A new $63 million Indian Ocean Marine Research Centre (IOMRC) based at UWA and the Waterman's Marine facility will house research teams from UWA, CSIRO and the Australian Institute of Marine Science (AIMS). The IOMRC will boost marine science capacity in Australia and provide the research capacity to address pressing ocean research questions in the north west of Australia and across the Indian Ocean.

In a joint statement released in Perth on June 10, then Deputy Prime Minister Julia Gillard and the Federal Minister for Science, Senator the Hon Kim Carr, announced federal funding of $34m for the centre. The additional funding will come from UWA ($12m), CSIRO ($10m), the State Government ($4m) and (AIMS) ($3m).

“The Centre will undertake research into the most important drivers of innovation in the marine sector – climate change, the sustainable use of marine resources, conserving marine biodiversity, coastal zone management, and security and safety,” UWA Vice-Chancellor Professor Alan Robson said.

$52m will be spent on a new ‘5+ Green Star-rated’ building on The UWA Crawley Campus to house staff and students from The UWA Ocean’s Institute, AIMS West and CSIRO. It will be located on the south-western corner of campus, near the intersection of Fairway Avenue and Myers Street.

The other $11m has been set aside for re-furbishing laboratories and aquarium facilities at Watermans Bay to house CSIRO, UWA and some State staff. The renovated building will include new marine culture facilities with direct access to seawater, general wet labs and offices.
Professor Robson said the new Centre would bring together a range of outstanding researchers as part of a truly national initiative which the University would be proud to lead. The Centre would complement existing nodes of marine research activity in Townsville and Sydney, focused on the Pacific Ocean, and in Hobart, focused on the Southern Ocean.

“The State’s 15,000km of coast stretches across 20 degrees of latitude with the full variety of marine habitats, from seagrass beds to inshore and offshore coral reefs and unique biodiversity. Managing this world-prominent marine estate requires a world-leading marine research capability. With this new centre, we will have that capability,” Professor Robson said.

Combined, the two sites will house 240 world-class researchers. Their work will include the mapping of the biodiversity of Australia’s western coastline and predicting ecosystem responses to climate change and resource development, to reduce climate change risk for the public and private sectors.

On July 2 UWA Pro Vice-Chancellor (Research) Prof Alistar Robertson spoke to staff and students at the Oceans Institute about all aspects of the project, from what it will mean for marine science nationally and internationally to the location and management of the new buildings.

One of the key messages was that feedback from staff at the Oceans Institute, CSIRO and AIMS that addresses how the centre can operate most effectively will very much influence its final design. Prof Robertson also spoke of the need for staff to understand that the IOMRC project is part of an integrated package of marine science initiatives in the State. The State Government is also considering support for the Integrated Marine Observing System (IMOS) that provides oceanographic infrastructure and an extension of funding for the Western Australian Marine Science Institution (WAMSI) to focus research projects on the NW of Australia and to provide integration of the State-funded marine research effort.

According to Associate Professor Ryan Lowe of the Oceans Institute, “This will be the most substantial facility on the west coast to study how marine organisms respond to environmental change.”

In addition to supporting the research of marine biologists, oceanographers, ocean engineers and ocean policy, the Centre will be a focus for the research of two WA Premier’s Fellows and marine scientists, Professors Malcolm McCulloch and Shaun Collin.

The whole project is estimated to take four years to complete.

Photos: leafy seadragon (*Phycodurus eques*) (front page); lionfish (top); anemone (bottom).
Students discover deep-sea canyon

A huge deep-sea canyon near the Montebello Islands has been discovered by students on a training voyage with the Australian National Network in Marine Science (ANNiMS).

Professors Anya Waite (UWA) and Tom Trull (University of Tasmania) ran the fortnight-long student training voyage in biological and geochemical oceanography aboard CSIRO’s Marine National Facility, the RV Southern Surveyor.

Beginning on March 29, the students travelled from Hobart to Broome, via Fremantle, on one of the first research voyages to track the whole length of the Leeuwin Current.

Sponsored by ANNiMS, fourteen postgraduate and honours students across Australia were selected through a national competition to join Professors Waite and Trull at sea for hands-on training as they tracked the length of the longest ocean feature in Australia, the Leeuwin Current.

Students were introduced to the fundamentals of shipboard oceanographic sampling, including the science of oceanography and the practical aspects of being at sea and deploying sampling gear.

