UMT Universiti Malaysia Terengganu

INOS | INSTITUTE OF OCEANOGRAPHY AND ENVIRONMENT

THE BEST OF OUR RESEARCH PROGRAM

IMPACTS & ACHIEVEMENTS

OUR TEAM

1.

Coastal Ocean
Dynamics

2.

Geohazard &
Marine Solution

3.

Coral Research
Group

4.

Marine
Endangered
Species

5.

Mangrove
Research Unit

6.

Centre for
Ocean
Governance

7.

Sea Turtle
Research Unit

8.

Remote Sensing
& Marine
informatics

9.

Repositroy &
Reference
Centre

10.

Marine
Pollution &
Geochemistry

11.

Ocean
Mapping

12.

Marine Portal
Database

13.

Laboratory

VISION & MISSION

Our Vision

Leading oceanography and marine-focused institution, reputed nationally and respected globally.
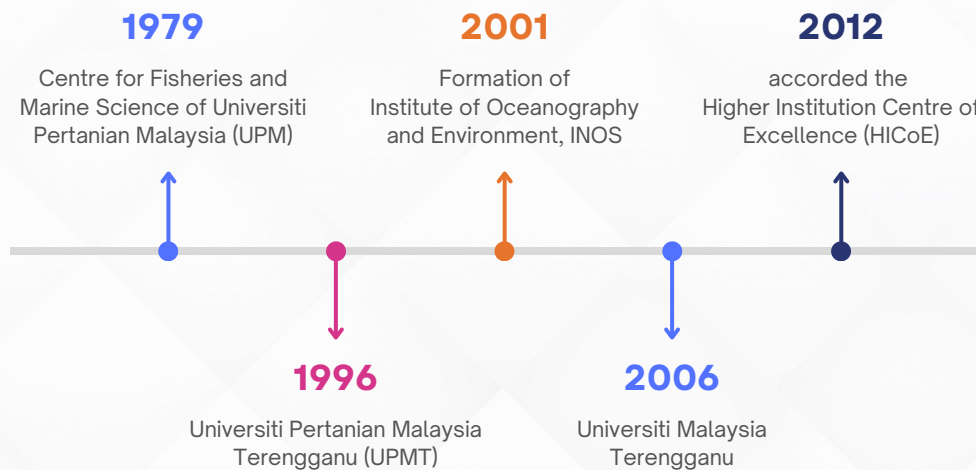
Our Mission

- Undertake oceanography and marine-related research with a long-term focus for high societal benefit.

- Manage, develop and coordinate marine data information and oceanographic facilities and infrastructures to benefit the Malaysian scientific community, policymakers and industries.

- Encourage advanced knowledge in ocean and marine systems through multi-disciplinary research at national and regional levels.

- Provide constructive and continuous training and research programs at postgraduate levels.

"We aspire to drive forward national ocean research and innovation through cutting-edge technology and solutions, strong industry collaboration, and sustainable community impact.

Prof. Dr. Mohd Fadzil Akhir, INOS Director

OUR JOURNEY

1979
Centre for Fisheries and Marine Science of Universiti Pertanian Malaysia (UPM)

2001
Formation of Institute of Oceanography and Environment, INOS

2012
accorded the Higher Institution Centre of Excellence (HICoE)

1996
Universiti Pertanian Malaysia Terengganu (UPMT)

2006
Universiti Malaysia Terengganu

INOS commenced its operations in 2001 as UMT's first research institute in conducting multi-disciplinary researches mostly related to oceanography. Taking advantage of the SCS as an open laboratory, increased understanding on the baseline information of the area has been achieved.

Among the oldest and most established marine and oceanography research institutes in Malaysia, INOS was accorded its official status as a centre of excellence by the Malaysian Government in April 2001 upon recommendation by the IOC-UNESCO.

In 2012, INOS was accorded the Higher Institution Centre of Excellence (HICoE) status.

COASTAL OCEAN DYNAMICS

Research Group

We aim to understand the role of ocean processes and dynamics of Malaysian seas and surrounding waters which includes current circulation, air-sea interaction, water mass characteristics, and waves.

