The UWA Oceans Institute
With over 20,000 km of coastline, the surrounding oceans are particularly important to Western Australia. We have a responsibility to improve our knowledge of these regions, protect them for future generations and determine what value can be extracted from them. Western Australia has a significant marine science research base, a scientifically fascinating environment and a major marine industry. It is, therefore, extremely well positioned to capitalise on this capability. The State Government has recognised this opportunity and identified Biodiversity and Marine Science as one of the State Government’s priority areas for science.

PROFESSOR PETER KLINKEN, CHIEF SCIENTIST OF WESTERN AUSTRALIA.
The UWA Oceans Institute is advancing research knowledge to support the delivery of Ocean Solutions by addressing ocean challenges. Bringing together UWA’s multidisciplinary research strengths, in areas such as Oceanography, Ecology, Engineering, Resource Management and Governance, the Oceans Institute continues to explore opportunities to use innovative marine research and ocean technologies to deliver Ocean Solutions in Western Australia and worldwide.

**Vision**

The UWA Oceans Institute is advancing research knowledge to support the delivery of Ocean Solutions by addressing ocean challenges.

**Priorities**

- Foster and promote interdisciplinary marine-related research across traditional science, engineering, social and policy boundaries.
- Provide excellence and leadership in ocean research and technology, locally and globally.
- Provide a focal point for quality training of postgraduate students in ocean research.
- Address the needs of Australian society, government and industry for safely operating in the marine environment.
- Promote innovative collaborative opportunities in marine research and technology in Western Australia.
- Articulate an evidence-based, intelligent and innovative use of marine resources to create opportunities for human and economic development.
- Generate the knowledge needed to reconcile the sustainable use of ocean resources with the conservation of its biodiversity.
Welcome to the 2014 Annual Report for the UWA Oceans Institute, which summarises some of the many highlights in this, the fifth year of our operation. This year was defined by a series of activities and events aimed at strengthening links with our international and national partners, particularly in the Indian Ocean and Asia Pacific regions, and growing our infrastructure.

In 2014, the Oceans Institute Futures Forum was introduced as a key mechanism for providing updated information to our members. The Futures Forum occurs quarterly and is a valuable opportunity to hear about the strategic focus of the Institute as well as providing an update on future activities and the chance to network.

Finally, I would like to thank Professor Carlos Duarte in his role as Director of the UWA Oceans Institute. Professor Duarte served the Oceans Institute for over four years and initiated a number of exciting programs as well as introducing the concept of Ocean Solutions, which is now guiding the Institute’s future focus on solution-based research and training.

I look forward to working more closely with our members, adjuncts, postdocs and students and pursuing the Institute’s vision as we seek new opportunities and face challenges in the year ahead.

Professor Shaun Collin
Deputy Director
Expansion of the Oceans Institute into 4 new disciplines with 4 new Oceans Institute academic members.

Oceans Institute researchers hosted the 10th International Temperate Reefs Symposium that saw over 200 delegates from 25 counties attend in January.

The Foundation Stone was laid in May marking the commencement of construction of the new Indian Ocean Marine Research Centre Crawley site.

Dutch company Vryhof Anchors, obtain the rights to prototype the Centre for Offshore Foundation Systems’ DEPLA anchor.

The Oceans Institute organised a range of academic and industry workshops and symposia:

- Animal Mobility Synthesis Workshop
- Decommissioning Dialogue
- Coastal Carbon Cluster Workshop
- Pilbara Marine Conservation Partnership Symposium

Strengthened links with Indian Ocean partners and international collaborators.

Signed MOU with University of Mauritius in September.

Hosted group of delegates at IORA conference in October.

Became a Foundation member of the Indian Ocean Business Alliance in October.

Hosted visitor from Zhejiang University for a collaborative research project with Oceans Institute researchers.

Launch of the ANFOG facility at UWA in November.

Oceans Institute Artist-in-Residence initiated opportunities for ongoing school-based engagement with St Stephen’s High School.

Advisory Board member Larry Madin from the Woods Hole Oceanographic Institution was the keynote speaker at Oceans Community 2014.

Oceans Institute members published more than 319 research articles and generated over $17 million in funding opportunities from government, industry and national and international sources.

Professor Shaun P. Collin appointed new Oceans Institute Director following Carlos Duarte’s departure at the end of 2014.

Enhanced community relations and awareness of Oceans Institute brand.

A Snapshot

160 Audience at Oceans Community
33 Media releases
14 Institute of Advanced Studies lectures
70,000 Website hits
Full house at the Postgraduate Student Conference
The UWA Oceans Institute draws on key strengths in cross discipline research to pursue its strategy of providing Ocean Solutions to address global challenges facing the supply of food, water and energy resources from our oceans. The Ocean Solutions approach goes beyond delivering research outcomes, taking the extra step to influence decision-making and community impact through contributing knowledge to the broader public.

Ocean Solutions seeks to approach global ocean challenges not in isolation, but with consideration to the connectivity between various aspects of the marine environment, maximising opportunities for efficient and effective outcomes.

Recent moves by Indian Ocean neighboring countries to establish ocean-based economies is a testament to the opportunities created by finding solutions from our oceans. The Oceans Institute has been working with these countries to establish opportunities for collaborative research and teaching in this newly strengthened blue economy.

At the Oceans Institute, we seek out these opportunities through our research and outreach mechanisms and in 2014 delivered the Ocean Solutions Dialogue on Decommissioning with a discussion concentrating on the economic and environmental benefits of leaving parts of offshore structures in situ after their commissioned life. This year’s Ocean Solutions Dialogue will be delivered in collaboration with the Royal Society, with a keynote address from Dr Tim Smith, Professor of Marine Geology at Griffith University.

The Oceans Institute will continue to pursue a solutions based approach to our research and community engagement.
Marine Monitoring

Animal movement meets human mobility

In November, Dr Ana Sequeira of the UWA Oceans Institute and Dr Michele Thums, from the Australian Institute of Marine Science (AIMS), led a group of renowned national and international multidisciplinary researchers to synthesise data on the movement of marine megafauna obtained from satellite tracking devices.

Data synthesis is becoming increasingly prevalent as it commonly reveals findings that would not be apparent by examining a single study.

Animals have been tracked with satellite transmitters since the 1980’s. The intervening years and rapid uptake of this technology has amounted to massive datasets being generated. This is particularly the case for marine megafauna, which includes marine mammals, birds, reptiles and large fishes, a group of animals whose lives would be invisible without this technology.

It has been the appearance of smartphones with geo-location capacity and the associated location data they generate that has allowed researchers to study human mobility at unprecedented spatial and temporal scales.

Dr’s Sequeira and Thums received a UWA Oceans Institute Emerging Leaders Synthesis Project Grant and, with support from AIMS, conducted a workshop, attracting a group of leaders in the field of marine megafauna to combine their research and collectively synthesise the tracking data.

Key to the synthesis was the presence of two physicists, Dr Victor Eguiluz and Dr Juan Fernandez-Gracia, both experts in applying complex systems approaches to understanding the movements of human beings.

The multidisciplinary team has collated a dataset amounting to over 2.5 million locations for a range of marine vertebrate species spanning more than two decades (1993 – 2014). Together, they started using the approaches derived from human mobility studies to attempt to make significant advances into better understanding the movement of marine megafauna.

The synthesis group is now collectively working on two research papers, including a cross-taxa classification of the types of movement exhibited by each species group and a review paper of the opportunities for using a complex systems approach to make new discoveries in the area of animal movement ecology.

In the last 50 years, we have observed exponential declines in many pelagic species on a global scale, with significant concern in relation to the inability of national and international fisheries management to prevent or reverse these declines. In response, there is a growing move towards the establishment of very large marine protected areas (MPAs).

Fundamental to assessing the benefits of these very large MPAs is determining the current status of pelagic shark and fish assemblages within and outside their boundaries. Since 2012, UWA Oceans Institute researchers, Professor Jessica Meeuwig, Research Associate Dr Tom Letessier and their team have pioneered the development of mid-water baited remote underwater video systems (mid-water BRUVS).

Like their seabed counterparts, mid-water BRUVS allow researchers to quantitatively document the diversity, abundance and size of fish assemblages. Importantly, the technique is non-destructive, a critical attribute given the threatened status of many of the observed species and the need to deploy them in no-take sanctuaries.

National and international collaborations have supported the team in deploying mid-water BRUVS across the Indian and Pacific oceans, with stereo imagery collected at over 1000 stations. Applications have included understanding how pelagic assemblages vary with proximity to seabed features in the Timor Sea and the Perth Canyon, supported by the National Environmental Research Program’s Marine Biodiversity Hub and in collaboration with AIMS and Geoscience Australia. Baselines in proposed or MPAs are also being established in Australia, the British Indian Ocean Territory and in New Caledonia. The desire to understand the composition of relatively intact pelagic ecosystems has driven further work in 2014 in Palau and Rapa (through the National Geographic’s Pristine Seas program).

