia.

**Marc Daly**
Coastal Advisor, NSW Office of Environment and Heritage

Marc’s path to winning his dream job started with a marine science degree at Sydney, where he studied marine biology, oceanography, geology and coastal zone management. Next, Marc enrolled in honours, which he says was essential in opening the door to his PhD and future job. It was contacts developed during his PhD that led Marc to his current job, in which he says no two days are the same. "Any day could see me implementing policy reform, improving planning and management within the coastal zone or writing briefing notes for the Minister.

**Ana Rubio**
Environmental Scientist at Hornsby Shire Council

Ana’s research revolves around marine ecology and aquaculture, in particular oyster farming (edible and pearl oysters). Her work combines environment, disease, health of catchments – waterways and aquaculture industry practices.

‘While working in a research environment, I really enjoy working with the oyster farmers and other stakeholders, implementing research outputs to develop sustainable practices and increase productivity’
University of Sydney Marine Science Students Volunteer in Costa Rica

For the second year, University of Sydney students joined the San Juanillo sustainable fisheries project in Costa Rica, lead by Edwina Tanner from USIMS together with a biologist from the University of Costa Rica.

The two-week project was completed in December 2014. The aim of the project was to; determine the current status of the Association De Pescadores San Juanillo-Guanacaste (ASOPESJU) fisheries, build an artificial reef from locally sourced materials, assess the abundance of live corals in Playa Pleito, and to test the water quality of the 5 major local rivers.

Artificial reefs have become an important method for restoring marine environments by concentrating biological resources. With many of the most popular designs currently in use around the world, cost of materials and installation prove a prohibitive barrier to implementation in artisanal fisheries. Research collected during the project showed that the fisheries were catching fish sustainably.

Frame of bamboo reef (re-bar fitted vertically through the corners) built and installed by the students

Using SCUBA to secure reef into place
Women In Marine Science

WIMS profiled five USIMS female staff and their current research. This exhibition was inspired by International Women’s Day and included USIMS Director and UNESCO Chair Prof Elaine Baker, Head of Byrne Lab and Deputy Director of One Tree Island Research Station Prof Maria Byrne, Director of One Tree Island Research Station Dr Ana Vila Concejo, oceanographer Ms. Edwina Tanner and marine biologist Dr Michelle Blewitt. This initiative will be continued by adding one new profile each year, and shared via USIMS social media. 2015 Profile is Dr Eleanor Bruce, USIMS Postgraduate Coursework Advisor and Coordinator.
University of Sydney is a partner in the Strategic Marine Alliance for Research, Teaching and Training (SMART2), a contemporary, cross-institutional endeavour to develop and establish a national, postgraduate level, sea-going training programme. The goals are to provide Australian marine postgraduate students with relevant experience and training on the Marine National Facility RV Investigator by establishing a national standard syllabus, with the incorporation of an Australian Maritime Safety Authority (AMSA) approved sea safety and survival training certification. SMART2 builds upon the experience of past sea-school activities run through the Australian National University and the University of Sydney and the modern experience of the Irish SMART programme and the Australian Maritime College, University of Tasmania.

Australian marine research has been significantly enhanced with the commissioning of a new research vessel the RV Investigator. This vessel is equipped with advanced marine surveying, sampling and analysing equipment enabling high-end, multidisciplinary research opportunities by Australian marine and atmospheric scientists across Australia’s broad maritime claims (Antarctic and Southern Ocean - Tropics). The vessel is logistically coordinated by the Marine National Facility (MNF).

SMART2 seeks to develop ship-based training in alignment with current developments in higher education postgraduate training. A short, two-week duration (summer or winter) schools enabling student involvement at the widest national level will be established for inclusion in the Master of Marine Science and Management. This will offer USyd marine postgraduates on-board research and training opportunities through an internationally benchmarked coursework program. It also opens the possibility for future extension into the International postgraduate training market servicing University-based postgraduate exchange students or direct international interest.
Appendix 1

FINANCIAL REPORT

USIMS has since 2013 received $35,000/year from the Science Faculty. This covers the cost of salaries for 0.2 FTE Administrative Assistant, 0.2 FTE Web Manager and welcome events for marine science students.

