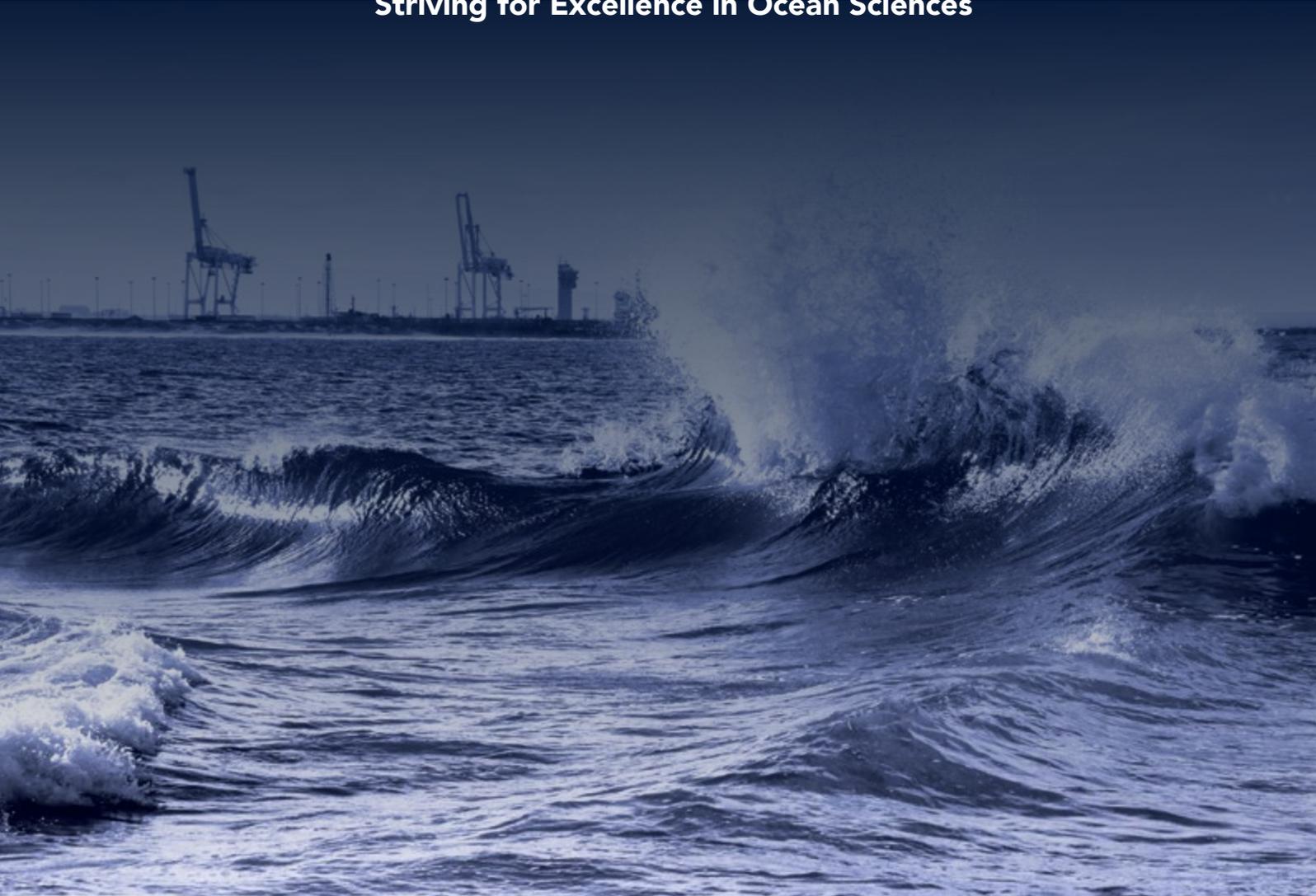