OUR FOCUS

The team mainly focuses on the following research;

- The dynamic of upwelling system within the southern South China Sea.
- Influence of climate variability (i.e. monsoon and ENSO) on ocean processes and current circulation.
- Climate change impact on air-sea interaction, dynamics and ocean productivity.

The team is also responsible in providing ocean observation and numerical modeling data. Our observation data comes from scientific cruises conducted by our RV Discovery, met-ocean buoy and various data points of sampling works.

OUR ACHIEVEMENTS

INOS has been able to work with NOC, UK and GEOMAR, Germany in developing downscaling ocean climate data that includes ocean dynamics parameter and BGC. The data that ranges for more than 100 years will provide significant input towards future study on climate change in Malaysia. This data will soon be available on INOS Marine Portal Database.

We also produce long-term hindcast modeling data spanning 20 years, which has supported various industry needs. We also produce our forecast system that provides up to 5 days of marine forecast with high resolution within Malaysia region that delivers high accuracy of data output. It has been used by many national agencies and businesses in maritime sector.

OUR IMPACT

One of the impacts for the group is the development of the Ocean Forecast System (OFS), the first of its kind in Malaysia. This serves as the main reference tool for numerous applications that need forecasting or backtracking information on the Malaysian seas which includes the information of current vector, wave height, and temperature.

Our forecasting models are designed with precision in mind, providing industry with the most accurate and reliable weather and marine predictions for specific location.

OUR NETWORK
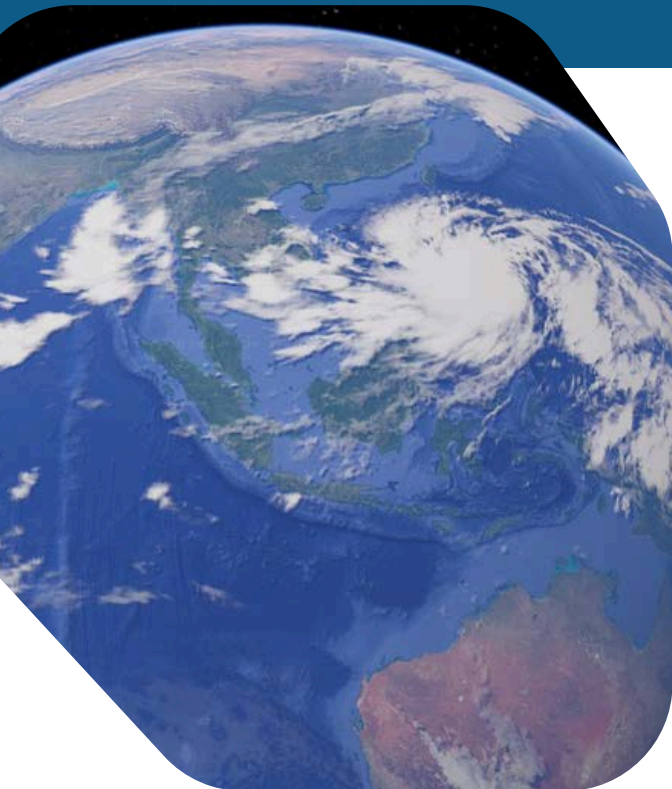
Ocean Seamless Forecasting Program;
To advance scientific understanding of the ocean-climate nexus, provide seamless forecasting, and serve effective ocean management.

Joint observation for ocean seamless forecasting using Met-ocean scientific Buoy

Ocean Hydro provides a range of support services including, ocean and hydrodynamics modeling, marine forecast and hindcast, marine data collection, visualization, analytics and data management.

CURRENT PROJECTS

Leading a sub-group under the UN Ocean Decades program in developing multihazard early warning system that is part of the ocean seamless forecasting program as one of the big decade initiatives

Developing the improved version of the model by incorporating AI and machine learning to provide better accuracy for SEA region and localize scale, the data is intended to benefit maritime industry, local agencies and coastal communities, ocean climate change, regional downscaling model and development of marine permanent station.

OUR TEAM

- **Prof Dr. Ts. Mohd Fadzil Mohd Akhir**
- **Dr. Nur Hidayah Roseli**
- **Dr. Chung Jing Xiang**
- **Dr. Zuraini Zainol**
- **Shukri Arsad**
- **Nurul Hidayah Mat Zaki**
- **Winfred Marshal**
- **Muhammad Naim Satar**
- **Afifi Johari**
- **Fathy Kamil bin Mohd Fadzil**

GEOHAZARD AND MARINE SOLUTION

Research Group

We aim on mitigating coastal and riverine hazards, studying erosion, flooding, and the impact of rising sea levels. We explore nature-based solutions, assess sediment and water quality, and investigate rare earth elements as potential resources.

