

Blue innovation: towards smart, secure and sustainable oceans



At first glance, the ocean may not seem relevant to a conversation about a smart city, but the ecological and economic value of a healthy ocean is fundamentally connected to the concept of a smart city. Eighty-five per cent of Australia's population lives within 50 kilometres of the coast, making human communities inextricably linked to oceans. Critical aspects of our lives rely upon the seas, including transport, food, energy and recreation, as well as the industries and livelihoods that are related to them.

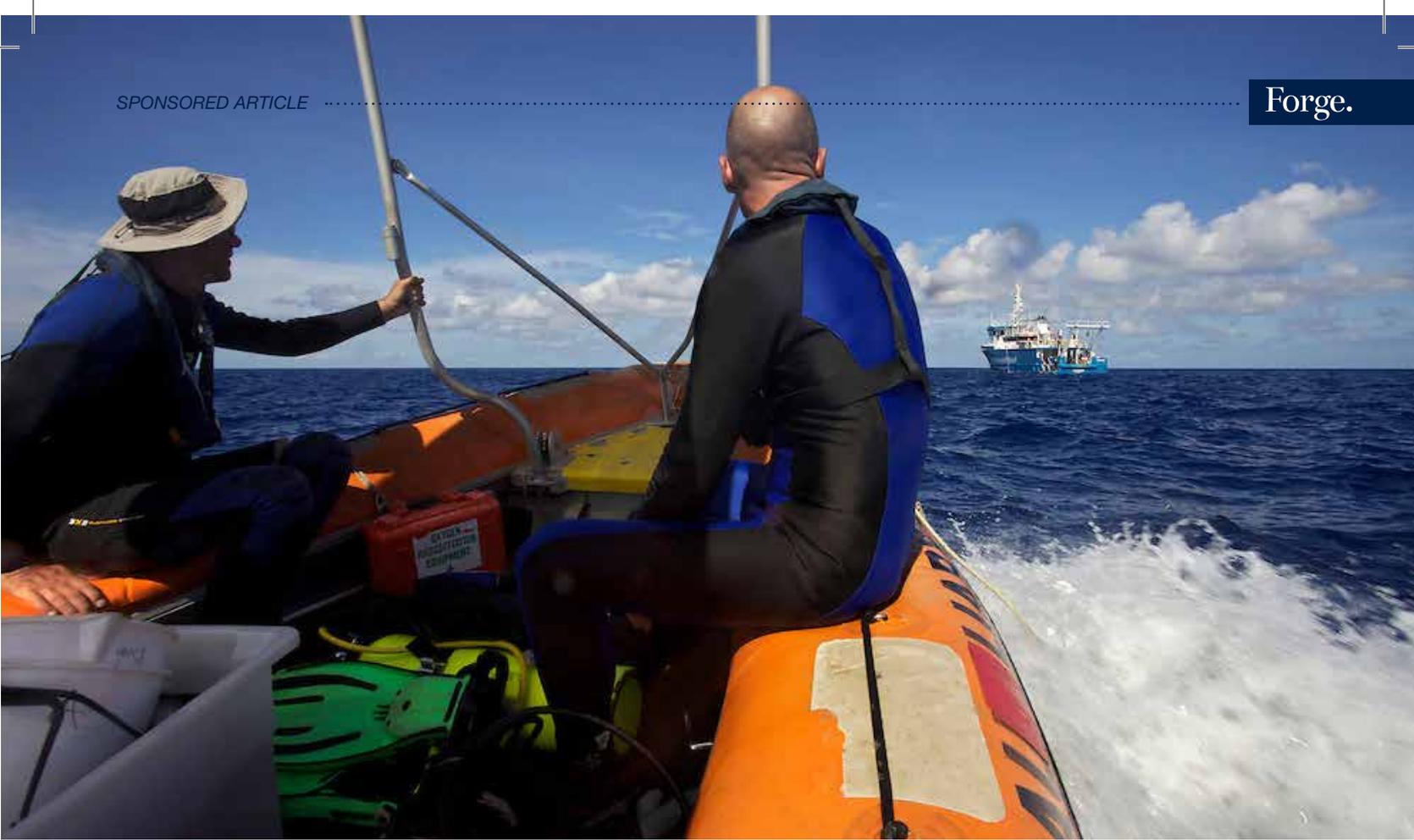
Through collaborative and interdisciplinary research, the Oceans Institute at The University of Western Australia (UWA) is supporting and promoting smart, sustainable and secure uses of the oceans to meet the needs of a rapidly increasing global population.

If the objective of a smart city is to promote urban developments that provide core infrastructure and initiatives that give a decent quality of life to citizens, while ensuring a clean and resilient environment – then the same approach is vital to our oceans. For this reason, marine resources must be used in a safe and sustainable manner to relieve global pressures on food, water and energy supplies, without threatening biodiversity or contributing to global climate change.

The strategic objective of the UWA Oceans Institute is not to address these issues separately or in isolation, but to explore comprehensive and connected approaches; balancing utilisation and conservation, drawing upon critical collaborations to devise efficient and effective outcomes.