Financial report 2014

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pg</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
</tbody>
</table>

3350 Internal Transfer Research

- $54,000.00

4002 Academic PT Teach Salary

- $40,000.00

4103 Casuals General Salary

- $40,000.00

4302 Academic PT Teach Payroll Tax

- $35,000.00

4303 Academic PT Teach Workers Comp

- $30,000.00

4306 Academic PT Teach Super Oncost

- $25,000.00

4420 Casuals General Payroll Tax

- $20,000.00

4421 Casuals General Workers Comp

- $15,000.00

4422 Casuals General Super Oncost

- $10,000.00

Total

- $150,000.00

Financial report 2013

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pg</td>
<td>1</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
<td>18</td>
<td>19</td>
</tr>
</tbody>
</table>

3350 Internal Transfer Research

- $70,000.00

4002 Academic PT Teach Salary

- $50,000.00

4103 Casuals General Salary

- $40,000.00

4302 Academic PT Teach Payroll Tax

- $20,000.00

4303 Academic PT Teach Workers Comp

- $15,000.00

4306 Academic PT Teach Super Oncost

- $10,000.00

4420 Casuals General Payroll Tax

- $15,000.00

4421 Casuals General Workers Comp

- $10,000.00

4422 Casuals General Super Oncost

- $5,000.00

Total

- $170,000.00

Financial report 2012

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pg</td>
<td>1</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
</tr>
</tbody>
</table>

3350 Internal Transfer Research

- $40,000.00

4002 Academic PT Teach Salary

- $25,000.00

4103 Casuals General Salary

- $20,000.00

4302 Academic PT Teach Payroll Tax

- $15,000.00

4303 Academic PT Teach Workers Comp

- $10,000.00

4306 Academic PT Teach Super Oncost

- $5,000.00

4420 Casuals General Payroll Tax

- $10,000.00

4421 Casuals General Workers Comp

- $5,000.00

4422 Casuals General Super Oncost

- $0.00

Total

- $95,000.00

sydney.edu.au/usims
## Appendix 2

### Grants Snapshot

<table>
<thead>
<tr>
<th>Name</th>
<th>Grant</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elaine Baker</td>
<td>UNEP Shelf Programme at the University of Sydney from GRID-Arendal Norway with funds from the Norwegian Ministry of Foreign Affairs</td>
<td>184,000</td>
</tr>
<tr>
<td></td>
<td>2014-2016 Enhancing Pacific Ocean Governance – DFAT (part of $3,646,190 AusAid grant with partners Geosciences Australia, Federal Environment Department and CSIRO)</td>
<td>438,900</td>
</tr>
<tr>
<td></td>
<td>State of the Marine Environment Reporting – Australian Commission for UNESCO</td>
<td>4,500</td>
</tr>
<tr>
<td>Gavin Birch, Daniel Harrison, Edwina Tanner</td>
<td>Real-time monitoring: Sydney Harbour Research Project</td>
<td>30,000</td>
</tr>
<tr>
<td>Maria Byrne</td>
<td>(2014-19) ARC Discovery: (with Poore&amp;Dworjanyn): Evolutionary potential of marine invertebrates to cope and adapt to climatic change</td>
<td>780,000</td>
</tr>
<tr>
<td></td>
<td>(2013-14) Great Barrier Reef Foundation (with Eggins et al) Reef-scale impacts of changing climates on calcification by large benthic foraminifera on the Great Barrier Reef.</td>
<td>90,000</td>
</tr>
<tr>
<td></td>
<td>(2012-14) ARC Discovery: (with Yang, Wray): Heads or tails – which did echinoderms lose in the evolution of radial symmetry?</td>
<td>390,000</td>
</tr>
<tr>
<td></td>
<td>(2013-15) NSW Environmental Trust: Physiological effects of climate change stress on adults and offspring.</td>
<td>200,000</td>
</tr>
<tr>
<td>Doug Cato</td>
<td>Behavioural Response of Australian Humpback whales to Seismic Surveys (BRAHSS)</td>
<td>247,000</td>
</tr>
<tr>
<td>Will Figueira</td>
<td>Diver-held stereo imaging and benthic habitat mapping system</td>
<td>42,639</td>
</tr>
<tr>
<td></td>
<td>Quantification of coral reef habitat structural complexity and community composition in a changing ocean using 3D models – Phase 2</td>
<td>150,000</td>
</tr>
<tr>
<td></td>
<td>2012-15 Studying relationships between habitat complexity and biodiversity using AUV imagery</td>
<td>315,000</td>
</tr>
<tr>
<td></td>
<td>2011-2104 Temperate trophic cascades ARC Linkage</td>
<td>334,000</td>
</tr>
<tr>
<td></td>
<td>2011-2014 Recreational fisheries modelling</td>
<td>188,000</td>
</tr>
<tr>
<td></td>
<td>2011-2014 Funding for Sydney Harbour Project (Sydney Institute of Marine Sciences)</td>
<td>500,000</td>
</tr>
<tr>
<td>Name</td>
<td>Project Description</td>
<td>Funded Amount</td>
</tr>
<tr>
<td>-----------------------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Maria Seton</td>
<td>2014-2018 Oceanic gateways: a primary control on global climate change?</td>
<td>624,024</td>
</tr>
<tr>
<td>Tim Stephens</td>
<td>The International Law Library on WorldLII: New content and facilities for the leading library and citator for international law; Australian Research Council (ARC)/Linkage Infrastructure, Equipment and Facilities (LIEF).</td>
<td>284,000</td>
</tr>
<tr>
<td>Edwina Tanner, Ian Jones</td>
<td>2012-2014 Sydney Harbour Observatory Hydrodynamic Model</td>
<td>180,000</td>
</tr>
<tr>
<td>Ana Vila-Concejo</td>
<td>Faculty of Science re-Entry Fellowship</td>
<td>20,000</td>
</tr>
<tr>
<td></td>
<td>eSpace</td>
<td>190,000</td>
</tr>
<tr>
<td></td>
<td>Interacções de processos oceanográficas em águas estuarinas e marinhas do litoral Amazônico. [Oceanographic interactions in coastal and estuarine waters over the Amazonian Coast of Brazil]</td>
<td>12,000</td>
</tr>
<tr>
<td>Jody Webster</td>
<td>2014-2017 Visiting Professorship (Universidade Federal do Espírito Santo, Brazil)</td>
<td>20,000</td>
</tr>
<tr>
<td></td>
<td>Uni. Of Western Australian (Research Collaboration Awards (RCA) Paleoshorelines and drowned reefs of WA: Predicting future sea-level rise from past sea-level change</td>
<td>14,500</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>2,904,163</strong></td>
</tr>
</tbody>
</table>
Appendix 3

