



Senator Evans opens SIMS' research facilities

Sydney turned on perfect weather as more than 60 guests gathered at SIMS for the official opening of the recently completed major research facilities on 17th May. The NSW Government, which also contributed funding for these facilities, was represented by Katrina Hodgkinson, Minister for Primary Industries.

“The new facilities will enable Australian and international scientists to research the impact of issues like climate change, invasive species and urbanisation on our oceans and coastal environments,” Senator Evans said. “SIMS is perfectly positioned on one of the most biologically diverse harbours in the world – Sydney Harbour.”

“It is the ideal place, in the middle of Sydney and close to the coastline, to be able to research the impact of urbanisation and climate change on our marine environments. SIMS plays a crucial role in its world-class research, as well as training the next generation of scientists, to ensure Australia remains at the forefront of marine science.”

Prior to the official opening, guests were regaled with superb finger food served by Sergeants Mess in the new conference facilities at SIMS' headquarters building. Hungerford Hill very generously donated wines for the occasion.

During their visit to SIMS, both Senator Evans and Minister Hodgkinson were treated to a tour of the new laboratories and the Ian Potter Research Aquarium. Dr. Belinda Curley had collected a variety of marine animals from Chowder Bay the day before and these were on display for all the visitors to marvel at what was actually living beneath the water right outside SIMS.



Senator Chris Evans, Federal Minister for Science and Research, addressing guests gathered at SIMS for this memorable occasion.



Dr. Emma Thompson, in SIMS' new molecular laboratory, explains her work on Sydney rock oysters to Minister Katrina Hodgkinson.



Students from year 6 at Mosman Public School were invited to the opening to give them a glimpse into the wonderful world of marine science.



Dick Smith joined us on the day. In an interview with SBS, he said: "For the future of mankind...very important that we know as much as we can about the oceans."



Harbour Hike 2012

**Father's Day
2nd September**

Bring your family and friends for a great day out along the shores of Sydney Harbour.

Finish the day with a marine festival at Chowder Bay and a ferry ride back to the starting line.

Touring the laboratories and aquarium

Ministers Chris Evans and Katrina Hodgkinson met scientists as they toured the new laboratory complex. After the opening ceremony everyone was invited into the Ian Potter Research Aquarium to view the remarkable collection of living creatures that Dr. Belinda Curley had found in Chowder Bay. All of these creatures were returned to their natural habitat as soon as the opening was over.



SIMS Director and CEO, Prof. Peter Steinberg and Amanda Tuplicoff, SIMS' Laboratory Supervisor explaining activities in SIMS' Molecular Biology Laboratory to Senator Evans. Pictured are Real-Time Polymerase Chain Reaction (PCR) machines which allow researchers to amplify and quantify genes and gene expression in samples from biological material. PCR machines have fundamentally changed biology as a whole, because they allow for the amplification of extremely small samples of DNA or RNA, which would otherwise be too minute to analyze. Examples of projects by SIMS researchers using the Molecular Biology Laboratory include investigations of genetic adaptation of oysters to chemical contamination, the population genetics of the grey reef shark, and genetic detection of marine phytoplankton toxins. The Bio-Rad CFX96 real-time PCR machine pictured is the latest in PCR technology.



The "Gloomy Octopus" in the tank captured everyone's interest. Dr. Curley described the octopus, which is very common in Sydney Harbour, as having excellent eye-sight and a well developed brain.

On the left, Dr. Curley explains to Senator Evans the habits of the gloomy octopus, which sits in a lair during the day collecting rocks and rubble to protect itself, and hunts for crabs and snails during the night.
Octopus photo below: Dallas Kilponen



Minister Katrina Hodgkinson holding a sea urchin from Chowder Bay. Researchers at SIMS have discovered how to breed these as delicacies for the Japanese market. They are also the subject of SIMS' research as they move south with the warming waters of the EAC, devouring kelp and creating barren areas that are no longer productive breeding grounds.

Fellowship awards

The doctoral fellowship program at SIMS commenced in 2010. To date, with the generosity of our wonderful supporters, we have been able to award 10 fellowships.