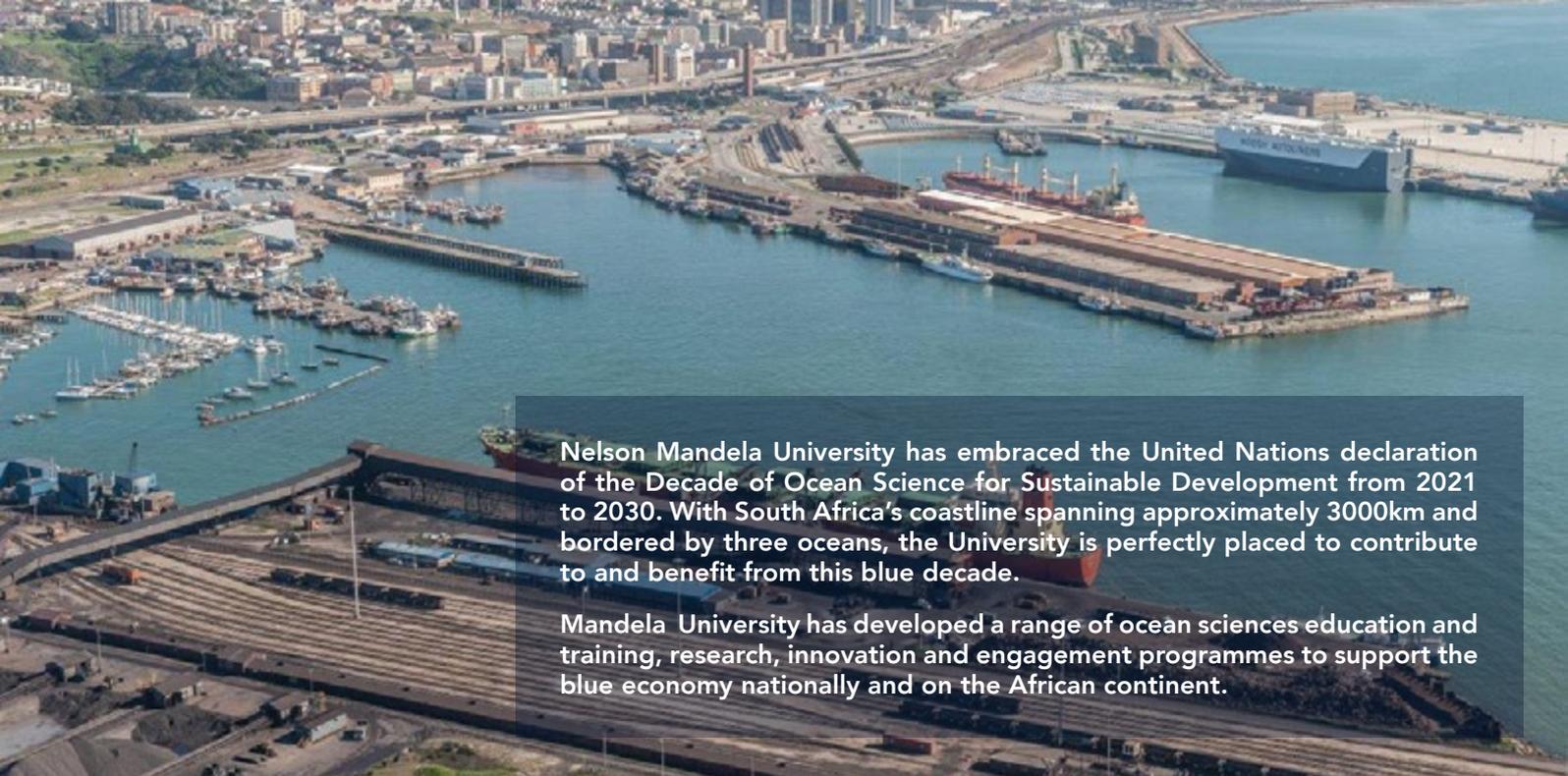