AFFILIATED STAFF

USIMS Director
Professor Elaine Baker

USIMS Deputy Director
Assoc Professor Tim Stephens

Teaching and Research Staff
Prof Elaine Baker
Dr Michelle Blewitt
Dr Eleanor Bruce
Prof Maria Byrne
Assoc Prof Ross Coleman
Assoc Prof Peter Cowell
Assoc Prof Dale Dominey-Howes
Dr Adriana Dutkiewicz
Dr Renata Ferrari Legorreta
Dr William Figueira
Dr Rachael Gray
Prof Rosemary Lyster
Dr Tom Hubble
Prof R. Dietmar Müller
Dr Phil Mulhearn
Dr Richard Murphy
Dr Maria Seton
Assoc Prof Tim Stephens
Ms Edwina Tanner
Dr Ana Vila-Concejo
Dr Ashley Ward
Dr Jody Webster
Prof Richard Whittington
Dr Stefan Williams

USIMS Coordinator
Sarah-Jo Lobwein

Marine Geoscience Undergraduate Advisor
Daniel Harris

Marine Biology Undergraduate Advisor
Dr William Figueira

Marine Science Postgraduate Advisor
Assoc Professor Ross Coleman

Marine Science Postgraduate Coursework Advisor
Dr Eleanor Bruce

Director of One Tree Island Research Station
Dr Ana Vila Concejo

Deputy Director of One Tree Island Research Station
Prof Maria Byrne

Web / Publicity
Mark Richards

Honorary Associates
Associate Professor Gavin Birch
Adjunct Prof Douglas Cato
Associate Professor Peter Cowell
Dr Adrienne Grant
Associate Professor Roslin Hinde
Adjunct Professor Ian SF Jones
Associate Professor Jock Keene
Professor Tony Larkum
Dr John Runcie
Appendix 4

USIMS AFFILIATED STAFF PUBLICATIONS 2014


Aze, T., Barry, J. Bellerby RGJ, Brander L., Byrne, M and others (2014). An updated synthesis of the impacts of ocean acidification on marine biodiversity. CBD Technical Series. 75


Baker, E. and Macmillan Lawler M. (2014). A review of the status (baseline) of current policies, strategies and implementation plans of countries and regions incorporating the ecosystem approach to management of marine and coastal ecosystem services. GRID Arendal. 29 pp and 4 Appendices.