A synthesis of these samples is now underway with a focus on understanding how assemblages vary with habitat and environmental conditions. These analyses are also feeding into spatial planning processes such as the review of the Commonwealth Marine Reserve network and other MPA assessment efforts.

Marine Ecology

Exploring the big blue

Our planet is blue. Pelagic, open water ecosystems occupy about 71% of the world’s surface with the ‘big blue’, home to some of the planet’s most commercially important species such as the tunas, and threatened predators such as billfish and oceanic sharks.
Shark forum highlights cutting edge deterrent research

The unfortunate spate of shark-related fatalities in Western Australia in recent years has highlighted the need for mitigation solutions to ensure the public as a whole are safe and confident in the water for a range of activities.

In 2014, the UWA Neuroecology Group, led by WA Premier’s Fellow and UWA Oceans Institute Deputy Director Professor Shaun Colyn, continued to lead the way in the testing and development of non-lethal shark mitigation solutions to protect ocean users. Their research into the innovative use of bubble curtains, strobe lights, electric fields and subaquatic sounds was the focus of an Institute of Advanced Studies public forum held at UWA in September. The Shark Science Forum gave the public the opportunity to engage directly with the research team, including Associate Professor Nathan Hart and Dr Ryan Kempster, to hear all about their latest findings, which included the viewing of exclusive never-before-seen footage of the team’s shark deterrents in action.

Since being awarded funding by the WA State Government 2012, the team has worked tirelessly to better understand the sensory biology of sharks to find the most effective solutions to protect ocean users. Their research focuses on a range of novel and existing deterrents that target multiple sensory systems such as vision, smell, the electrosense and the lateral line. To test their deterrents, the team has travelled throughout Western Australia in search of sharks and even as far as South Africa to find the most infamous species of all, the white shark.

The team is hopeful that the development of an effective non-lethal and non-invasive shark deterrent will help to reduce negative interactions with sharks and increase the confidence of the public to enter the ocean. The researchers have also set out to increase public awareness and understanding of sharks through communication of their findings in a number of high profile international documentaries.

Ocean Engineering

Launch of Engineering for Remote Operations

For many years the Faculty of Engineering, Computing and Mathematics (ECM) has been a world leader in activities spanning offshore foundations, coastal and physical oceanography, fluid science for offshore oil and gas production and remote sensing and data analysis. To build and expand on these strengths, and grow the transdisciplinary links between them, ECM is now focussing its research efforts under the banner of Engineering for Remote Operations (ERO), forming several multidisciplinary research groups charged with addressing the diverse challenges in ERO.

Key groups active in ocean related research include: big data processing and mining, engineering communities and environment, engineering system health, and offshore facilities and ocean systems. A primary aim of the research groups is to build a critical mass of active researches in key multidisciplinary areas.

Despite only being established recently, the launch of these ERO research groups is already proving to be highly successful. In 2014, the ERO group on Offshore Facilities and Ocean Systems developed a successful proposal to host a prestigious ARC Research Hub for Offshore Floating Facilities at UWA, spearheaded by David White, the Shell EMI Professor in Offshore Engineering. The ARC Research Hub is a $5 million 5 year research with a collective matching contribution from industry partners Shell, Woodside, Bureau Veritas and The Lloyd’s Register. The Hub will address the critical engineering challenges associated with Australia’s next generation of offshore oil and gas projects, which will require innovative floating facilities such as floating liquefied natural gas (FLNG).

The Offshore Facilities and Ocean Systems (OFOS) is a multidisciplinary group led by Oceans Institute members, with expertise in metocean dynamics and ocean forecasting, offshore geotechnical engineering, offshore fixed and floating structural engineering, hydrodynamics and structure interaction, gas processing, and asset management. Members involved in the research group include Professors Mark Cassidy, Scott Draper, Christopher Gaudin, Greg Ivey, Nicole Jones, Ryan Lowe, Chari Pattiaratchi and David White. The group has capabilities in offshore oil and gas, floating liquefied natural gas (FLNG), offshore and coastal renewable energy, offshore mining, marine aquaculture and ocean management. This enables a unified and comprehensive approach to offshore ocean facilities, ranging from core understanding of regional ocean dynamics and forcing, to structural and system design, to operation, to maintenance, and to decommissioning and closure.

Drawing on world-leading multidisciplinary expertise at UWA across metocean, hydrodynamic, geotechnical and reliability engineering, the Research Hub will develop and deploy the new technologies and analysis methods that are required for safe and efficient projects, spanning waves and current forecasting, vessel motion and oil and gas production, riser and mooring longevity and novel anchoring and subsea foundations. This research will blend experiments and numerical simulations, validated by field observations from offshore.

More detail on each of the ERO groups is available at www.ecm.uwa.edu.au/research.
UWA Oceans Institute researchers, Professor David Pannell and PhD candidate Katrina Davis from UWA School of Agriculture and Resource Economics, are examining spatial optimisation models, helping to determine the most appropriate allocation of marine areas to support management of marine resources worldwide.

One of the biggest threats to the sustainability of the world’s oceans is the over-exploitation of marine resources. To manage this threat, which is largely a product of over-fishing and other extractive activities, governments restrict which activities can occur in marine areas, for example, through regulating fishing effort or creating no-take zones.

Spatial models help identify the optimal allocation of area amongst activities that will maximise conservation or economic value while meeting some objective, for example a conservation target or economic constraint. Different activities incur different opportunity and management costs and produce different levels of ecological or economic benefit. Data on the spatial distribution of these costs and benefits can be incorporated into spatial optimisation models.

Ms Davis and Professor Pannell undertook a detailed analysis, collecting data on management costs and species’ abundance levels specific to different activities or zones. Basing the study on the central marine region of Chile (Figure 1), a marine area where enforcement is required to deter poachers, the researchers modelled the spatial distribution of enforcement costs, combining it with abundance data for five commercially exploited fish species to generate a spatial optimisation model for the region.

This model determines the optimal allocation of the study area across different management zones: no-take, fishing zones and open access. Professor Pannell and Ms Davis incorporated key conservation objectives into the model using fixed species’ abundance targets to determine how the inclusion of enforcement and opportunity costs affects optimal marine zoning allocation. The final model minimised the opportunity costs to fisher communities of meeting these targets by maximising fisher revenue.

The results showed that there were net benefits from enforcing marine areas – fisher revenue was higher when fishing areas were enforced to prevent poaching - suggesting investment in management could be justified by greater economic returns for fishers. Their results further highlight the importance of accounting for both the benefits and costs of enforcement in marine conservation, particularly when incurred by fishers.

Improving our understanding of what influences fishers’ decisions to enforce their fishing management areas is identified as a high research priority for the future.

The UWA Oceans Institute hosted an Ocean Solutions Decommissioning Dialogue in November 2014, as part of an ongoing series of workshops where academia, governments, industry and relevant society stakeholders contribute their collective intellectual capital, talent and power to take on opportunities to explore ocean-based solutions to relevant problems.

The decommissioning event generated much interest and was attended by academics, industry specialists, government regulators and other stakeholders. Legal, financial and scientific issues were examined and possible future actions and activities discussed. Beyond the event itself the Dialogue catalysed further research in various disciplines.

Two attendees at the decommissioning event, Professors Erika Techera and John Chandler from the UWA Faculty of Law explored the current legal frameworks in place to regulate decommissioning of oil rigs and associated infrastructure. This included a review of current international law and the state of play in Australia compared with that in the US and UK. The offshore oil and gas industry is facing the prospect of decommissioning thousands of installations in the coming decades and in some other parts of the world the issue is already pressing. The financial cost of complete removal is significant, and therefore the prospect of leaving part of the installation in situ is attractive. At present, however, there are no legal frameworks in Australia which would facilitate the conversion of rigs to reefs. The value of such infrastructure as artificial reefs has been highlighted, particularly in the US, but in Australia the way forward is not clear. Despite the success of rigs-to-reef projects in the US it is uncertain whether such initiatives are transferable to other contexts given very different physical and jurisdictional contexts.

Professors Techera and Chandler have also developed their research, making tentative recommendations for future law and policy developments in this area. Their article on this topic – ‘Offshore installations, decommissioning and artificial reefs: Do current legal frameworks best serve the marine environment?’ – has been accepted for publication in the journal Marine Policy in 2015.

The Oceans Institute is continuing to investigate the decommissioning landscape in Australia, building on the momentum created, and stakeholder relations commitment.
**Marine Ecology**

**Leading WAMSI research uncovers seagrass sensitivity**

UWA Oceans Institute researchers are investigating the vulnerability of tropical seagrasses to dredging off the northwest coast, uncovering new information that may impact on how the region is managed.