NELSON MANDELA
UNIVERSITY

**GROWING AFRICA'S
BLUE ECONOMY**
for a Green Future

Striving for Excellence in Ocean Sciences





Nelson Mandela University has embraced the United Nations declaration of the Decade of Ocean Science for Sustainable Development from 2021 to 2030. With South Africa's coastline spanning approximately 3000km and bordered by three oceans, the University is perfectly placed to contribute to and benefit from this blue decade.

Mandela University has developed a range of ocean sciences education and training, research, innovation and engagement programmes to support the blue economy nationally and on the African continent.

Expressing Vision 2030 through Ocean Sciences

As a dynamic African institution, Nelson Mandela University aspires to be recognised for its leadership in generating cutting-edge knowledge for a sustainable future. To this end, the University is advancing ocean sciences as a strategic differentiator and it is the only higher education institution in South Africa with a dedicated Ocean Sciences Campus.

Nelson Mandela University is one of only six comprehensive universities in South Africa, with more than 31 000 students and 2 500 staff across seven campuses in Gqeberha and George. The Ocean Sciences Campus, launched in 2017, serves as a multi-purpose hub for transdisciplinary, postgraduate studies, research, innovation and engagement in various spheres of the marine and maritime sectors.

Sustainability

Mandela University's Ocean Sciences strategy spans three interdependent spheres of sustainability, namely:

- Promoting sustainable livelihoods for coastal communities
- Optimising the economic potential of the oceans
- Preserving marine biodiversity and ecological integrity

Our aim is to support the blue economy by "conserving and sustainably using the oceans, seas, and marine resources..." (United Nations Sustainable Development Goal 14: Life Below Water), as well as to address global goals such as eradicating poverty and addressing climate change.

In service of society

As a university in the service of society, our mission is to offer a diverse range of life-changing educational experiences for a better world.

Our overarching ocean sciences strategy is underpinned by the following objectives:

- Advancing inter- and transdisciplinary synergies to promote learning, teaching, research, innovation and engagement "where art meets science"
- Promoting social, economic, and environmental sustainability
- Developing and maintaining mutually beneficial and collaborative partnerships with civil society, industry, government, and other post-school educational institutions nationally and internationally
- Positioning the university to be a destination of choice for ocean sciences nationally and on the African continent



Ocean sciences qualifications

Currently, ocean sciences qualifications are offered by various faculties and entities at the University. Over and above these qualifications, various short learning programmes are also offered to address different aspects of ocean sciences.

FACULTY OF BUSINESS AND ECONOMIC SCIENCES

- Postgraduate Diploma in Maritime Studies
- Master of Philosophy in Maritime Studies
- Master of Maritime Management

FACULTY OF ENGINEERING, THE BUILT ENVIRONMENT AND TECHNOLOGY

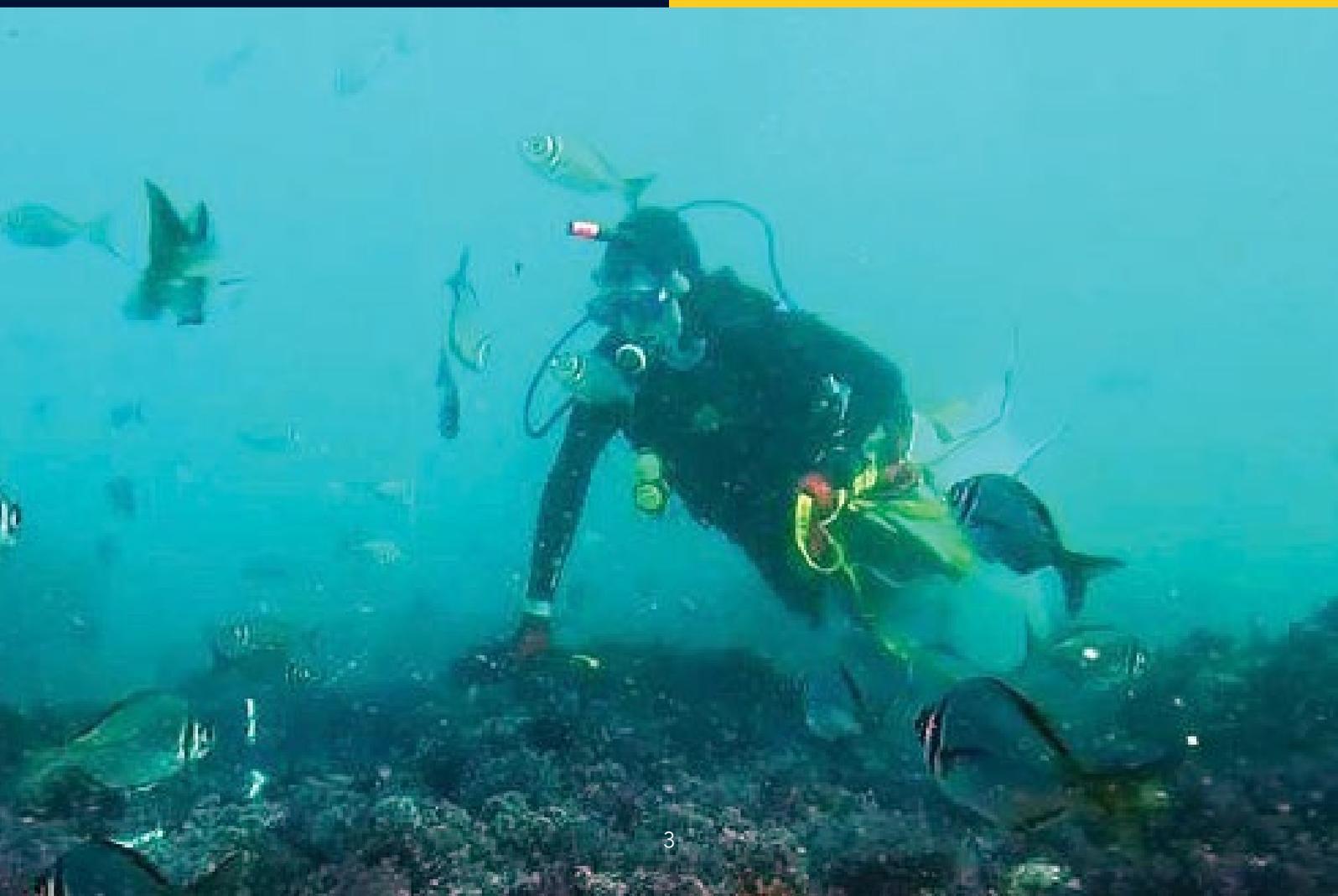
- Bachelor of Engineering Technology in Marine Engineering
- Bachelor of Engineering Technology Honours in Marine Engineering