Fellowships are awarded on a competitive basis. A panel of highly qualified scientists assesses the applications and the fellowships are awarded to the applicants whose research is judged to be the most significant. Each fellowship has a value of \$37,500 paid as \$12,500 per annum for three years.

Dr. Sylvia Earle, on her visit to SIMS last year, said that these fellowships “*are the best investment you can make.*”

The fellowships encourage more students to undertake research at PhD levels. The number of marine scientists in Sydney urgently needs to increase and these fellowships will be a significant factor in assisting this.

Experience has shown that these early years of research, commencing from the time when a PhD is undertaken, are the most creative time of a researcher’s career. They can concentrate on research as they have minimal administrative and teaching commitments. This is the time when they can make the difference – they can explore novel ideas that will change the way people think – leading to significant advances in our ability to understand and manage our marine ecosystems.

The doctoral fellows who undertake their studies at SIMS will recognise the excellence of the facilities and its ideal location for research. This will have a multiplier effect as very often, they will return later with other researchers and their own students. This will be a significant factor in the long term development of SIMS.

Thyne Reid Doctoral Fellowship:



Ian Reid (left) presents the 2012 Thyne Reid Doctoral Fellowship to Aroon Melwani, Peter Steinberg looking on. Aroon’s project is “**The Biology of Environmental Stress: Genetic and Physiological Adaptation in Sydney Rock Oysters with Prolonged Exposure to Contaminants**”.

In Sydney Harbour, urban and industrial runoff has resulted in prolonged environmental stress to aquatic species, through inputs of toxic contaminants and altered water quality conditions. Significant changes in the activity of numerous genes have been identified in Sydney rock oysters responding to contaminants and other environmental stressors. We still do not know whether these changes are due to inherited genetic adaptations or short-term transient responses to environmental stress. Making this distinction will help to predict the fate of iconic species, such as Sydney rock oysters, in Sydney Harbour.

In this research project, gene and protein expression will be compared in wild oysters with and without long-term exposure to contaminants. This work will identify the genes and proteins associated with heritable responses to environmental stress. Based on analyses, laboratory experiments will test if the key biological systems affected can explain oyster resilience to the long term effects of pollution. This information will help develop strategies to conserve their future populations.



Tony Roach Award

This is an annual award funded by the NSW Office of Environment and Heritage in memory of Dr. Tony Roach, an internationally recognised expert in contaminants. The award is for the best paper done in NSW on marine or estuarine environmental science by a person within three years of their award of a PhD.

Tony’s wife, Ann Buchner presented the award to Dr. Graeme Clark and Dr. Catherine Burke.

SIMS doctoral fellowships - 2012

Shawna Foo:

“The effects of ocean acidification and warming on gene expression in marine invertebrate development.”



Shawna Foo collecting the Black Urchin *Centrostephanus Rodgersii* in Little Bay, Sydney. This urchin is an ecologically important herbivore in rocky reefs where it creates extensive barrens free of leafy macroalgae. This species is expanding its range poleward due to ocean warming.

Excess carbon dioxide emissions are causing the oceans to acidify with this decrease in pH decreasing mineral saturation in the ocean. This makes it difficult for marine invertebrates to make a skeleton or shell. There is a large weight of evidence on the stunting effect of ocean acidification on echinoderm development, including skeleton formation, however little is known about the molecular mechanisms underlying these effects and the potentially confounding influence of temperature.

Ocean warming is especially relevant along the east Australian coast with greater rates of warming waters. Shawna will investigate the effects of ocean acidification and warming on gene expression in marine invertebrate development to help understand the dwarfing effect it has on larval and skeletal growth. She will analyse the quantitative effects of near future ocean pH conditions on important developmental genes to understand the molecular mechanisms underlying the negative effects of ocean acidification. The data will help identify major cellular and developmental processes that are affected.

Sonia Brazao:

“The ecology of limpets on New South Wales rocky shores: interaction between food intake and biochemical profiles in natural and artificial habitats.”



Here is Sonia Brazao looking for potential field sites in Sydney Harbour. The rocky shores in Sydney Harbour and nearby coasts are very different. The research on limpets means she has to make sure that her studies really do reflect what happens in Sydney Harbour.