They investigated the diversity of plant plankton and animal plankton, analysed chlorophyll samples, measured carbon dioxide and oxygen concentrations in surface waters, and collected samples for nutrient analysis.

The students had the opportunity to use some exciting gear on board, such as a continuous plankton recorder, state of the art nutrient analysers and a swath mapper, which uses sonar to map the sea floor.

It was on the second leg of the journey that students discovered the deep-sea canyon on the continental shelf near the Montebello Islands.

As they navigated the many oil rigs offshore from the Pilbara, some students were watching flying-fish and whales when others noticed odd-looking contour lines on the bathymetric chart (the submerged equivalent of a topographic map).

The students found a deep cleft in the continental shelf,” Professor Waite said. “We went right over it and made a map with the swath mapper...

“Their measurements also suggested that the canyon might be associated with ‘upwelling’ to the continental shelf, a physical process known to make the surface ocean more productive with plankton, the sea’s main fish food.”

The graphic on the left depicts the ocean floor of the canyon. The red represents shallow water, transitioning to dark blue and purple as the water becomes deeper.
Oceans Institute and AIMS collaborate at Ningaloo

UWA Oceans Institute researchers are collaborating with the Australian Institute of Marine Science (AIMS) to study the oceanography influencing Ningaloo Reef.

In November 2009 UWA researchers deployed two moorings in 75m and 150m of water off Tantabiddi Beach, a short drive from Exmouth. These moorings were positioned between two long-term AIMS moorings that have been collecting data for almost ten years.

The AIMS moorings, deployed in 50m and 100m of water, have been in place to observe the dynamics of the Leeuwin Current and counter-flowing Ningaloo Current over inter-annual time scales. These long time series have enabled description of the seasonal variability of alongshore currents in the region. Furthermore, the data set has been used to validate the performance of regional and coastal numerical models.

UWA researchers Associate Professor Ryan Lowe, Assistant Professors Nicole Jones and Jim Falter, and PhD student Cynthia Bluteau joined Dr. Richard Brinkman on the AIMS vessel RV Solander in January 2010 to recover the UWA moorings and service the AIMS moorings.

"By combining the long-term AIMS measurements with the high resolution spatial and temporal UWA measurements, we can achieve excellent research outcomes and contribute data to multiple projects," said Assistant Professor Nicole Jones.

UWA Oceans Institute PhD student Cynthia Bluteau will use the data to study the dynamics of internal waves on the steep slope offshore of Ningaloo Reef. Internal waves are similar to surface waves, but they travel at density interfaces within the water column rather than on the surface.

They occur when cold water from the bottom of the ocean is pushed up the continental slope by tides. Internal waves steepen and break as they move inshore, and hence may be an important mechanism for delivering nutrients to the Ningaloo Reef.

Another PhD student, Tao Xu, will use the field measurements along with numerical modelling to investigate the regional circulation dynamics surrounding Ningaloo. This includes quantifying how interactions between the Leeuwin Current and the local winds control coastal upwelling, a phenomenon whereby dense, cooler water rises toward the surface to replace the warmer, usually nutrient-depleted water.

His research will ultimately provide insight into how ecological processes such as nutrient delivery and coral bleaching are linked to hydrodynamics. In turn, this will help to assess the susceptibility of the reef ecosystem to the effects of climate change.
Never before seen images of marine life deep inside the Perth Canyon, 22km west of Rottnest Island, have called for more thorough protection of WA’s marine environment.

The images were revealed on World Oceans Day, Tuesday June 8, by scientists at UWA’s Centre for Marine Futures (CMF) and School of Plant Biology, and CSIRO.

The display was part of a tour by Federal politicians Dr. Mal Washer (Liberal MP for Moore), Ms Melissa Parke (Labor MP for Fremantle) and Ms Rachel Siewert (Senator for The Greens) to learn about the groundbreaking research that scientists are conducting on WA’s marine environment.

They saw compelling images of pink snapper, rocket squid, deepwater sharks, synchronised swimming by rays and skates (which are similar to rays but produce eggs rather than live young), and billowing sand clouds. The photographs were captured as part of research into the health of WA’s unique marine environment.

The original project was funded by the Fisheries Research and Development Commission and is headed by Dr. Alan Williams of CSIRO (Hobart). Professor Euan Harvey of the Oceans Institute has been working with Dr. Williams and other CSIRO and industry scientists to determine the distribution and vulnerability of gulper sharks (pictured above).