The Western Australian Marine Science Institution (WAMSI) is delivering one of the largest marine research programs in Australia, addressing key areas of uncertainty in our understanding of how dredging activities affect the marine environment.

The WAMSI Dredging Science Node project has brought together a number of Oceans Institute researchers, including Professors Gary Kendrick, Ryan Lowe, Marco Ghiassalberti and Dr. John Statton and Dianne McLean, together with other partner institutions, who are investigating nine integrated research themes to help improve the planning and regulation of major dredging operations in the marine environment. Further highlighting the importance of this local partnership, WAMSI also co-funds three Oceans Institute PhD students, working on projects under the WAMSI Dredging Science Node.

The seagrasses off Western Australia are among the most extensive and diverse of any region in the world and are among the most extensive and diverse of any region in the world, addressing key areas of uncertainty in our understanding of how dredging activities affect the marine environment.

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**Oceanography and Climate Change**

**Rising sea levels leave coasts under pressure**

Research into rising sea levels was under investigation in 2014 and this was the focus of a highly cited paper published by UWA Oceans Institute researchers Drs Ivan Haigh, Sarah Wijeratne, and Professor Chari Pattiratnach that estimated, for the first-time, present day extreme water level exceedance probabilities around Australia’s coastline.

There is growing concern about rising sea levels and over the last 150 years, global sea levels have risen, on average, by 25 cm with predictions this rise will accelerate over the twenty-first century.

Extreme water levels arise as a combination of three main factors, including astronomical tide, storm surge and mean sea level and Australia’s northern coastline can be prone to tropical cyclone-induced surges creating a need to better understand the probability of extreme events and advise design conditions for flood defences and other coastal and offshore structures.

Using a high-resolution depth-averaged hydrodynamic model, Drs Haigh and Wijeratne and Professor Pattiratnach analysed data from several tide gauge sites along the coast to generate a 61-year time series of water levels around Australia.

The model was configured for the Australian shelf region and informed by a global tidal model and meteorological fields, and outputs from this model were validated against measurements from the 30 tide sites along the long and complex Australian coastline. At each site, a value was fitted to the available time series of data and combined with annual highest water levels to generate a multi-decadal hindcast.

The hindcast was used to estimate present day extreme water level probabilities around the entire coastline. There is great potential for this new dataset for Australia to be widely used in the future, while the multi-decadal system could be applied to a variety of other research and practical applications.
Collaborations

“NOPSEMA’s focus is on environmental management compliance and ensuring an ecologically sustainable future for Australia’s offshore petroleum industry. NOPSEMA encourages collaborative marine research that is targeted towards addressing the environmental management needs of end-users and which assists industry to continuously improve its environmental management.”

STUART SMITH, CEO NOPSEMA

An international perspective

In 2014, the UWA Oceans Institute strengthened its international links, promoting Indian Ocean research to support the development of an ocean-based economy.

In September, the Oceans Institute’s Deputy Director Professor Shaun Collin and General Manager Ms Tracy Parker travelled to Mauritius to attend an Oceans Economy event. During their visit, a Memorandum of Understanding was signed between UWA and the University of Mauritius for the development of joint research and training opportunities between the two institutions. Present to witness the signing was The Honourable Julie Bishop MP, Foreign Minister of Australia, in her role as Representative of Australia as Chair of the Indian Ocean Rim Association (IORA).

The Oceans Institute was again in the international spotlight when the Hon Julie Bishop later welcomed foreign dignitaries and other ministers to UWA during the Indian Ocean Rim Association conference in October.

The conference saw the launch of the Indian Ocean Business Alliance (IOBA), of which the UWA Oceans Institute is a founding member. The alliance is formed by UWA and seven other not-for-profit partners working collaboratively to support developments and explore opportunities in the Blue Economy.

IOBA is an important platform to facilitate Australia’s shared interests in the region and, as a member, the Oceans Institute will seek opportunities for integrated research and development in the Indian Ocean in emerging areas such as aquaculture, ocean energy and food security.

The formation of the IOBA recognises the wide scope of business in the Indian Ocean region and the need for a common voice from industry.

The Oceans Institute will continue to strengthen collaborations with its Indian Ocean partners, particularly with the Faculty of Ocean Studies at the University of Mauritius, to develop joint research opportunities in the areas of Marine Energy, Ocean Engineering, Aquaculture, Ocean Forecasting and Marine Ecology.

Similar agreements will be extended to neighbouring countries who are members of the Indian Ocean Rim Association, all working to develop a strong ocean-based economy, including the Seychelles.

www.ioba.org.au

Indian Ocean Region Alliance delegates with the Hon Julie Bishop and UWA senior executives.
The Indian Ocean Marine Research Centre (IOMRC), Crawley

Progress in 2014

The Indian Ocean Marine Research Centre is a collaboration between project partners, the Australian Institute of Marine Science (AIMS), The CSIRO, The University of Western Australia and the Department of Fisheries, Western Australia. It is being supported by a $34 million grant by the Australian Government and contributions from the partner organisations.

Construction of the Indian Ocean Marine Research Centre (IOMRC) commenced in April 2014. On 30 May, the start of construction was marked by a special event to thank those involved, which was officiated by The Hon Julie Bishop MP, Minister for Foreign Affairs and Federal Member for Curtin, who unveiled the building’s foundation stone.

Construction continued throughout the year and in December, the first floor slab pour took place. In addition, the pouring of the chamber for a new centrifuge was completed during the final month of 2014. The centrifuge is currently being tested under stringent conditions in France and is due for delivery to site mid-2016. The refurbishment works on Watermans Bay Marine Centre also commenced in 2014. It is anticipated the centre will be fully operational late 2015.

www.oceans.uwa.edu.au/iomrc

Below: Indian Ocean Marine Research Centre, Crawley

The Ningaloo Alliance

The Oceans Institute has many local partnerships, all of which are essential in facilitating collaborative research and lending support in our efforts to understand and conserve the Western Australian marine environment.

The UWA Oceans Institute is a member of the Ningaloo Alliance, a collaborative partnership established to share the outcomes of research on the World Heritage Listed Ningaloo Reef with the Exmouth community.

The partners are all working with the Shire of Exmouth towards developing a marine research facility within the Ningaloo Centre, a multi-use community and research building to be constructed in Exmouth. The Ningaloo Centre will enable the member organisations to have a base in Exmouth to conduct their research and promote their findings as a component of the reef to range exhibits.

As a key partner, the Oceans Institute is helping to coordinate the final designs for educational outreach, the aquarium facilities and the wet and dry research laboratories in the Centre.

The Oceans Institute will collaborate with the Alliance, members, which include research institutions, state and local government departments and local organisations, to increase the capacity for marine research in Exmouth and the Ningaloo Marine Park.

The Ningaloo Centre is due for completion in early 2017.

IMOS observes our oceans

Vast areas of Australia’s oceans are being better monitored and understood thanks to an observing system operating from UWA.

The Integrated Marine Observing System (IMOS) ocean radar facility uses high frequency radar systems, located on the coastline, to map the real-time sea-surface currents. Established at James Cook University in 2006, this IMOS facility relocated to UWA in October 2014. The UWA Deputy Vice-Chancellor of Research, Professor Robyn Owens, then relaunched the IMOS Coastal Ocean Radar Facility at UWA at a well-attended workshop event in November.

The Australian Coastal Ocean Radar Network (ACORN) joins UWA’s fleet of ocean gliders in the Australian National Facility for Ocean Gliders (ANFOG) – all part of the national research infrastructure of IMOS.

In WA, radar systems cover the Turquoise Coast – from Lancelin to Green Head – and the ocean beyond Rottnest between Guilderton and Fremantle. The data will be useful for search and rescue operations, shipping, boating, fisheries, coastal and offshore engineering and many other marine-based activities and industries.

IMOS helps scientists and researchers to better understand ocean change, climate variability and extreme weather, ocean processes, and marine ecosystems in Australia.

www.imos.org.au

The Oceans Institute continues to support the work of IMOS by leading research utilising state-of-the-art IMOS facilities. Providing strong capabilities for ocean and coastal modelling, IMOS delivers a wide range of opportunities in ocean science and technology.
Coastal Carbon Cluster CO₂ emissions workshop

CSIRO’s Coastal Carbon Cluster is fostering vital scientific research to strengthen our low carbon economy and prevent future excessive greenhouse gas emissions. The Coastal Carbon Cluster combines the research capabilities of CSIRO’s Oceans and Atmosphere Flagship with those of the UWA Oceans Institute, and other research partners, to improve methods in estimating how much carbon is stored in coastal areas.

In November, UWA Oceans Institute members Professors Carlos Duarte and Gary Kendrick, and Dr Oscar Serrano Gras participated in a two-day workshop held at UWA to discuss CO₂ emissions associated with degradation of blue carbon habitats and possible enhanced CO₂ sequestration associated with restoration of these habitats. The workshop focused on an analysis of the uncertainties around CO₂ emissions with degradation of blue carbon habitat, where participants examined the emerging evidence for sediment carbon losses.