FACULTY OF SCIENCES

- Bachelor of Science
- Bachelor of Science Honours in Botany
- Bachelor of Science Honours in Zoology
- Master of Sciences in Botany
- Master of Science in Zoology
- Master of Science in Biological Oceanography
- Doctor of Philosophy in Botany
- Doctor of Philosophy in Zoology
- Doctor of Philosophy in Oceanography

FACULTY OF LAW

- Bachelor of Laws
- Master of Laws in Ocean Governance
- Doctor of Laws in Public Law





Ocean sciences research chairs

There are five National Research Foundation (NRF) South African Research Chairs Initiative (SARChI) research chairs specialising in ocean sciences at Nelson Mandela University.

Marine Spatial Planning

The Chair in **Marine Spatial Planning** (MSP) focuses on how to sustainably use marine resources and manage South Africa's ocean waters.

This Chair, with Professor Mandy Lombard as the incumbent, focuses on marine conservation assessments and plans, and applied research that can be implemented for effective conservation outcomes.

Through the Chair, Nelson Mandela University undertakes research that informs ecosystem-based MSP in South Africa.

Law of the Sea and Development in Africa

The Chair in the **Law of the Sea and Development in Africa**, held by Professor Patrick Vrancken, is part of a South African and continent-wide engagement to develop the law of the sea for Africa.

The Chair also plays a pivotal research role in combatting organised fisheries crime, through PescaDOLUS, an independent research and fisheries crime network co-founded by the Chair.

Ocean Cultures and Heritage

The work of the Chair in **Ocean Cultures and Heritage**, headed by Professor Rose Boswell, resonates with the initiatives supported in the United Nations' Decade of Ocean Science for Sustainable Development.

The primary goal of the research is to explore, investigate, identify, document, report on, debate and advance national and global knowledge of a diversity

of ocean cultures and heritages in South Africa, Africa and selected regions of the world.