The strength of the UWA Oceans Institute lies in its ability to call upon its breadth and depth of marine expertise. Its core disciplines are marine biology and ecology, and physical oceanography and ocean engineering, but its research also reaches into the social sciences – particularly through marine environmental law, international relations, resource economics, commerce, history and maritime archaeology. In each of these disciplines, new knowledge advances our social and economic development. Brought together, these resources have the capacity to solve global challenges and deliver significant commercial, environmental and societal benefit.

The UWA Oceans Institute is committed to expanding its multidisciplinary membership to better position it as a



leader in the development of smart, sustainable and secure oceans. The Director of the Oceans Institute, Professor Erika Techera, is passionate about multidisciplinary approaches to oceans research, saying:

‘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.’

The Oceans Institute at UWA is a key player in the most ambitious and prestigious interdisciplinary marine partnership in the Southern Hemisphere, the Indian Ocean Marine Research Centre (IOMRC). This dynamic high-level research partnership brings together CSIRO, the Australian Institute of Marine Science (AIMS), the Department of Fisheries Western Australia, and the UWA Oceans Institute researchers and infrastructure.

The IOMRC partnership was created to further our multifaceted knowledge of the Indian Ocean. The IOMRC will continue to build Australia’s international marine research status through stimulating, innovative and

synergistic research, as well as the training of the next generation of researchers.

Two state-of-the-art, multimillion dollar purpose-built facilities have recently been completed to house the IOMRC partnership – one at the UWA Crawley campus and the other at Watermans Bay, located 20 minutes from the main campus on the ocean front. The \$63 million, five-storey Indian Ocean Marine Research Centre at Crawley is the new home of the UWA Oceans Institute.

Deputy Director of the Oceans Institute Professor Shaun Collin says the innovative co-working space is the perfect catalyst for marine research collaboration:

‘Through IOMRC, we can go outside traditional boundaries of marine research to solve complex problems and influence government policy and industry practice.’

The Indian Ocean is the world’s third-largest ocean, and while it is physically the most complex of the world’s oceans, it is the least researched and understood. More than 25 per cent of the world’s population lives within the Indian Ocean region, which demonstrates the significance of its impact on the lives of billions of people.

Australia is a major stakeholder in affairs of the Indian Ocean, including its security and stability. Australia has significant inshore and offshore marine areas in the Indian Ocean and, as the most developed country in the region, has a responsibility to enhance the governance of resources, people and industries. Just as cities must be secure, so must the oceans impacted by them.

Weak governance, intra- and interstate conflict, terrorism, smuggling in all its forms and illegal fishing pose a threat to our urban centres if not policed appropriately. Climate change, rising sea levels and natural disasters are also factors to be taken into account when designing smart, sustainable, secure cities.

Many of these large national and international challenges are expressed in terms of the security of resources like energy, food and water, as well as sustainability and the resilience of ocean environments, human societies and industries. Resources and services must be maintained in ways that ensure that they persist into the future and do not become self-destructive or exhausted. All of these matters relate to oceans as they do to cities, and all have the potential to be advanced through marine research across multiple disciplines.



Indian Ocean Marine Research Centre, Crawley facility

The UWA Oceans Institute works with a growing list of partners, including industry; government and non-government organisations; and national, regional and international research institutions. All are committed to helping progress and advance our understanding of the oceans through solutions-based research. For example, to focus on delivering the knowledge required to propel the blue economy, the UWA Oceans Institute has developed a joint research program with the Ocean College at Zhejiang University, one of China's leading universities. This research collaboration extends from ocean engineering and marine sciences to marine governance and resource economics. Relationships have also been fostered with the University of Seychelles Blue Economy Research Institute, and the University of Mauritius.

Another significant international collaboration is with the Woods Hole

Oceanographic Institution (WHOI) in Massachusetts, United States. WHOI is considered one of the world's leading non-profit oceanographic research organisations, and illustrates the UWA Oceans Institute's commitment to partnering with globally endorsed marine research bodies.

Local partnerships are equally as important in facilitating collaborative research to foster solution-based marine research. The UWA Oceans Institute is committed to its local communities – demonstrated, for example, by its membership of the Ningaloo Alliance, a collaborative partnership established to share the outcomes of research on the World Heritage-listed Ningaloo Reef with the Western Australian Exmouth community. As a key partner in the Ningaloo Alliance, the UWA Oceans Institute is working with the Shire of Exmouth to develop a marine research facility within the new Ningaloo

Centre, a multi-use community and research building due for completion this year.

The UWA Oceans Institute continues to use its strengths in multifaceted marine research to deliver ocean-based solutions for humanity's grand challenges, including the provision of food, water, energy and bioresources. Focusing on solutions-oriented ocean research allows immense scope for innovation and growth of new ideas and industries to address these challenges. Safeguarding marine resources and developing smart cities will in turn enable governments, industries, non-government organisations and the community to make decisions that ensure safe, sustainable and resilient oceans for current and future generations. ●

To learn more about the UWA Oceans Institute, visit www.oceans.uwa.edu.au.