Across the two days, participants identified where the greatest risks for CO₂ emission might occur and developed a risk analysis framework. A key outcome was an understanding that the final fate of lost sediment carbon, whether redeposited or remineralised to CO₂, was dependent on a wide range of environmental factors, which the group recorded in order to reduce uncertainties and to focus future work. The outputs of the workshop will be documented in a manuscript that is currently in preparation.

Investigating the vulnerability of Kimberley seabirds to oil spills

The UWA Oceans Institute and the School of Animal Biology have partnered with the Australian Institute of Marine Science (AIMS) to gather baseline information on the foraging and breeding behaviour of several species of seabirds on the Lacepede Islands in the Kimberley.

Oceans Institute researcher Dr Belinda Cannell and UWA Associate Professor Amanda Ridley are leading the project, harnessing the expertise in avian ecology at the university.

The objectives of the project are to determine breeding parameters, foraging behaviour and diet of seabirds on the Lacepede Islands and their variability between years. Such information will allow them to evaluate the vulnerability of key seabird species to spill events and their ability to recover following a spill.

Funded by Shell and INPEX, this is one of several projects to develop comprehensive environmental baselines to monitor the health of the waters off north-Western Australia, and represents collaboration between industry, government agencies and universities.

Fourteen species of seabirds breed on the Lacepede Islands, including the largest colony of breeding brown boobies in the world. However, very little is known about the ecology of the seabirds in this region. Consequently it is currently difficult to assess the vulnerability of seabird species in this area to an oil spill.

The main target species are Crested Terns, Brown Boobies and Lesser Frigatebirds, representing short (within 40 km), medium (within 100 km) and long range (>200 km) foragers from the breeding colony. Drs Cannell and Ridley also hope to understand the relationship between diet composition and foraging areas with various environmental variables such as sea surface temperatures and chlorophyll a concentrations (a measure of productivity in the food web). Within each group of seabirds, it is also important to identify differences in foraging habitats between the sexes, as these differences will impact overall conclusions about the impact of an oil spill.

The research team successfully competed their first two field trips to the Lacepede Islands in 2014, with two more trips scheduled in both 2015 and 2016.
Collaborations

The UWA Oceans Institute has a growing list of partners from academics and research institutions to government and industry stakeholders, locally and abroad. These alliances provide opportunities for sharing knowledge, facilities and innovation, leading to collaborative research and new ocean-based initiatives.

India Ocean region
Signed MOU with University of Mauritius to develop joint research and training opportunities in the areas of Marine Energy, Ocean Engineering, Aquaculture, Ocean Forecasting and Marine Ecology.

Member of Indian Ocean Business Alliance working collaboratively to support developments and explore opportunities in the Blue Economy.

Asia Pacific region
Hosted a delegation from Zhejiang University in China to further develop research programs and teaching opportunities under the new MOU.

Signed MOU to explore a joint research centre and welcomed Dr Xiao Xi to the Oceans Institute for a 6-month collaborative research project.

Keynote presentation by Oceans Institute researcher at the International Joint workshop on Coral Reef Environmental Earth sciences in Japan.

Europe
Researchers led a significant international collaboration, involving field expeditions to three European countries and collaboration with four universities.

USA
Advisory Board member, Dr Larry Madin from the Woods Hole Oceanographic Institution visited the Oceans Institute and was keynote speaker at the 2014 Oceans Community.

Stanford University worked with Oceans Institute researchers to find global ocean solutions.

UWA researchers collaborate with the Schmidt Ocean Institute to plan two research expeditions in Western Australia for 2015.

Africa and the Middle East
Director Carlos Duarte departed the Oceans Institute at the end of 2014 to head up the Red Sea Ecology Division at the King Abdullah University of Science and Technology in Saudi Arabia.
Collaborative research projects were initiated in fields of Plant Biology, Animal Biology and Law and Governance with partner institutions in South Africa.

Local
Hosted the 10th International Temperate Reefs Symposium attended by 192 delegates from 24 countries.

WAMSI Dredging Science Node Project continues to improve scientific understanding on how dredging activities affect the marine environment.

Construction commenced on the IOMRC building marked by the laying of the Foundation stones at an event with the Hon Julie Bishop.

WA Scientist of the Year for 2013, Professor Mark Randolph, appointed inaugural Fugro Chair in Geotechnics by UWA’s Centre for Offshore Foundation Systems (COFS).

Research into pipeline stability on mobile seabeds using the O-tube was distilled into new design guidelines as part of the STABLEPIPE Joint Industry Project (through WA:ERA – Woodside).
Pilbara Marine Science Symposium

The 2014 Pilbara Marine Science Symposium attracted over 100 participants, speakers and sponsors from over 27 organisations, showcasing the work completed to date towards undertaking the first regional-scale assessment of the West Pilbara marine environment between northern Ningaloo and the Dampier Archipelago.

The Pilbara Marine Conservation Partnership (PMCP) is a partnership between the UWA Oceans Institute and CSIRO working in the remote Pilbara region of northwestern Australia. The partnership is creating a baseline assessment of dynamics and rates of recovery of the reef ecosystem and the near-coast areas across the west Pilbara.

The PMCP organised the first Pilbara Marine Science Symposium in November 2014. Researchers from the PMCP and those from WA Department of Parks and Wildlife (DPAW) all presented their current research being carried out in the Pilbara. A discussion of ways in which to build synergies and integrate the range of projects to achieve better outcomes across the region followed.

The momentum established at the symposium is spearheading closer collaboration between DPAW, industry and the PMCP researchers. Researchers are now planning collaborative field trips, cooperating in site selection, aligning sampling methods and sharing ship time for cost-effectiveness.

The Pilbara Marine Conservation Partnership has two years remaining, ending in June 2017.


2014 Collaborations

International

In 2014, the Oceans Institute focused on strengthening its international links, creating new alliances in major global zones, including promoting Indian Ocean research to support the development of an ocean-based economy.

Local and National

Local and national industry and government connections were vital to the UWA Oceans Institute, supporting productive, multi-dimensional relationships and leading to collaborative research and new ocean-based initiatives.

Memoranda of Understanding

New Oceans Institute members

New research disciplines

Scientific publications

International collaborators

Countries

Media and Outreach

“Science communication is essential both for inspiring the next generation of scientists and to engage and inform the community. If we are to have scientists in the future, children must be exposed to the idea that a career in the sciences is a lifetime adventure of exploration and discovery. This will be achieved when scientists and communicators work together to communicate this important message.”

ANGELA ROSSEN,
UWA OCEANS INSTITUTE
ARTIST IN RESIDENCE

The Pilbara Marine Conservation Partnership (PMCP) is a partnership between the UWA Oceans Institute and CSIRO working in the remote Pilbara region of northwestern Australia. The partnership is creating a baseline assessment of dynamics and rates of recovery of the reef ecosystem and the near-coast areas across the west Pilbara.

The PMCP organised the first Pilbara Marine Science Symposium in November 2014. Researchers from the PMCP and those from WA Department of Parks and Wildlife (DPAW) all presented their current research being carried out in the Pilbara. A discussion of ways in which to build synergies and integrate the range of projects to achieve better outcomes across the region followed.

The momentum established at the symposium is spearheading closer collaboration between DPAW, industry and the PMCP researchers. Researchers are now planning collaborative field trips, cooperating in site selection, aligning sampling methods and sharing ship time for cost-effectiveness.

The Pilbara Marine Conservation Partnership has two years remaining, ending in June 2017.


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UWA OCEANS INSTITUTE
ARTIST IN RESIDENCE
Showcasing our postgraduate student’s research

The extent of marine research being undertaken by PhD students at the Oceans Institute was on display at the 2nd UWA Oceans Institute Postgraduate Student Conference held in October.

Conference presenters spanned nine schools and four faculties, with topics ranging from the tropics to the subtropics, from the ecology of the Swan River to marine archaeology and from offshore engineering to plastic pollution in the deep sea.

The scope of marine studies across all of the Oceans Institute key research areas gave students an appreciation for the range of research products being undertaken across UWA, as well as opportunities to network and learn from several of our leading researchers.

UWA research and testing facilities were also on show with presentations from the WA Biogeohemistry Centre, CMCA and iVEC highlighting the capabilities available for researchers on campus, such as the potential of molecular isotope probing.

Participants were able to quiz senior UWA researchers and postdocs at the ‘Speed Networking’ session, and took part in a debate facilitated by Professor Alan Dench on ‘Advocating for Science’.

PhD candidate, Jordan Goetze was presented with the Best Student Presentation Award that won him a trip to Rottnest Island. Jordan’s presentation captivated the audience and deepened the audience’s understanding about the management and the effectiveness of periodically harvested fisheries closures in Fiji.