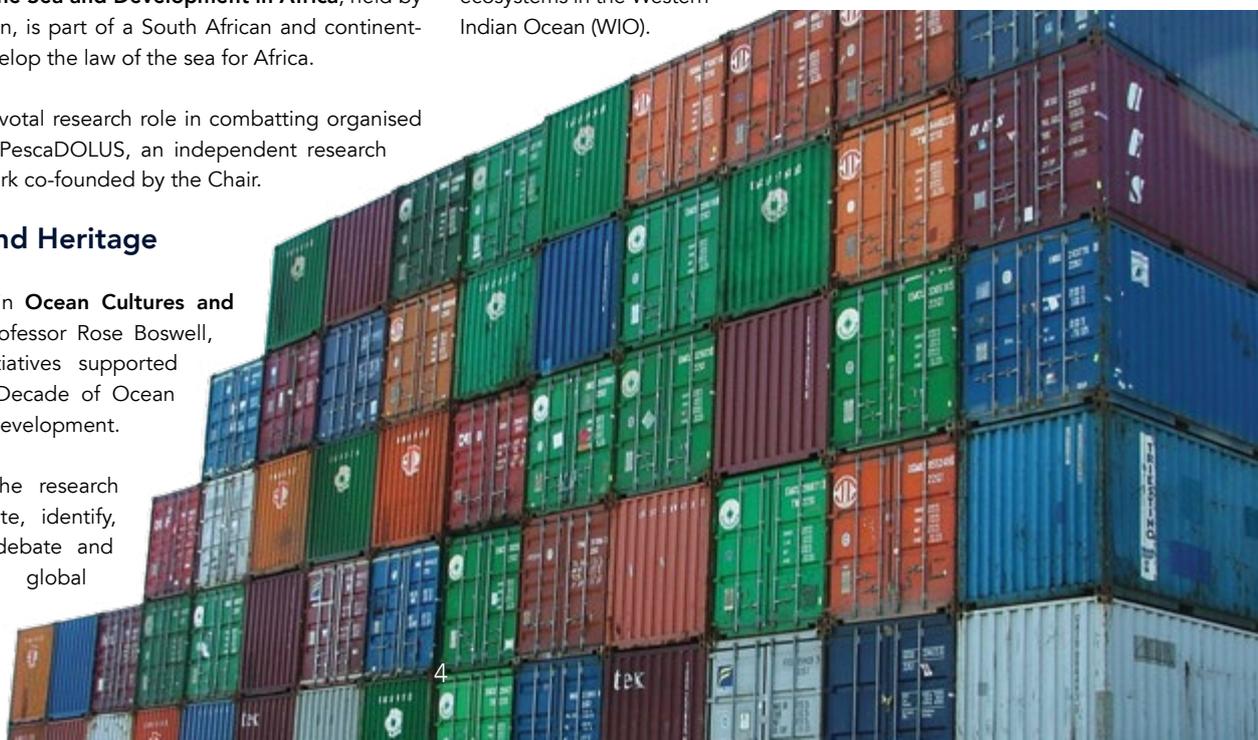
Shallow Water Ecosystems

The Chair in **Shallow Water Ecosystems**, held by Professor Janine Adams, investigates blue carbon ecosystems and responses to climate change, mangrove and salt marsh ecology, and water quality management of estuaries.

With water a scarce commodity in southern Africa, where many aquatic ecosystems are currently on a trajectory of rapid deterioration, the sustainable use and rehabilitation, where necessary, of our water resources is vital.

Ocean Science and Marine Food Security

The UK-SA Bilateral Research Chair in **Ocean Science and Marine Food Security** researches what sustains marine food security and the underpinning ecosystems in the Western Indian Ocean (WIO).





The Chair is jointly hosted by Nelson Mandela University, the University of Southampton, and the Southampton-based National Oceanography Centre (NOC) – the United Kingdom’s leading marine science research and technology institutions.

Led by Professor Michael Roberts, this Chair is developing an Innovation Bridge – Regional Hub (IB-RH) aimed at building strong, formal partnerships between top institutions in Africa and leading, well-resourced institutions in the Global North.



Ocean sciences partnerships

As a coastal institution, Nelson Mandela University partners with the national and international marine and maritime research community. We have forged strong collaborations with other coastal countries in Africa and globally to advance our scientific contribution to ocean sciences.

University partnerships

- Florida International University, US
- University of California, US
- Washington State University, US
- University of North Carolina (Wilmington), US
- Stanford University, US
- Universidade Federal do Rio Grande do Sul, Brazil
- University of Chile, Chile
- Durham University, UK
- Plymouth University, UK
- University of Edinburgh, UK
- University of Essex, UK
- University of Southampton, UK
- University of Strathclyde, UK
- University of Ulster, UK
- University of Reunion, France
- Carl von Ossietzky University of Oldenburg, Germany
- University of Turin, Italy
- University of Lisbon, Portugal
- University of Gothenburg, Sweden
- World Maritime University, Sweden
- University of Agder, Norway
- University of Bergen, Norway
- Western Norway University of Applied Sciences, Norway
- University of Tromsø – The Arctic University, Norway
- Sakakunta University of Applied Sciences, Finland
- University of Dar es Salaam, Tanzania
- Shanghai Maritime University, China
- University of Tasmania, Australia
- University of Queensland, Australia
- University of Wollongong, Australia

The University also has close working relations with other institutions of higher learning which have ocean sciences links in South Africa.