Byrne, M., Smith, A.M., West, S., Collard, M., Dubois, P., Dworjanyn, S.A. (2014). Warming Influences Mg(2+) content, while warming and acidification influence calcification and test strength of a sea urchin, Mar Env Res 48: 12620-12627


Dominey-Howes, D., Gorman-Murray, A., McKinnon, S. (2014). Queering disasters: On the need to account for LGBTI experiences in natural disaster contexts (Article) [Queerificar los desastres: Sobre la necesidad de dar cuenta de las experiencias LGBTI en los contextos de los desastres naturales]. Gender, Place and Culture, 21(7), 905-918.


33


Nath, B., Chaudhuri, P. and Birch, G. F. (2014). Assessment of biotic response to heavy metal contamination in Avicen-


a Sea Urchin. Genome Biology and Evolution 6, 964-973.

Appendix 5

LINKED PROJECTS/INSTITUTES

BRAHSS

The BRAHSS study is one the largest and most comprehensive studies on the effects of noise on whales ever undertaken. This project aims to provide information that will reduce the uncertainty in evaluating impacts of seismic surveys on humpback whales leading to management and mitigation measures that allow surveys to be conducted efficiently with minimum impact on the whale. It will also assess the effectiveness of ramp-up as a mitigation measure, and the potential to improve design of ramp-up. The results will be in a form useful for designing management of seismic surveys and mitigation procedures.

BRAHSS is collaboration between the following Australian institutions:
Universities of Queensland, Sydney, Newcastle, Curtin University of Technology, the Australian Marine Mammal Centre (Australian Antarctic Division which is in the Department of Sustainability, Environment, Water, Population and Community) and the Defence Science and Technology Organisation.

http://www.brahss.org.au/content/project.html

Coastal and Marine Ecosystem Group

Coastal and Marine Ecosystem group was created to reflect the wide range of marine research activities done within the School of Biological Sciences. This includes EICC world-class research on ecological problems arising from urbanisation of coastal environments. We work with councils, regulatory agencies, Federal, State and Local Governments to identify problems and suggest valid solutions based on experimental evidence.

Many currently positive solutions lack proper support from rigorous data collection. By treating environmental problems as ecological experiments, then using appropriate experimental designs to test relevant hypotheses, we can provide better solutions. The EICC is now a subset of CMEG. We retained the EICC name as it has substantial brand recognition among the users of marine science in NSW.

https://www.facebook.com/cmegaustralia

Australian Centre for Field Robotics (ACFR)

The Australian Centre for Field Robotics is dedicated to the scientific advancement and uptake of autonomous and intelligent robots for operation in outdoor environments. It is one of the largest robotics research institutes in the world and has been instrumental in developing breakthrough technologies and in conducting world-leading research and development of field robotics principles and systems.
MARINE ROBOTICS PROGRAM

The program undertakes fundamental and applied research in a variety of areas related to the development and deployment of marine autonomous systems. The ACFR, as operator of a major national Autonomous Underwater Vehicle (AUV) Facility, conducts AUV-based surveys at sites around Australia and overseas. These AUV surveys are designed to collect high-resolution stereo imagery and oceanographic data to support studies in the fields of engineering science, ecology, and biology, geoscience, archaeology and industrial applications.

Our recent research has focused on generating high fidelity, three-dimensional models of the seafloor; precisely matching survey locations across years to allow scientists to understand variability in these environments; and identifying patterns in the data that facilitate automated classification of the resulting image sets. Providing precise navigation and high-resolution imagery lends itself to novel methods for data discovery and visualization. The ACFR leads Australia’s Integrated Marine Observing System (IMOS) AUV Facility and is involved in national and international marine archaeological studies.

http://marine.acfr.usyd.edu.au

Geocoastal Research Group (GRG)

Geocoastal research spans from the study of daily change in coastal environments due to meteorological events, to improving our understanding of the links between global climatic and tectonic adjustments. Spanning the coastal sedimentary continuum from river systems to the edge of continental margins, and encompassing both clastic and carbonate environments, coastal morphodynamics is focused on the coupling between flow dynamics and geomorphic evolution enacted by sediment transport. The research approaches practiced by the group include in situ field measurement, remote-sensing techniques, and both physical-process and systems-behaviour modelling. Across the spectrum of scales, research extends beyond geomorphic evolution of continental margins to habitat responses, environmental contamination and marine territorial rights.