OUR FOCUS

The team primarily concentrates on geohazards from river to coastal areas, with research focusing on:

- Erosion and sedimentation along riverbanks and beds, and their impact on flooding.
- Wave overtopping in coastal areas and its effect on beach erosion caused by climate change.
- Nature-based solutions for river and coastal hazards.
- The rising sea levels and their influence on the distribution of coastal aquifers.
- Evaluation of sediment and water quality, including marine debris, in both marine and terrestrial environments.
- The exploration of rare earth elements (REE) as potential natural resources.

The team also provides ocean mapping services to assess seabed changes and support various research activities, including:

- Bathymetric mapping
- Marine habitat mapping
- Identification of maritime archaeology
- Coral mapping

OUR ACHIEVEMENTS

INOS has collaborated with NAHRIM and DID Malaysia on monitoring, mitigation, and modeling efforts related to sea level rise and storm surge impacts. Additionally, UMT has developed a new, more eco-friendly technique for analyzing rare earth elements (REE) and exploring sediment sources.

OUR IMPACT

One of the group's achievements is the development of various nature-based approaches, such as the Effective Fence (E-Fence by UMT), Hybrid Fence (H-Fence by UMT), Marine Net (M-Net by RYE Engineering Sdn. Bhd. and UMT), MyPODE (by UM) and the Submerged Modular Artificial Reef (by NAHRIM), which are more eco-friendly and beneficial for the ecosystem and biodiversity.

OUR NETWORK

Collaborative efforts involve partnerships between government agencies (NAHRIM and DID) and multiple universities both within and outside Malaysia, including UM, UTHM, UIAM, UKM, UTM and Politeknik Nilai in Malaysia, as well as international institutions such as the University of South Brittany in France, Kingston University in United Kingdom, Kasetsart University in Thailand, Hasanuddin University in Indonesia, and the Third and Fourth Institutes of Oceanography from China. Furthermore, collaboration with Industry (i.e. RYE Engineering Sdn. Bhd.) is needed to explore the fabrication and commercialization for our products.

CURRENT PROJECTS

In an effort to improve coastal resilience and public safety, our team is developing a mobile application designed for public use, which provides real-time early warnings and forecasts related to coastal erosion and marine debris. This app integrates data from advanced numerical models and remote sensing technologies, offering timely updates on erosion risks, marine debris accumulation, and weather-related threats.

By delivering accessible, user-friendly alerts to coastal communities and stakeholders, the project aims to enhance awareness, facilitate proactive measures, and support local authorities in managing coastal hazards more effectively. This innovative tool plays a critical role in empowering communities to mitigate the impacts of environmental challenges along vulnerable coastlines.

OUR TEAM

- **Assoc. Prof Dr. Effi Helmy Ariffin**
- **Assoc. Prof. Dr. Che Mohd Imran Che Taib**
- **Assoc. Prof Dr. Hasrizal Shaari**
- **Ts. Dr. Azizi Ali**
- **Dr. Nor Bakhiah Baharim**
- **Dr. Mohd Sofiyan Sulaiman**
- **Dr. Joseph Bidai**
- **Dr. Muhd Nur Ismail Abdul Rahman**
- **Gs. Muhammad Izuan Nadzri**
- **Siti Nur Hanani Zainuddin**

CORAL RESEARCH GROUP

Research Group

We are making an important contribution to the understanding of coral reef community structure, the various stressors to the reef ecosystem, coral reproductive biology, recruitment and growth. We also focus on coral reef mapping and science-based reef conservation and ultimately aim to become one of the most important reference centres for coral knowledge.