Runner up, PhD candidate Eduardo Garza-Gisholt’s presentation focused on the retinal adaptations of sharks and their relatives to the light conditions where these animals live. IMOS also awarded a gift voucher to PhD candidate Moritz Wanders, who emphasised his use of IMOS data to validate his model outputs and gain insights in the hydrodynamic processes along the south-west Australian shelf.

Maria J. Gonzalez-Bernat, an Oceans Institute PhD student representative and conference coordinator, said that it was really exciting to see so many experts from so many schools sharing their expertise and passion for their own research.

‘Deep Ocean’ was the hot topic at the UWA Oceans Institute’s Oceans Community 2014, an event created together with the UWA Institute of Advanced Studies and designed for the wider community to better understand marine issues in Western Australia.

Set in the iconic WA Maritime Museum in Fremantle, the 2014 Oceans Community event attracted over 160 members of the public.

Researchers from the Oceans Institute discussed their exploration of the deep ocean off Western Australia. PhD student Madeline McAllister enthused audiences with her talk about the 3D modeling of shipwrecks while Anton Kuhar gave us an insight into the vision of deep dwelling species. Next, Oceans Institute Professor Julian Partridge emphasised the importance of exploring the largest habitat on earth, with a captivating description about life in the deep sea.

Keynote speaker, Dr Larry Madin, Executive Vice President and Director of Research, from the Woods Hole Oceanographic Institution, USA spoke about the importance of exploring the deep sea, particularly at a time when climate change is resulting in rapid changes to ocean characteristics.

Dr Madin discussed some of the tools and techniques for modern exploration that have been developed at the Woods Hole Oceanographic Institution. Some impressive video footage enthralled audience members, the highlight being a recent expedition to the deep ocean trenches using new robotic technology. Dr Madin also touched on the risks of exploring the Hadal Zone. In May 2014, one such robot ‘Neveus’ attempted a deep-sea expedition, diving to over 10,000 kilometres before imploding, an explosion equal to 64 pounds of TNT.

Rounding off the afternoon, the Southseas Oceans Hero Award was presented to Albany seagrass champion, Geoff Bastyan for his work restoring degraded seagrass habitat in Oyster Harbour.

Oceans Community continues to be an important way of helping the community understand the importance of our oceans and the research that is taking place, here in Western Australia and globally.
Feeding inquiring minds

The Institute of Advanced Studies (IAS) at The University of Western Australia (UWA) is committed to improving society through learning and discovery, supporting the wide dissemination of ideas and research at UWA. As part of their annual program, IAS hosts public lectures, postgraduate masterclasses and symposia to share knowledge and research, and to engage community discussion on contemporary issues.

In 2014, the following events took place in partnership with IAS.

- Living up to our Promise: Re-visioning field stations, marine laboratories, and research centers to address global environmental change; Peggy Fiedler, Director of the Natural Reserve System at the University of California
- Coral reefs in a stressed world: synergies, resilience and refugia; Emily Darling, the David H Smith Conservation Research Postdoctoral Fellow, University of North Carolina
- Making marine protected areas more cost-effective: resilience through diversity; Dr Peter Jones, University College London
- WAMSI Blueprint for Marine Science 2055; panel discussion
- Living and working underwater: The Aquarius Reef Base underwater laboratory and residence; James W. Fourqurean, Director, Marine Education and Research Initiative at Florida International University, and 2014 IAS Professor-at-Large
- Blue Carbon: Carbon storage in coastal marine ecosystems and its importance in climate change mitigation schemes; Masterclass with James Fourqueran
- Ecophysiology of Seagrasses; Masterclass with Ole Pedersen, University of Copenhagen (2014 IAS Professor-at-Large)

Shaping the next generation of marine scientists

Marine science continues to inspire most of us and it is vital to communicate our research to encourage a whole new generation of researchers. The UWA Oceans Institute has forged links with St Stephen’s School to identify opportunities to share its knowledge and appreciation of the marine world with the next generation.

Angela Rossen continued to play a meaningful role in connecting the school with Oceans Institute members during the year and began an initiative to encourage researchers to share their projects with children in schools.

In August, marine neuroecologists, Dr Ryan Kempster and Ms Channing Egeberg, took up the opportunity to share their thoughts on shark research and conservation at a presentation to a group of St Stephen’s students.

It is the first step at exploring opportunities under the emerging MOU and helping to connect a new generation with research in marine science.
A decade on and what have we learnt

December marked the 10-year anniversary of the unprecedented 2004 Indian Ocean Tsunami, one of the world’s most devastating natural disasters. The University of Western Australia’s Oceans Institute Professor Chari Pattiaratchi acknowledged the event by giving a public lecture on the advances in tsunami science and lessons learnt.

Professor Pattiaratchi experienced first-hand the effects of the tsunami on a beach in Sri Lanka and subsequently became chair of the working group on Tsunami modelling as part of the Indian Ocean Tsunami Warning System.

The 10-year anniversary of the 2004 Indian Ocean Tsunami marks a decade of new understanding in tsunami science with improved observations and computer modeling. In his lecture, Professor Pattiaratchi discussed the establishment of the Indian Ocean Tsunami Warning System, which helps to more accurately predict when a tsunami is generated. The warning system provides an early warning to authorities to help mitigate the effects of the tsunami on vulnerable coastlines.

Professor Pattiaratchi highlighted the presence of tsunami-like waves generated by meteorological effects (‘meteo-tsunamis’) that have been a regular occurrence along the WA coastline. Meteo-tsunamis are responsible for events such as the flooding that forced the closure of Perth’s Riverside Drive in 2012, and more recently, the cargo ship ripped from its moorings that struck the Fremantle rail bridge in August.

Visiting scholars

The Visitors Program works to enhance the international reputation of the Oceans Institute by providing opportunities for members and marine specialists to collaborate and share knowledge. In the third year of the Visitor’s Program the Institute awarded four visitor’s grants to visiting researchers from across the globe.

Dr Xiao Xi

In July, the Oceans Institute welcomed Dr Xiao Xi from partner institution, Zhejiang University in China.

Dr Xi spent six months at the Oceans Institute, working with Professor Carlos Duarte, Professor Susana Agustí, Associate Professor Thomas Wernberg and Dr Ylva Olsen on a project investigating the joint impacts of UV radiation and temperature on southwest Australian seaweed species vulnerable to climate change.

A complex aquarium system was created for this project that investigated the physiological responses of seaweed to different temperature gradients and UV radiations.

Dr Xi is the first researcher from Zhejiang to visit the Oceans Institute for an extended research stay which heralds a long-term collaboration between the two universities on a joint, large-scale seaweed farm project that will attempt to remove nutrients and fixed carbon dioxide from the air to restore the coastal environment.

Professor Pere Masque

Department of Physics and the Institute of Environmental Science and Technology at the Universitat Autònoma de Barcelona (Spain) – 2014 Gledden Visiting Fellow

Dr Peter Jones

Department of Geography at University College London

Professor James W. Fourqurean

Director of the Marine Education and Research Initiative at Florida International University
Media and Outreach

The UWA Oceans Institute facilitates timely, relevant and effective media engagement as a key approach to communicating members’ research, as well as the Institute’s broader outreach activities and initiatives, to the general public.

Media

Media engagement was a key priority for the Oceans Institute in 2014, further developing our reputation as a central source of information about research and innovation in the marine environment. This year, the Oceans Institute released 33 media releases on a broad range of multidisciplinary research projects and activities, including international accomplishments, awarded researchers and highly regarded research papers.

Coverage of the Institute’s research ranged across print, online, television and radio media at local, national and international levels confirming our research is in constant demand.

High impact media stories included research on sharks, meteor tsunamis, oceanography and engineering, resulting in nearly 200,000 media mentions across international, national, state and local news media and demonstrating the extent of the Institute’s global reach.

Oceans Institute researchers featured in a number of television documentaries including PBS International’s ‘The Real Jaws’ and ‘Operation Maneater’ and a program on French television ‘des racines et des ailes’ based on inter-continental research on kelps and climate change. Researchers also participated in several television interviews, locally and more broadly.

The disappearance of Malaysian Airlines flight, MH370 also generated an unprecedented level of media coverage by Professor Chari Pattiaratchi who gave 49 television and 24 radio interviews about the oceanographic conditions of the search area, producing over 100,000 media references.

Media engagement was also key to the Oceans Institute’s strong connection with its stakeholders. In 2014, the Oceans Institute released an online version of the newsletter with the purpose of more regularly showcasing the Institute’s research highlights and activities as they occur.

Outreach

Community based activities can bring people to science and the Oceans Institute is dedicated to engaging with the community through a range of public and targeted outreach activities aimed at increasing awareness about marine issues and research. In 2014, the Oceans Institute organised a range of academic and industry workshops and forums, focused on the broad range of multidisciplinary research underway and involving the Institute’s many key stakeholders and partners.