These sharks have an Australia wide distribution, but have decreased in numbers by up to 95% in the last 20 years as a result of trawl fishing for their oils.

By using baited cameras (also known as stereo BRUVs – Baited Remote Underwater Video Systems), they hope to gain fisheries independent data of shark numbers, size and distribution.

Sixty-two (3 hour) BRUV drops were completed in the Perth Canyon at depths ranging from 200-550m on a ten day trip in April 2010 on the Fisheries WA boat Naturaliste.

“Gulper sharks are at a high risk of being overfished because they are long living, slow to mature and have low reproductivity. We hope to gather enough data to determine a sustainable level of fishing for the sharks, or if they should be fished at all,” said Professor Harvey.

The Rottnest Canyon work involved collaboration with staff for the Department of Fisheries WA who were interested in the broad fish assemblage sampled by the baited cameras. Little is known about the status of these deeper water fish stocks, which are presently targeted by both recreational and commercial fishers.

Further deepwater sampling is planned on both the east and west coasts of Australia for later in 2010.

For more info on this project and similar shark projects, visit www.csiro.au/news/sharktagging

Photos: young gulper shark (Centrophorus moluccensis) recorded on stereo BRUV (top); Australasian snapper (Pagrus auratus) (bottom left); large whaler shark (bottom right).
On 1 April 2010, climate change, whale sharks, and the social impacts of climate change at Ningaloo were discussed at the Ningaloo Student Research Day.

The day was jointly led by the Department of Environment and Conservation, CSIRO’s Ningaloo Collaboration Cluster, and the Western Australian Marine Science Institution (WAMSI).

Three researchers were presented with awards for outstanding work. One of them, Cecile Rousseaux from The UWA Oceans Institute, won the award for the best science-based work.

Cecile spoke about the seasonal and inter-annual variation in the transport of phytoplankton offshore of Ningaloo reef. She proved the existence of high seasonality in the quantity and quality of food being delivered to the reef.

“This was the product of three years of research and it is always very rewarding to have people recognise your work for its quality,” she said.

“This project started off as mostly based on field data but we soon realised that the questions I was trying to answer would require to combine several disciplines together. We decided to combine in situ data with numerical models and satellite data.”

It was this interdisciplinary approach that the Oceans Institute is encouraging that was recognised as being outstanding.

Cecile believes that the skills this experience has taught her will enable her to gain more international research experience.

“The issues we will face in the future such as climate change will undoubtedly require researchers to have some expertise in several fields.”

This image was created using data from the Satellite MODIS (Moderate-Resolution Imaging Spectroradiometer).

Chlorophyll is used as an indicator of phytoplankton concentration.
ANNiMS opportunities for students

The Australian National Network in Marine Science (ANNiMS or ‘the Network’) is a collaboration between James Cook University (JCU), The University of Tasmania (UTAS) and The University of Western Australia (UWA). The partners are leaders in Australian marine science research.

ANNiMS provides unique opportunities for collaboration. Expertise at the three institutions is complementary and provides an excellent basis to undertake multidisciplinary teaching and research.

This year the Network started its ‘Semester Swap’ program, which offers UTAS, UWA and JCU students the opportunity to move to a partnering university to undertake a full academic load for one semester. Students can also study single units in 2-3 week intensive summer courses.

"The idea of the program is to give the student the opportunity, which otherwise would be difficult for them to fund themselves, of going interstate to another major player in the marine space, such as UTAS and JCU, to get another perspective, and experience another area of marine science research and activity," said Bernadette Ulbrich-Hooper, ANNiMS Manager.

To aid the students the Network will provide return air fares, accommodation and meal allowance for the time they are interstate, as well as cover any relating field excursion costs.

Six UWA Marine Science students have also been selected to undertake the ANNiMS Scientific Diving Course to be run in January or February 2011. Jacqueline Doran, Peter Keron, Lindsay Abbott, Jacob Azarello, Amy Lewitza and Claire Wellington have been invited take part in this very popular course ran by UTAS.

If you are interested in exploring this opportunity further, please email Bernadette.UlbrichHooper@utas.edu.au or go to www.marine-science-network.edu.au for more information.

Photos: cuttlefish (top); reef fish, by Heather Taylor (bottom).
A series of lunchtime workshops have been run at The UWA Oceans Institute in an initiative to build a collaborative culture between staff and students.