OUR FOCUS

- Conducting marine ecology mapping of coral reef ecosystem through integrated approaches (aerial, acoustic and benthic approaches).
- Development of advanced methodology of reef fish survey and patent application.
- Development of coral health index using four significant components in coral reef; coral, macroalgae, macro-invertebrates and fish.
- Development of database system for coral reefs.
- Strengthens engagement among coral researchers.
- Promote sustainable conservation of coral reefs.
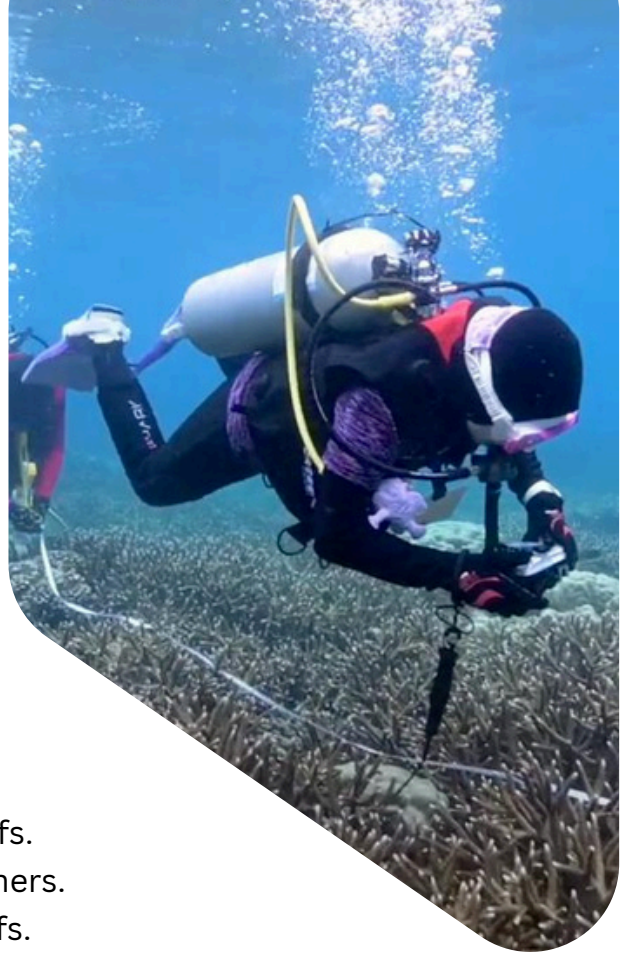
OUR ACHIEVEMENTS

- Combination of different survey methods results in a comprehensive dataset for the application of marine spatial planning by providing specific zone for specific purposes.
- Improves current coral reef management in Malaysia particularly on marine protected area designation.
- Creating an advance survey method for coral reef fishes which helps in providing permanent data, reducing underwater work and field sampling's cost as well as providing more robust and reliable dataset.
- Functions as a new benchmark for assessing coral reef conditions which helps in ecosystem based management for a better management practice through scientific-based evidence.
- Providing information in determination of conflicts between user and environment which is crucial for management purposes.

OUR IMPACT

- Integrated methods for assessing coral reef ecosystem from broad to fine scale survey to provide integrated data that combine and interpolate on map for a detailed marine ecology mapping of coral reef ecosystem.
- Improvement of reef fish survey method through the application of advanced technology and artificial intelligence.
- Development of new coral health index through combination of significance biological components and other parameters for comprehensive coral reef health assessment.

OUR NETWORK

The collaboration involves a partnership between local government agencies (Department of Fisheries Malaysia, Sarawak Forestry Corporation), several universities (Universiti Malaya, Universiti Teknologi Malaysia, Universiti Kebangsaan Malaysia) and private agencies (International Petroleum Corporation, Reef Check Malaysia). International institutions such as the Prince of Songkla University, Thailand, Diponegoro Universiti, Indonesia, James Cook University, Australia and Academia Sinica, Taiwan are involved in international cooperation.

CURRENT PROJECTS

- Marine biology conservation towards sustainable ecosystem.
- Coral reef mapping of Malaysian marine park - Tenggol, Kapas, Melaka and Perhentian.
- Artificial reef research.
- Application of Ecological Tools in Providing Scientific Based Solutions for the Sustainability of Marine Resources.