Oceans Community, an event designed for the wider public, generated great public interest and saw a crowd of 160 guests attend who were keen to learn more about the deep ocean, the largest, unexplored frontier on earth.

Oceans Institute Artist-in-Residence Angela Rossen (www.angelarossen.com), has played a significant role facilitating outreach opportunities with the wider community. In 2014, Angela initiated several community environmental science art workshops and worked with these school groups and local communities inspiring families and community groups to engage with their natural world. Observing and recording nature in a methodical way opens the doors for discussion about the part individuals can play in coastal and marine conservation based on good science and Angela continued to share her passion for science communication throughout the year.

Outreach activities aimed at increasing awareness about marine issues and research. In 2014, the Oceans Institute organised a range of academic and industry workshops and forums, focused on the broad range of multidisciplinary research underway and involving the Institute’s many key stakeholders and partners.

The Oceans Institute Doctoral and Postgraduate Student Conference that showcased the scope of marine studies across all of the Oceans Institute key research areas and provided students with opportunities to network and learn from several of our leading researchers.

Internally, the Institute continues to partner with the Institute of Advanced studies to facilitate oceans-based public lectures and postgraduate masterclasses while continuing to support global visitors to the Institute.

Marketing and Communications

In 2014, the Oceans Institute developed a range of communications and marketing products over a range of electronic and print formats based on a growing number of stakeholders who are interacting with the Institute across these mediums.

Newsletter

The Oceans Institute Newsletter is an important channel through which the Institute promotes its activities, research and collaborations as well as the achievements of its students and staff to members, alumni, industry, funding bodies and research institutions.

The Newsletter was published three times in 2014 and represented one of the key tools to engage and enhance the Institute’s strong connection with its stakeholders. In 2015, the Oceans Institute took an online version of the newsletter with the purpose of more regularly showcasing the Institute’s research highlights and activities as they occur.

Social Media

Social media remains a central tool to promote the Institute’s research and engage global audiences. The Oceans Institute posts social media content via its Facebook and Twitter pages daily.

facebook.com/UWAOceansInstitute

Facebook continues to perform well as a social media tool and the number of people engaged and sharing our posts has increased, with over 2000 followers in 2014, while the number of people engaged in conversations and talking about the Oceans Institute on Facebook doubled since 2013.

@uwa_oceans

The Oceans Institute posts regular feeds on its Twitter account and the Institute saw a steady increase in the number of followers through 2014 (up to 700) that included a broad range of international and national research institutions, media, NGOs, community groups and individuals.

The Oceans Institute’s global reach.

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“As a student representative, I became a voice for the postgraduate students at the Oceans Institute. The organisation of the Postgraduate Conference gave me great insight in conference planning and scientific outreach to the broader community.”

ERIC RAES, 2014 POSTGRADUATE STUDENT REPRESENTATIVE

Governance Structure

UWA Oceans Institute Advisory Board

Dr Ian Poiner
Advisory Board Chair
Professor Lyn Beazley, AO
Former Chief Scientist of Western Australia
Dr Tom Hatton, PSM
Principal, Thomas Hatton Environmental Consulting
Dr Larry Madin
Executive Vice President and Director of Research, Woods Hole Oceanographic Institution
Mr Michael Wood
Director, WA Office of the Department of Foreign Affairs and Trade
Professor Carlos Duarte
UWA Oceans Institute Director
Professor Shaun Collin
UWA Oceans Institute Deputy Director
Ms Tracy Parker
UWA Oceans Institute General Manager (Executive Officer)

UWA Oceans Institute Executive Board

Professor Robyn Owens
Deputy Vice-Chancellor, Research (Chair)
Professor Peter Davies
Pro Vice-Chancellor, Research
Professor Carlos Duarte
UWA Oceans Institute Director
Professor Shaun Collin
UWA Oceans Institute Deputy Director
Professor Tony O’Donnell
Dean of Science
Professor John Dell
Dean of Engineering, Computing and Mathematics
Professor Erika Techera
Dean of Law
Ms Tracy Parker
UWA Oceans Institute General Manager
Ms Maria-Jose Gonzalez Bernat
Mr Eric Raes
PhD Student Representatives

Business Team

Professor Carlos Duarte
UWA Oceans Institute Director
Professor Shaun Collin
UWA Oceans Institute Deputy Director
Ms Tracy Parker
UWA Oceans Institute General Manager
Ms Lesley McCann
Ms Jennifer Gilbert
UWA Oceans Institute Executive Assistants
Ms Guiomar Duarte
Ms Anna-Lee Harry
UWA Oceans Institute Marketing and Communications Officers
Ms Clare Peter
UWA Oceans Institute Administration Officer
Ms Kim Wee
UWA Oceans Institute Accounts Officer

UWA Oceans Institute farewells influential Director

At the end of 2014, the UWA Oceans Institute farewelled its Director, Professor Carlos Duarte, on his departure from the University, following four years of exemplary service.

Professor Duarte commenced at UWA as the Oceans Institute Director in March 2011 and his visionary approach to seeking ocean solutions to address humanity’s grand challenges has been paramount to advancing the reputation and contribution of the Institute, locally and worldwide.

Developing a foundation for co-operative, multidisciplinary marine research, Professor Duarte launched a range of collaborative programs and outreach initiatives at the Institute, while driving international and national partnerships, most notably, the Indian Ocean Marine Research Centre partnership with AIMS, CSIRO and the WA Department of Fisheries.

Professor Duarte is confident the vision of the UWA Oceans Institute will continue to advance through its commitment to world-leading marine research, collaborative focus and strong leadership.

Professor Duarte will maintain a position as Adjunct Professor with UWA.
External Advisory Board

Dr Ian Poiner (Chair)

Dr Ian Poiner’s scientific expertise focuses on research into tropical marine systems especially understanding how they are influenced by human activities. Of particular interest are the development of indicators of ocean health and their use in observing networks, and the application of marine science to support policy, management and the sustainable development of marine industries. Dr Poiner has significant experience in the strategic development and planning of science, both as a practising scientist and at the organisational level. Until the end of 2011, Dr Poiner was the Chief Executive Officer of the Australian Institute of Marine Science (AIMS) and is now appointed as an AIMS Associate. Dr Poiner currently chairs the Gladstone Healthy Harbour Partnership Independent Science Panel, the Board of the Reef and Rainforest Research Centre Ltd, the Steering Committee of the Marine National Facility and the Advisory Board of the Integrated Marine Observing System.

Professor Lyn Beazley, AO

After graduating from Oxford and Edinburgh Universities, Professor Beazley built an internationally renowned research team in Neuroscience that focused on recovery from brain damage. Currently she is the Sir Walter Murdoch Professor of Science at Murdoch University.

As Chief Scientist of Western Australia from 2006 to 2013, Professor Beazley advised the WA Government on science, innovation and technology as well as fulfilling the role of science ambassador, locally and worldwide. In 2009, Professor Beazley was awarded Officer of the Order of Australia and was elected a Fellow of the Australian Academy of Technological Sciences and Engineering.

More recently, Professor Beazley was inducted into the inaugural Western Australian Women’s Hall of Fame and in 2012, Professor Beazley became the second recipient of the Governor’s Award for Giving, in recognition of her enthusiastic philanthropy through her outreach activities promoting Science, Technology, Engineering and Mathematics in the WA community. In 2013, Professor Beazley was honoured to be inducted into the WA Science Hall of Fame and, most recently, was delighted to be named the WA Australian of the Year for 2015.

Dr Tom Hatton, PSM

Tom is Principal of Thomas Hatton, Environmental Consulting and Adjunct Professor at UWA. He chairs the Marine Parks and Reserves Authority, and serves on the boards of the Environmental Protection Authority, the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development, the International Centre for Radio Astronomy Research and the Science Advisory Panel for the Department of Water. Dr Hatton led the production of the Australian State of the Environment Report 2011, and is Chief Author for the 2016 Report. In 2014, Dr Hatton retired as CSIRO’s Group Executive for Energy, where he previously directed national water and marine research programs.

Dr Larry Madin

Dr Larry Madin is the Executive Vice President and Director of Research, and a Senior Scientist, at the Woods Hole Oceanographic Institution (WHOI) in Woods Hole, MA. Previously Dr Madin was Chair of the WHOI Biology Department, and Director of the WHOI Ocean Life Institute and has been at WHOI since 1974.

His principal research interests are in the biology of oceanic and deep-sea zooplankton and fishes, with special emphasis on medusae, siphonophores, ctenophores and pelagic tunicates. Dr Madin was among the first biologists to use SCUBA and submersibles for the in-situ study of oceanic plankton.