Between April and June, RRaFT (Respect, Recreate and Facilitate Transformation) Educators and Helen Close from Strategic Management Solutions facilitated five “Lunch box sessions” specifically designed for the UWA Oceans Institute. Sessions generally lasted for 90 minutes, including time for relaxed discussions over the provided lunch.

Up to 30 members of the Oceans Institute participated in the sessions, the first of which addressed some of the aspects of working across disciplines. It equipped the attendees with the tools to communicate effectively, whilst providing an opportunity to share and get to know the other staff and students at the Institute.

The following sessions focused on extraordinary teamwork, building resilience in times of change, and the structures and practices we can put in place to continue expanding our communication and effectiveness.

By delivering specific tools and strategies to staff and students, these sessions will help to develop the unique culture of The UWA Oceans Institute.

Fish Fact

Frost fish (*Lepidopus caudatus*) exhibit the unusual behaviour of hanging vertically in the water column.

The above image was recorded off the coast of Gippsland, Victoria, and shows this narrow, barracouta-like fish bobbing up and down - an unexplained, previously unreported phenomenon.
Kings Park dives deeper into seagrass genetics

Between 1967 and 1999, more than three thousand hectares of seagrass were lost from Cockburn Sound due to industrial pollution and eutrophication.

Now, Doctors Siegy Kraus, Kingsley Dixon and Liz Sinclair from Kings Park, Professor Gary Kendrick and Doctors Marion Cambridge and Renae Hovey from the Oceans Institute, and PhD student John Statton are uncovering the best methods for restoring seagrasses through the Seagrass Research and Rehabilitation Plan (SRRP).

So what’s important about strappy green plants at the bottom of the ocean? Despite their modest appearance, seagrasses play a crucial role in our coastal ecosystems. They provide homes and food for a myriad of ocean creatures, from small sponges and snails to crabs and fish. Shallow, sheltered seagrass meadows provide vital nurseries for many commercial fish and crustaceans, including the Western Rock Lobster – WA’s most valuable fishery.

The challenges of working underwater mean that much less is known about these flowering plants than their terrestrial counterparts. Dr. Elizabeth Sinclair, research scientist at Kings Park and The University of Western Australia, says that seagrass rehabilitation must piece together knowledge from both ecology and genetics to be truly successful.

Liz explains: “There’s a whole field of people studying the practical side of things – how to collect seagrasses, how to plant them. The genetics work I’m doing will be used to identify the species we want to restore, and figure out where to source plant material.”

On land, restoration ecologists recommend re-establishing plants with a similar genetic makeup to the original plants lost through clearing. Introducing distantly-related plants, even of the same species, can ‘pollute’ the gene pool and make the population vulnerable to environmental changes.

With these principles in mind, Liz is using the latest genetic technology to investigate the DNA of a variety of Western Australian seagrasses. The results will guide the collection of donor plants, and maintain the genetic composition of seagrass populations in the restored sites.

She is confident that the seagrass meadows can be restored. “I think they can be. In calmer waters, where seeds can settle, seagrasses will recruit naturally. But other sites have changed so much that they’re going to need a huge amount of help.”

The stark changes began in the late 1960s, with effluents from industry along the shores of Cockburn Sound polluting the water and spawning algal growths that suffocated the seagrasses.

Just 15 years ago, the prevailing view in WA was that restoring seagrass meadows was impossible. Since then, a number of small-scale projects have shown that seagrass rehabilitation is certainly feasible, although there is still a tremendous amount to be learned. The knowledge learned by the SRRP team will be useful not only for WA, but for interstate and overseas seagrass rehabilitation as well.

For more information, please visit the Botanic Gardens and Parks Authority website at www.bgpa.wa.gov.au or the Oceans Institute website at www.oceans.uwa.edu.au
Early career researchers encouraged to aim high

Since May, The UWA Oceans Institute has been running a series of workshops aimed at helping postgraduate and postdoctorate researchers to publish in the top journals in their fields.

These will be followed up in August and September with workshops aimed at writing for Australian Research Council (ARC) Linkage Grants.

The initiative was the result of a meeting in April with Pro Vice-Chancellor Alistar Robertson, a small group of PhD students, and the Director and General Manager of the Oceans Institute. The consensus was that workshops, as well as ongoing support, would be necessary to encourage these early career researchers to aim for prestigious journals including Science and Nature.

Members from The UWA Research Development Office presented the workshops, which so far have looked at building a track record in research, strategic writing for high quality journals and preparing for ARC linkage grants.