OUR TEAM

- **Prof. Gs. Ts. Dr. Aidy @ Mohamed Shawal bin M Muslim**
- **Prof. Madya Dr. Tan Chun Hong**
- **Prof. Madya Dr. Muhammad Hafiz Borkhanuddin**
- **Prof. Madya Dr. Maizah Mohamad Abdullah**
- **Dr. Siti NurTahirah Jaafar**
- **Dr. Mohammad Shawkat Hossain**
- **Dr. Khaira Ismail**
- **Ts. Dr. Azizi Ali**
- **Dr. Mohd Safuan Che Din**
- **Idham Khalil**

MARINE ENDANGERED SPECIES

Research Group

The MES program focuses on studying the population ecology and behaviour of cetaceans, dugong, and sea turtles, and human–animal interactions in Malaysia.

OUR FOCUS

The team mainly focuses on the following research;

- Occurrence, Distribution and Genetic Diversity of Irrawaddy (Orcaella brevirostris) and Indo-Pacific Humpback (Sousa chinensis) Dolphins in the Bay of Brunei and Matang Waters, Perak.
- Studies of Acoustic Characteristics and Behaviour of Irrawaddy (Orcaella brevirostris) and Indo-Pacific Humpback (Sousa chinensis) Dolphins in the Bay of Brunei and Matang Waters, Perak.
- Ecological Studies on Dugong (Dugong dugon) and Seagrass in the Bay of Brunei.
- Stable Isotope Studies on Marine Mammals, Sea Turtles, and It's Preys in the Bay of Brunei and Matang Waters, Perak.
- Incidental Catches of Marine Mammals in Fisheries in Malaysia.
- Genetic and Health Studies of Sea Turtles Foraging in the Bay of Brunei.
- Tagging and Nesting Biology of Green and Hawksbill Turtles in Chagar Hutang, Redang Island, Terengganu.
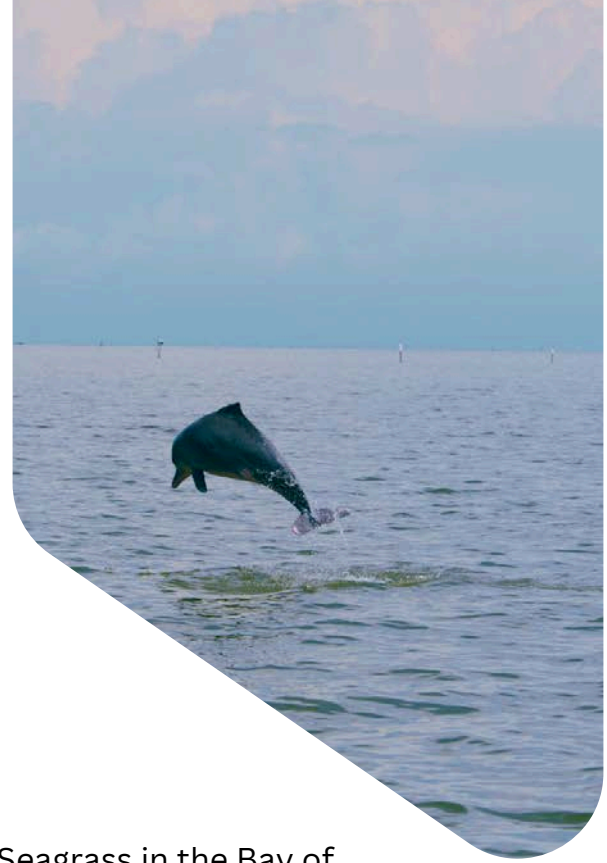
OUR ACHIEVEMENTS

To be able to focus research on Irrawaddy and Indo-Pacific humpback dolphins in the Straits of Malacca (Matang, Perak) and the South China Sea (Bay of Brunei) using hi-tech methodologies (biopsy for genetic and stable isotope studies, eDNA, bioacoustics, UAV and USV).

OUR IMPACT

The program makes major contributions to the understanding and is the main reference centre of marine mammals and sea turtles in Malaysia. It has completed a section on Marine Endangered Species in the Malaysian Marine Ecological Gap Assessment Project Report (DOF, 2023) and in Chapter 7: Maritime Southeast Asia of A Global Assessment of Dugong Status and Conservation Needs (UNEP, 2024).