Mr Michael Wood

Michael Wood is (former) Director of the Western Australian office of the Department of Foreign Affairs and Trade (DFAT). He leads DFAT’s engagement with the WA State Government and local business. He is an experienced Australian diplomat who has worked extensively in Australia and overseas in government relations, public affairs and communications, policy development and negotiation. Between 1996 and 2012, Mr Wood held roles in Hong Kong, Singapore, Japan, and India. His broad experience in multilateral, regional and bilateral trade negotiations in particular has led to a strong understanding of business needs and motivations and he is a highly credible economic interlocutor.

Internal Advisory Board

Professor Carlos M. Duarte

Professor Carlos M. Duarte is Director of the UWA Oceans Institute and a Research Professor with the Spanish National Research Council (ICSc) at the Mediterranean Institute for Advanced Studies (IMEDEA) in Mallorca, Spain.

Professor Duarte’s research focuses on understanding the effects of global change in aquatic ecosystems, both marine and freshwater. He is co-leader of a large EU-funded project on Arctic Tipping Points and is working closely with the United Nations to develop strategies to increase the sustainable production of marine aquaculture, as well as the restoration and conservation of coastal habitats to mitigate climate change.

Professor Duarte served as President of the American Society of Limnology and Oceanography between 2007 and 2010 and in 2009 was appointed member of the Scientific Council of the European Research Council (ERC).

Professor Duarte will depart the UWA Oceans Institute at the end of 2014 to take up a position at the King Abdullah University of Science and Technology (KAUST) as Chair in Red Sea Ecology. Professor Duarte will maintain a position as Adjunct Professor with UWA.

Professor Shawn P. Collin

Professor Shawn Collin is a world leader in comparative neurobiology and vision. He heads the Neuroecology Group at UWA and investigates the neural basis of animal behaviour and its links with ecology. His research investigates the sensory systems of a range of deep-sea and shallow reef vertebrate species in the context of evolution, development and plasticity, concentrating on the influences of environmental cues such as light, colours, sound, hydrodynamic disturbances and weak electric fields.

Professor Collin has held many of the world’s most prestigious fellowships in places such as the Scripps Institution of Oceanography in the United States (US); the Marine Biology Laboratory in Woods Hole in the US; The University of Tuebingen in Germany; the University of Montreal in Canada; the University of Washington (Friday Harbor) in the US; and The University of Queensland in Brisbane. Professor Collin is also a Western Australian Premier’s Research Fellow.

In 2025, Professor Collin will lead the UWA Oceans Institute as its Director.

Ms Tracy Parker

Ms Tracy Parker is Executive Officer of the UWA Oceans Institute. She is responsible for providing strategic advice and analysis to the Director, including the development and enhancement of the strategic relationship, financial and resource management aspects of the Institute.

Ms Tracy Parker joined the UWA Oceans Institute from the UWA Business School where she was appointed as Strategic Analyst to the Dean and Executive Officer to the Business School Board and Ambassadorial Council.

Ms Tracy’s professional interests include alignment of strategy, business systems and organisational structure, using strategic business intelligence to enhance and support decision making and inform continuous improvement and women in business.

Ms Tracy holds a Bachelor of Commerce in Corporate Administration and Management (Curtin) and a Master of Commerce in Strategic Value Management (UNSW).
Oceans Institute Membership

Members

Prof Susana Agusti
School of Plant Biology

Prof Mohammed Bennamoun
School of Computer Science & Software Engineering

Asst/Prof Bryan Boruff
School of Earth and Environment

Dr Anne Brearley
School of Plant Biology

Prof Michael Burton
School of Agriculture and Resource Economics

Dr Marion Cambridge
School of Plant Biology

Prof Mark Cassidy
Centre for Offshore Foundation Systems

Asst/Prof Julian Clifton
School of Earth and Environment

Assoc/Prof Peta Clode
Centre for Microscopy, Characterisation and Analysis

Prof Shaun Collin
School of Animal Biology

Assoc/Prof Wayne Davies
School of Animal Biology

Prof Carlos Duarte
Oceans Institute

Prof Christophe Gaudin
Centre for Offshore Foundation Systems

Prof Andrea Gaynor
Centre for Western Australian History

Dr Agi Gedeon
School of Civil, Environmental and Mining Engineering

 Assoc/Prof Anas Ghassemi
 School of Civil, Environmental and Mining Engineering

 Dr Pauline Grierson
 School of Plant Biology

 Assoc/Prof Atakelty Halli
 School of Agriculture and Resource Economics

 Assoc/Prof Nathan Hart
 School of Animal Biology

 Assoc/Prof Jan Hemmi
 School of Animal Biology

 Prof David Hunt
 School of Earth and Environment

 Asst/Prof Muhammad Hossain
 Centre for Offshore Foundation Systems

 Prof David Pannell
 School of Agriculture and Resource Economics

 Prof Julian Partridge
 School of Animal Biology

 Prof Chari Pattiaratchi
 School of Civil, Environmental and Mining Engineering

 Asst/Prof Natasha Pauli
 School of Earth and Environment

 Prof Alistair Paterson
 School of Archaeology

 Assoc/Prof Sarah Percy
 School of Political Science and International Relations

 Dr Jane Prince
 School of Animal Biology

 E/Prof Alistair Robertson
 School of Plant Biology

 Assoc/Prof Elizabeth Sinclair
 School of Plant Biology

 Assoc/Prof David Sutton
 School of Chemistry and Biochemistry

 Professor Erika Techina
 Law School

 Asst/Prof Julie Trotter
 School of Earth and Environment

 Assoc/Prof
 Kimberly van Niel
 School of Civil, Environmental and Mining Engineering

 Dr Ingrid Ward
 School of Social Sciences Postdoctoral / Research

 Asst/Prof
 Thomas Wernberg
 School of Plant Biology

 Dr Kara Yoop
 School of Animal Biology

 Prof Ming-Hao Zheng
 Faculty of Medicine, Dentistry and Health Sciences

 Post Doctoral/ Research Associate

 Dr Zachary Aman
 Centre for Energy, School of Mechanical and Chemical Engineering