Human modification of coastlines is a worldwide phenomenon and natural habitats are being replaced by a variety of artificial structures such as seawalls, breakwaters and/or jetties. Understanding the effect of these artificial habitats on ecological interactions is vital in order to plan their design and minimise their impacts on nearby rocky shores.

Limpets are key organisms playing a fundamental ecological role in structuring and modifying ecosystems properties, in that their grazing stops shorelines being dominated by large seaweeds. On artificial habitats in Sydney Harbour however, the number of limpets diminished. Previous research has shown that limpets do not breed naturally on seawalls. One reason for this may be the fact that the food available may not be enough for their nutritional requirements.

Since in the marine environment direct observations of feeding are often very difficult, Sonia plans to use cutting edge methods such as chemical tracers (e.g. stable isotopes and fatty acid analyses) to determine the nutritional requirements of limpets and develop new knowledge on the biology and ecology of animals on the structures and coasts of the Harbour and adjacent shores.

It's on again...take Dad for a hike this Father's Day

Thousands of hikers will take to the spectacular Harbour foreshore paths around the lower north shore this Father's Day, Sunday 2 September to help discover the secrets of Sydney Harbour and raise much needed funds for marine research. The 11km SIMS Harbour Hike, being held for the second year, starts under the Sydney Harbour Bridge and concludes with a marine-themed festival at the Chowder Bay finish line, home of SIMS.

SIMS Harbour Hike, is an easy to moderate walk taking in the best vistas that Sydney Harbour has to offer and providing an opportunity for families, colleagues, friends, and even individuals to participate in a healthy community event.

Along the way, SIMS' scientists can be found at checkpoints where questions about Sydney Harbour's marine life and natural environment are asked – the most correct answers win great prizes. Food stalls, live entertainment and children's activities along with displays and information about Sydney Harbour await hikers at the finish line at the Chowder Bay marine-themed festival.

Registrations are now open on SIMS' Harbour Hike website and organisers are urging hikers to register early as the numbers of walkers accepted is limited - www.harbourhike.com. In 2011 the inaugural event involved over 2,000 participants and thousands more at the Marine Festival, with almost \$50,000 raised for SIMS' important marine research and education work. Hikers, including some of NSW's most famous dads, hailed from as far afield as the ACT, Orange, Taree and Coffs Harbour, as well as from across Sydney's greater metropolitan area.

Harbour Hike participants will each receive an event passport with a course map, information about SIMS, and questions about Sydney Harbour – clues to these questions will be given by SIMS' scientists at checkpoints throughout the walk.

Entry fees for the SIMS Harbour Hike are: \$35 for an individual, \$65 for a team of two, and \$95 for a group of three to five people or families, with the funds raised going to SIMS Foundation. All entrants receive a SIMS Harbour Hike passport and registration bib as well as a ferry ticket from the finish line back to the start line. Participants also will be encouraged to have their friends and families sponsor their hike with additional prizes for the top fundraisers.

All participants in the SIMS Harbour Hike must register at www.harbourhike.com. The event is limited to the first 4,000 people who register. The event starts under the Sydney Harbour Bridge in groups hourly, between 8am and 12noon on 2nd September and follows a path taking in Kirribilli, Neutral Bay, Shell Cove, Cremorne Point, Mosman Bay, Sirius Cove, Taronga Zoo and the Sydney Harbour National Park at Bradley's Head around to Clifton Gardens Reserve, Mosman, a distance of 11km.

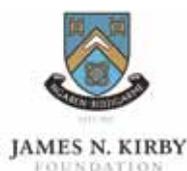
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CONTACT US

SIMS office:
Building 19
Chowder Bay Road,
Mosman, NSW 2088

Tel: (02) 9435-4600
foundation@simS.org.au

TO MAKE A DONATION:

Go to www.simS.org.au
and follow the prompts.

SIMS at work:

Most current antifouling paints are based on biocides such as copper and have damaging non-target effects. The lower plate shown here demonstrates the effects of paints containing novel, non-toxic inhibitors which reduce the fouling of surfaces by marine invertebrates and seaweed. They are part of a project testing the efficacy of a new range of antifouling products. The top plate is a control plate that does not contain the novel non-toxic inhibitors now being tested, hence the considerable growth on it.