Aiding them have been some of UWA’s most successful researchers and prolific grant winners, including Winthrop Professors Shaun Collin and Mark Cassidy, Dr. Pauline Grierson and Associate Professor Jon Evans.

The next workshop is scheduled for Friday, August 6, and is titled ‘Writing a Winning Application for ARC Research Grants’.

For more information on upcoming workshops please visit the Oceans Institute website at www.oceans.uwa.edu.au

Postgraduate students showcase their research projects

Postgraduate students were given the opportunity to show off their research projects at the inaugural Oceans Institute postgraduate student showcase, held on April 16 in the Economics & Commerce Conference Room.

Thirty-six students from five UWA schools (across two faculties) and AIMS presented highlights of their research projects. The students are supervised by 22 UWA academics and 15 external supervisors.

By sharing knowledge and learning about each other’s projects, the students were able to see the collaborative opportunities that the Oceans Institute enables.

“It was a wonderful opportunity to see the true breadth of research projects within the Oceans Institute; the diversity of approaches as well as the backgrounds of the students is really exciting,” said Assistant Professor Nicole Jones, who helped organise the showcase. “The students embraced the opportunity to share their research.”

Winthrop Professor Gary Kendrick, Acting Director of the Oceans Institute, remarked, “I was very impressed with the energy, breadth of subject material and professionalism shown by all speakers. It makes my job so satisfying.”
Visitors to the Oceans Institute April-June

<table>
<thead>
<tr>
<th>NAME</th>
<th>VISITOR ORIGIN AND COUNTRY</th>
<th>RESEARCH SUBJECT</th>
<th>HOST</th>
<th>DATES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professor David Prandle</td>
<td>University of Wales, School of</td>
<td>Estuarine systems</td>
<td>Winthrop Professor Chari Pattiaratchi</td>
<td>24 March – 2 June</td>
</tr>
<tr>
<td></td>
<td>Ocean Science, Bangor, UK</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dr. Steve Schill</td>
<td>The Nature Conservancy, USA</td>
<td>Protecting Nature, Preserving Life: The Nature Conservancy in the Caribbean</td>
<td>Assistant Professor Bryan Boruff</td>
<td>7 – 19 May</td>
</tr>
<tr>
<td>Indonesian Delegation</td>
<td>Indonesia</td>
<td>Indian Ocean Research Group</td>
<td>Professor Dennis Rumley</td>
<td>18 May</td>
</tr>
</tbody>
</table>

New Research Projects

<table>
<thead>
<tr>
<th>TITLE</th>
<th>FUNDING PERIOD</th>
<th>FUNDING BODY</th>
<th>SUPERVISOR(S)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evolutionary shifts in vertebrate visual ecology and visual system</td>
<td>2009-2011</td>
<td>National Evolutionary Synthesis Centre (NASCent) Collaborative Grant USA</td>
<td>Winthrop Professor Shaun Collin</td>
</tr>
<tr>
<td>morphology</td>
<td></td>
<td>USA</td>
<td></td>
</tr>
<tr>
<td>Sensory strategies for protecting endangered sawfish</td>
<td>2009-2010</td>
<td>ARC Linkage project</td>
<td>Winthrop Professor Shaun Collin</td>
</tr>
<tr>
<td>Sensory biology and prey manipulation behaviour of sawfish</td>
<td>2008-2010</td>
<td>The Sea World Research and Rescue Foundation</td>
<td>Barbara Wueringer and Winthrop Professor Shaun Collin</td>
</tr>
<tr>
<td>Seeing without eyes: the evolution of non-visual photoreceptors in</td>
<td>2009-2011</td>
<td>ARC Discovery Project</td>
<td>Winthrop Professor Shaun Collin and Professors David Hunt, Russell Foster and Ian Potter</td>
</tr>
<tr>
<td>vertebrates</td>
<td></td>
<td>USA</td>
<td></td>
</tr>
<tr>
<td>Alternate diets for a sustainable aquaculture industry: neuroethology</td>
<td>2008-2010</td>
<td>ARC Linkage project</td>
<td>Winthrop Professor Shaun Collin, Associate Professor Andrew Barnes, Professor Mark Porter and Dr. Richard Smullen</td>
</tr>
<tr>
<td>of feeding in barramundi</td>
<td></td>
<td>USA</td>
<td></td>
</tr>
</tbody>
</table>

Close-up of the eye of the Slingjaw Wrasse (Epibulus Insidiator)