 Dr Belinda Cannell
 School of Animal Biology

 Asst/Prof Scott Draper
 Centre for Offshore Foundation Systems

 Assoc/Prof Jim Falter
 School of Earth and Environment

 Dr Lara Garcia-Corral
 School of Plant Biology

 Mr Ben Hollings
 School of Civil, Environmental and Mining Engineering

 Dr Renae Hovey
 Plant Biology

 Dr Tim Langlois
 Oceans Institute

 Dr Diane McLean
 School of Plant Biology

 Dr Cordelia Moore
 School of Earth and Environment

 Dr Caroline Ochieng-Erfemeijer
 Oceans Institute

 Dr Vlada Olsen
 School of Plant Biology

 Dr Abbie Rogers
 Centre for Environmental Economics and Policy

 Dr Verena Schoepf
 School of Earth and Environment

 Adjuncts

 Dr Fabio Boschetti
 CSIRO

 Dr Tim Cooper
 BHP Billiton

 Dr Martial Depczynski
 CSIRO

 Dr Paul Erfemeijer
 Jacobs

 Dr Ana Sequiera
 School of Animal Biology

 Mr Dennis Stanley
 School of Civil, Environmental and Mining Engineering

 Assoc/Prof Michael Stat
 Centre for Microscopy, Characterisation and Analysis

 Dr John Statton
 School of Plant Biology

 Dr Paul Thomson
 School of Civil, Environmental and Mining Engineering

 Dr Sarah Wijeratne
 School of Civil, Environmental and Mining Engineering

 Membership Growth

 PhD Students
 Corporate
 Postdocs
 Academics

 Dr Stuart Field
 Department of Parks and Wildlife

 Dr Rebecca Fisher
 AMS

 Dr Kim Friedman
 Department of Parks and Wildlife

 Dr James Gilmore
 AMS

 Dr Ivan Haigh
 University of Southampton

 Dr Nick Hardman-Mountford
 CSIRO

 Dr Thomas Hatton
 CSIRO

 Dr Andrew Heyward
 AMS

 Dr Thomas Holmes
 Department of Parks and Wildlife

 Dr Ross Jones
 AMS

 Dr John Keesing
 CSIRO

 Dr Kenneth Lee
 CSIRO

 Dr Mark Meekan
 AMS

 Dr Jamie Oliver
 AMS

 Dr Ben Radford
 AMS

 Dr Zoe Richards
 WA Museum

 Dr Tyrone Ridgeway
 Oceania

 Dr Stephen Rogers
 AMS

 Dr Michael Rule
 Department of Parks and Wildlife

 Dr Christine Schonberg
 AMS

 Dr Oscar Serrano Gras
 Oceans Institute

 Dr Luke Smith
 Woodside

 Dr Michele Thums
 AMS

 Dr James Underwood
 AMS

 Dr Shaun Wilson
 Department of Parks and Wildlife

 Distribution of Oceans Institute Members

 Assoc/Prof Natasha Pauli
 School of Earth and Environment

 School of Agriculture and Resource Economics

 School of Plant Biology

 School of Environment

 School of Animal Biology

 School of Earth and Environment

 School of Civil Engineering

 School of Electrical Engineering

 School of Engineering

 School of Animal Biology

 School of Plant Biology

 School of Chemistry

 School of Earth and Environment

 School of Physics

 School of Medicine, Dentistry and Health Sciences

 School of Chemistry

 School of Computer Science

 School of Computer Science

 School of Computer Science

 School of Computer Science

 School of Computer Science
# Key: Supervisors

- **JM**: Jessica Meeuwig
- **SC**: Shaun Collin
- **MM**: Nicola Mitchell
- **NH**: Nathan Hart
- **PC**: Peta Cicide
- **CO**: Crollith L’Oughlin
- **DW**: David White
- **PG**: Pauline Grierson
- **MR**: Mark Randolph
- **SH**: Shazad Hossain
- **GC**: Mark Cassidy
- **CG**: Christophe Gaudin
- **SD**: Scott Draper
- **MK**: Mehndad Riziaei
- **SS**: Shazad Hossain
- **BP**: Binta Bienen
- **CP**: Chari Pattiaratchi
- **PG**: Greg Ivey
- **TL**: Julie Trotter
- **RL**: Ryan Lowe
- **AG**: Aras Shadouane
- **GS**: Greg Ivey
- **MM**: Malcolm McCulloch
- **NH**: Matthew Hipsey
- **JC**: Julian Clifton
- **ET**: Erik Tschera
- **TW**: Thomas Wernberg
- **GC**: Gary Kendrick
- **TL**: Timothy Langlois
- **EH**: Euan Harvey
- **TF**: Thomas Wernberg
- **AP**: Alastair Paterson

## School of Animal Biology

- **Ryan Kempster**: SC
- **Anton Kuchar**: SC
- **Nicolas Naglo**: NH
- **Laura Ryan**: NH
- **Carlos Salas**: SC
- **Rachael Warington**: SC

## Centre for Microscopy Characterisation and Analysis

- **Pia Bassoli-Browne**: PC
- **Gerard Ricardo**: PC

## Centre for Offshore Foundation Systems

- **Anthony Blake**: GD
- **Michael Coijn**: BW
- **Youkou Dong**: MG
- **Mienh Tri Duong**: CG
- **Dengfeng Fu**: CG

## School of Civil, Environmental and Mining Engineering

- **Olga Bondarenko**: CP
- **Cyprien Bossurelle**: CP
- **Paul Branson**: GI
- **Liah Coggins**: AG
- **Andrew Cunnathers**: AG
- **Ashu de Vos**: CP
- **Mohammed Hadi**: CP
- **Bahnspour**: CP
- **Tanzila Mahjabin**: CP
- **Martin James McLaughlin**: CP
- **Wandress Morris**: CP
- **Jennifer Person**: CP
- **Eric Raes**: PG
- **Julia Reisser**: CP

## School of Earth and Environment

- **Kaylee Anderson**: JT
- **Mark Buckley**: RL
- **Napo Cayabyabi**: RL
- **Michael Cutler**: RL
- **Sana Dandon**: MH
- **Gayen Lakendra Gunaratne**: MH
- **Dekandura Arachchige**: MH
- **Edwin Drool**: RL
- **Laura Elena Segura**: RL
- **Taryn Foster**: MH
- **Lucy Georgiou**: MH
- **Maria Gonzalez-Bornat**: JC
- **Reene Gruber**: RL
- **Daniel Paraska**: MH

## School of Plant Biology

- **Aliezz Salehi**: CP
- **Sarki Salim**: CP
- **Taj Sarker**: RL
- **Darshani Thotagamuwa**: CP
- **Lei Tian**: GI
- **Jingtao Xu**: GI

## School of the Environment

- **Simone Anderson**: JT
- **David Ahrons**: ET
- **Caroline Coombs**: ET
- **Stephanie Price**: ET

## School of Social Sciences

- **Mark Polzer**: AP

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**PhD Students**

**School of Animal Biology**

- Shanta Barley
- Charlotte Birkman
- Phil Bouchez
- Janelle Brathwaite
- Victoria Camillieri
- Luciana Cerqueira Ferreira
- Marjorie Fernandez
- Beverly Oh
- Joyce Om
- Jamie Tedeschi
- Dave Tickler
- Gabriel Vianna

**School of Animal Biology – Neuroecology**

- Audrey Appadurais
- Lucille Chapuis
- Joao Coimbra
- Eduardo Garza Gisholt
- Ryan Kempster
- Anton Kuchar
- Nicolas Naglo
- Laura Ryan
- Carlos Salas
- Rachael Warington

**Centre for Microscopy Characterisation and Analysis**

- Pia Bassoli-Browne
- Gerard Ricardo

**Centre for Offshore Foundation Systems**

- Anthony Blake
- Michael Coijn
- Cathal Colneye
- Youkou Dong
- Mienh Tri Duong
- Dengfeng Fu

**School of Civil, Environmental and Mining Engineering**

- Olga Bondarenko
- Cyprien Bossurelle
- Paul Branson
- Liah Coggins
- Andrew Cunnathers
- Ashu de Vos
- Mohammed Hadi
- Bahnspour
- Tanzila Mahjabin
- Martin James McLaughlin
- Wandress Morris
- Jennifer Person
- Eric Raes
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- Caroline Coombs
- Stephanie Price

**School of Social Sciences**

- Mark Polzer
The need to understand and protect our marine environment has never been more important. Given our increasing reliance on the ocean for leisure, trade and resources, it is our duty to manage our marine environment responsibly. The role of research and training is vital and underpins our ability to provide sound, evidence-based advice on how to assess and manage the health of our marine environment.

Professor Shaun Collin
UWA OCEANS INSTITUTE DEPUTY DIRECTOR
(2015 DIRECTOR)

Case Study: Research Impact in 2014

The UWA Oceans Institute prides itself on its multidisciplinary capabilities and for almost six years the Institute has facilitated research programs and published highly cited scientific papers that play a significant role in impacting government policy and influencing community awareness and understanding.

Plastic pollution was an important issue worldwide following the publication of a scientific paper resulting from the global Malaspina Circumnavigation Expedition led by Professor Carlos Duarte in 2011. The research found that plastic pollution in the open ocean is widespread but less than predicted, sparking researchers to ask the question ‘where is the missing plastic?’ Former PhD student, Julie Reisser, supported by Professor Chari Pattiaratchi, was a key advocate for research into understanding the impacts of plastic pollution to better inform decision makers tasked with developing mitigation strategies for this worldwide problem.

The number of cites received by UWA Oceans Institute members continues to grow, providing evidence of the growing impacts of the research conducted at the Institute. In 2014, five publications involving Oceans Institute researchers, were recognised as ‘Highly Cited’ papers, receiving enough citations to place them in the top 1% of their academic field.

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</table>
Oceans Institute 2014 Publications

Journal Articles


B蔼ker K, Baruch BY, William R, Fernandez B, Westphal M, Matthew Hipsey, Draper, Professor David White, Dr. Tina Olen


Bennett S,,’’Wernberg T, Bennett S,,’’Wernberg T, Bennett S,,’’Wernberg T, Bennett S,,’’Wernberg T, Bennett S,,’’Wernberg T, Bennett S,,’’Wernberg T, Bennett S,,’’Wernberg T, Bennett S,,’’Wernberg T, Bennett S,,’’Wernberg T, Bennett S,,’’Wernberg T, Bennett S,,’’Wernberg T


Galindo MA, Collin SP, Miller MR. 2014. Ultraviolet radiation enhances tissue regeneration and survival in mobile invertebrate assemblage on artificial habitats off Western Australia. *Marine Pollution Bulletin* 83: 156-166.


Research Impact

Sea Level


Coral Reefs


Ocean Acidification


Coral bleaching


Climate change


Marine biodiversity

There is no simple solution to the challenges facing the marine environment. All disciplines have a role to play including natural and social sciences, engineering, business and humanities. Only through collaboration will we ensure the health of our oceans and marine life.

PROFESSOR ERIKA TECHERA
DEAN OF LAW

- Oceans Institute
  2015 Strategic Priorities
  - Communicate Oceans Institute’s research and its Vision on Ocean Solutions
  - Strengthen and spread capacity in marine research
  - Invest in internationalisation
  - Enhance high performance culture

- 2015 Operational Priorities
  - Enhance research profile
  - Advance the Oceans Institute’s international development
  - Engage in knowledge transfer
  - Invest in international research and programs
  - Develop strategic partnerships
  - Increase available resources

“"There is no simple solution to the challenges facing the marine environment. All disciplines have a role to play including natural and social sciences, engineering, business and humanities. Only through collaboration will we ensure the health of our oceans and marine life.”

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DEAN OF LAW