Other partners

Global

- Belmont Forum
- Benguela Current Commission, SA, Angola and Namibia
- British Council
- British High Commission Pretoria – UK Science and Innovation network
- Centre for Sea and Society at the University of Gothenburg, South Africa-Sweden University Forum, Sweden
- Climate Service Centre, Germany
- Deutsche Gesellschaft für Internationale Zusammenarbeit, Germany
- French Embassy in South Africa, Institut Français de Recherche pour l'Exploitation de la Mer
- French Institute for Research and Development
- Institute of Marine Sciences, Tanzania
- French National Centre for Research

- Helmholtz Centre for Functional Marine Biodiversity at the University of Oldenburg, Germany
- Holisticos
- iAtlantic International Consortium
- International Association of Maritime Universities
- Kenya Marine and Fisheries Research Institute
- International Union for Conservation of Nature
- MeerWissen, Germany
- Nairobi Convention, Kenya
- Nansen-Tutu Centre for Marine Environmental Research, SA
- National Centre for Ecological Analysis and Synthesis, US
- National Fisheries Research Institute, Mozambique
- National Oceanography Centre, Southampton, UK
- Newton Fund, UK
- Norwegian Institute for Nature Research
- Norwegian Polar Institute
- NOVA FCSH University of Lisbon, Portugal
- Ocean Unite, US
- UK Research and Innovation
- UNESCO – Indian Ocean Expedition
- United Nations
- Wäertsilä Marine Solutions, Finland
- Western Indian Ocean Marine Science Association
- World Ocean Council
- World Wildlife Fund

National partners

- BirdLife South Africa
- Council for Scientific and Industrial Research
- Department of Agriculture, Land Reform and Rural Development
- Department of Employment and Labour
- Department of Forestry, Fisheries and Environment
- Department of Higher Education and Training
- Department of Public Works and Infrastructure
- Department of Science and Innovation
- Department of Water and Sanitation
- Fitzpatrick Institute of African Ornithology, University of Cape Town
- Manufacturing, Engineering and Related Services SETA
- National Geographic
- National Research Foundation
- National Youth Development Agency
- Oceanographic Research Institute
- South African Environmental Observation Network
- South African Foundation for the Conservation of Coastal Birds
- South African Institute for Aquatic Biodiversity
- South African Maritime Safety Authority
- South African National Biodiversity Institute
- South African National Parks
- South African Squid Management Industrial Association
- Sustainable Seas Trust
- The Shark Conservation Fund
- TRAFFIC Wildlife
- Transnet National Port Authority
- Water Research Commission
- Wildlands Conservation Trust
- Wildlife and Environment Society of South Africa

Provincial partners

- CapeNature
- East Cape Development Corporation
- Eastern Cape Department of Basic Education
- Eastern Cape Socio-Economic Consultative Council
- Ezemvelo KZN Wildlife
- KwaZulu-Natal Sharks Board
- Nature's Valley Trust

Local partners

- Bayworld
- Coega Development Corporation
- Mandela Bay Development Agency
- Nelson Mandela Bay Metro



Research and engagement entities

Our Ocean Sciences Campus is home to several research and engagement entities.

FishFORCE

FishFORCE is South Africa's first Fisheries Law Enforcement Academy. A global leader in its field, it works to equip enforcement agencies to handle the increasingly complex investigations and prosecutions of fisheries crime throughout Africa and the world.

South African International Maritime Institute

The **South African International Maritime Institute (SAIMI)**, hosted by Nelson Mandela University, links industry, government, and educational institutions. It is a multi-disciplinary, multi-stakeholder entity active in all aspects of the maritime sector, including shipping, harbours, manufacturing and construction, environment, law, and marine tourism.

SAIMI is the implementing agency for ocean sciences skills development and capacity building funded by the Department of Higher Education and Training.