The Geocoastal Research Group is integrated with the University’s wider marine science community via the University of Sydney Institute of Marine Science (USIMS), which exploits a mutual interest in process interactions to connect geocoastal research with the related fields of coastal marine ecology, marine robotics and coastal engineering. The Geocoastal Research Group has strong links with One Tree Island Research Station, one of the most pristine coral cays available to the scientific community only.

Key research areas of the Geocoastal Research Group include:

- Coastal and near shore processes
- Carbonate structures and sedimentology
- Lake and estuarine sediments
- River systems and riverbank stability
- Deep marine research

http://grgusyd.org
GeoReef Lab

Dr Jody Webster is part of the Geocoastal Research Group in the School of Geosciences at Sydney University. His research group – the GeoReef Lab – is focused on carbonate sedimentology, sea level, climate change and tectonics. This work takes the group to all the beautiful places in the world, including the Great Barrier Reef, Tahiti, Hawaii, Seychelles and Papua New Guinea.

The group is particularly interested in coral reef and carbonate platform systems, both modern and ancient, and their associated sedimentary systems as tools to address fundamental questions in paleoclimate variability and tectonics, and in turn the influence of these factors on the geometry, composition and evolution of these systems.

Byrne Lab

Research in the Byrne Laboratory investigates the biology of marine and freshwater invertebrates with a focus on the Echinodermata and the Mollusca. Current projects involve species from tropical and temperate Australia. Using a multidisciplinary approach we addresses major paradigms in evolution, development and biology.


Charles Perkins Centre (2015)

A new research group has been established by the Charles Perkins Centre to consider the significance of human–animal interactions from a broad and multidisciplinary perspective, in an effort to understand and maximise their positive effects on our health. The Charles Perkins Centre has established a uniquely multidisciplinary project group that will study this important topic from across disciplines and research facilities, both within and beyond the University of Sydney.

Sydney Centre In Geomechanics And Mining Materials (SCIGEM)

SciGEM was established in 2013 and incorporates the former Centre for Geotechnical Research. The overall objective of SciGEM is to both strengthen and broaden the University of Sydney’s already world-leading position in geotechnical engineering and granular mechanics, and to establish a stronger focus on mining geomechanics. SciGEM incorporates the following three specialised laboratories:

- Geomechanics and Geoenvironmental Laboratory
- Particles and Grains Laboratory
- Mining Materials Laboratory

http://sydney.edu.au/engineering/civil/research/scigem/

University Electron Microscope Unit

The Australian Centre for Microscopy & Microanalysis (ACMM), a cross-disciplinary research centre, explores physical and biological structures at the micro, nano and atomic scales. Sydney Microscopy & Microanalysis (SMM) is a core facility of the university, one of the largest and most comprehensive of its kind in the world. The ACMM and SMM are located in Madsen building, with additional facilities at the Charles Perkins Centre and in the Australian Institute for Nanoscale Science & Technology.

http://sydney.edu.au/acmm/
Animal Behaviour Lab

The Animal Behaviour Lab comprises Associate Professor Ashley Ward and his research group, who focus on questions about the mechanisms and the functions of animal behaviour, integrating our extensive experimental work with theoretical approaches to better understand how and why animals do what they do. As well as being of great intrinsic interest, the study of animal behaviour can provide vital insight into a variety of other disciplines, both within the biological sciences (physiology, conservation biology, toxicology, ecology) and beyond (psychology, sociology, economics).


Australian Centre for Climate and Environmental Law (ACCEL)

The objectives of the Centre are to encourage, promote and support innovative and important scholarship including teaching, research, consultancy and public interest advocacy in all areas of environmental law and policy. These objectives are pursued within the University of Sydney, with other related Centres and institutions in Australia and overseas, with the legal profession, and with the wider community.


EXTERNAL CENTRES:

Sydney Institute of Marine Science (SIMS)

In recognition of the core research strength in marine science, the university is a foundation member of the Sydney Institute of Marine Science (SIMS), a flagship interdisciplinary facility located on the picturesque shores of Sydney Harbour. The Master of Marine Science and Management program is taught under the framework of SIMS as a partnership between four major Australian universities. It is a unique Australian cross-institutional postgraduate marine science program, which will combine each institute’s strengths in marine science research and education to provide a truly multidisciplinary learning environment.

http://sims.org.au

ANSTO

Australian Institute of Nuclear Science and Engineering (AINSE), and Institute for Environmental Research

http://www.ainse.edu.au