Institute for Coastal and Marine Research

The **Institute for Coastal and Marine Research (CMR)** is a research entity that draws staff and postgraduate students from all seven faculties of the University. It also includes research associates, collaborators from external research entities, and local and international collaborators.

CMR conducts cutting-edge research, builds capacity, and advances understanding of the coastal and marine environment to serve the needs of South Africa, the African continent and beyond, in a sustainable manner.

South African Environmental Observation Network

The **South African Environmental Observation Network (SAEON)** is a research facility within the National Research Foundation that focuses on

environmental change. The SAEON Elwandle Coastal Node is based in Gqeberha and also manages the Shallow Marine and Coastal Research Infrastructure (**SMCRI**) to provide a suite of innovative research platforms and data to the national science community.

SAEON's national operations include research, data management and modelling related to environmental change, decision and technical support, education and outreach, and instrumentation.

Marine Robotics Unit

The **Marine Robotics Unit (MRU)** is based in the Faculty of Engineering, the Built Environment and Technology (EBET) but works across all University departments and faculties. Its objective is to support research in the Western Indian Ocean (WIO) through the deployment and operation of off-the-shelf existing robotics such as autonomous underwater vehicles (AUVs) and gliders. It also aims to design and build new robots to support ocean sciences.

MandelaUni Autonomous Operations Group

The **MandelaUni Autonomous Operations (MAO)** Group, part of the Advanced Mechatronic Technology Centre (AMTC) in EBET, focuses on remotely piloted aircraft systems that include Unmanned Aerial Vehicles (UAVs). MAO offers new research and development opportunities for students wanting to focus on autonomous systems related to marine research, such as airborne and underwater drone technology.

African Centre for Coastal Palaeoscience

The **African Centre for Coastal Palaeoscience (ACCP)** conducts and coordinates interdisciplinary palaeoscientific research on the south and south-east coast of South Africa. It also promotes and facilitates inter-disciplinary, intra-institutional and inter-institutional palaeoscience research.



Infrastructure and facilities

Our Ocean Sciences Campus is located in Gomery Road, Summerstrand, Gqeberha. Its state-of-the-art facilities include:

Hyperbaric chamber

The hyperbaric chamber was procured by NRF-SAEON through the Shallow Marine and Coastal Research Infrastructure (SMCRI) to improve research and commercial diver safety in the Eastern Cape. In 2022, SAEON established a public-private partnership with a diving medical practitioner (Level 2) to use the Southern African Underwater and Hyperbaric Medical Association (SAUHMA) accredited chamber to treat patients using hyperbaric oxygen therapy.

Research Dive Unit

The research dive unit supports the scientific diving needs of Nelson Mandela University staff and students. NRF-SAEON also has an active research dive unit on the Ocean Sciences Campus, consisting of seven full-time and numerous part-time scientific divers, supervisors, and chamber operators. Each unit has its own high-pressure compressor equipped with banks to fill diving cylinders.

Dive tank

The dive tank is 8 metres deep and holds 173 000 litres of water. The multi-purpose tank is used for diver training, work-up dives, calibration of underwater scientific equipment, and to test new innovative underwater technology.

Laboratories

A strong collaboration between Nelson Mandela University, NRF-SAEON and SMCRI has resulted in the establishment of the following fully equipped and staffed marine laboratories on campus:

- Microplastics (co-funded by the Centre for Environment, Fisheries and Aquaculture Science, UK)
- Heavy metals
- Carbon
- Nutrients
- Microscopy
- Microalgae
- Invertebrates
- Genomics
- Aquaculture
- Student laboratories

There are also several support facilities such as a dedicated chemical store, sample storeroom, cold room, wet laboratory, and equipment store.

Science Centre

The new Science Centre features a dome-shaped amphitheatre as well as teaching, exhibition and meeting spaces, and laboratories. The Centre aims to promote science literacy by encouraging the youth to pursue careers in science and technology, and providing hands-on training of science educators.

Operational Oceanographic Centre

The centre consists of a dedicated team of Mandela University and NRF-SAEON oceanographic technicians and instrument scientists, and an electronics laboratory. It also has a boat shed housing nine research vessels and a large double-volume warehouse to store, assemble and test a variety of coastal and deep-sea oceanographic instruments and moorings.

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