OUR NETWORK
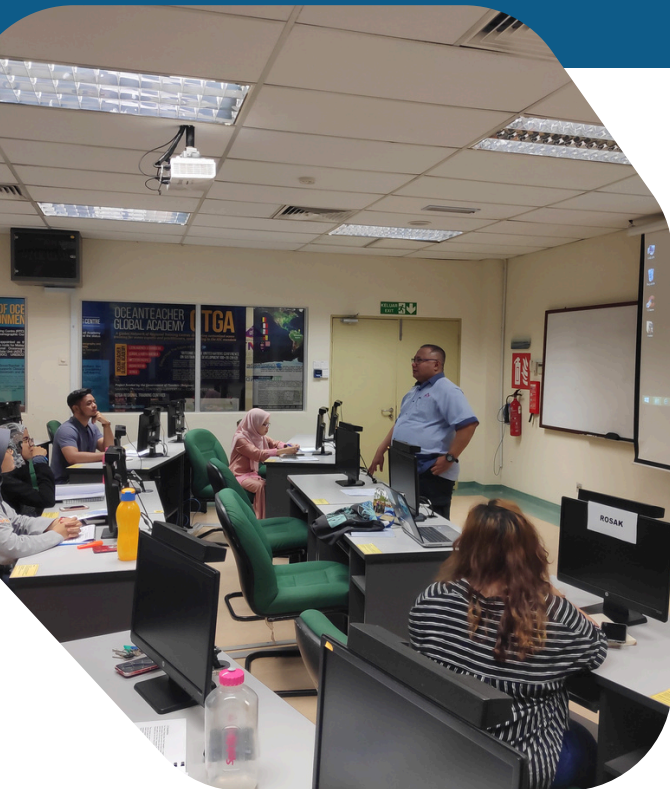
Join the global initiatives for MES through the China-ASEAN Maritime Cooperation Fund sponsored project "Monitoring and Conservation of the Coastal Ecosystem in the South China Sea" and the IOC/WESTPAC project "Regional Study of Marine Endangered Species (Mammals and Sea Turtles) in the Tropical Asia for Effective Conservation (MESTA)".

CURRENT PROJECTS

- Using Environmental DNA (eDNA) to assess the biodiversity of marine fish species as an indicator of the endangered dolphin habitat in Matang estuarine and coastal waters, Perak.
- Stable Isotope Studies on Marine Mammals, Sea Turtles, and It's Preys in the Bay of Brunei and Matang Waters, Perak.
- Exploratory Acoustic Research for Irrawaddy dolphin (Orcaella brevirostris) and Indo-Pacific humpback dolphin (Sousa chinensis) in Cowie Bay, Malaysia.
- Assessment of the Distribution, Abundance, and Ecological Changes of Small Cetaceans through eDNA Analysis in the Straits of Malacca.

OUR TEAM

- **Assoc. Prof. Dr. Saifullah Arifin Bin Jaaman @ Sharman (UMT - Head of MES Program)**
- **Assoc. Prof. Dr. Uzair Bin Rusli (UMT)**
- **Assoc. Prof. Dr. Maizah Binti Mohd Abdullah (UMT)**
- **Dr. Siti Tafzilmeriam Binti Sheikh Abdul Kadir (UMT)**
- **Prof. Dr. Zhang Xuelei (FIO, China)**
- **Prof. Dr. Zulqarnain Bin Mohamed (UM)**
- **Prof. Madya Dr. Yusmin Binti Mohd Yusuf (UM)**
- **Dr. Song Sze Looi (UM)**
- **Assoc. Prof. Dr. Juanita Joseph (UMS)**
- **Dr. Hairul Masrini Binti Muhammad (UMS)**
- **Dr. Leela Rajamani A/P Ramnath Rajamani (USM)**
- **Muhammad Amirul Siddiq Bin Abd Rashid (DOF-FRIRA)**

MANGROVE RESEARCH UNIT

Research Group

Promote sustainable conservation and management of the mangrove ecosystems in Malaysia through innovative research. It stands at the forefront of pioneering studies in mangrove social-ecological systems to bring science and society together for a better policy.

OUR FOCUS

The esteemed MARU group of scientists are focusing on –

- floristic and faunastic surveillance
- environmental and land-use/cover changes
- above and belowground carbon
- remote sensing (satellite & drone) data
- stakeholder discourses
- community-based habitat restoration
- extreme weather and climate change impacts
- knowledge transfer and capacity building
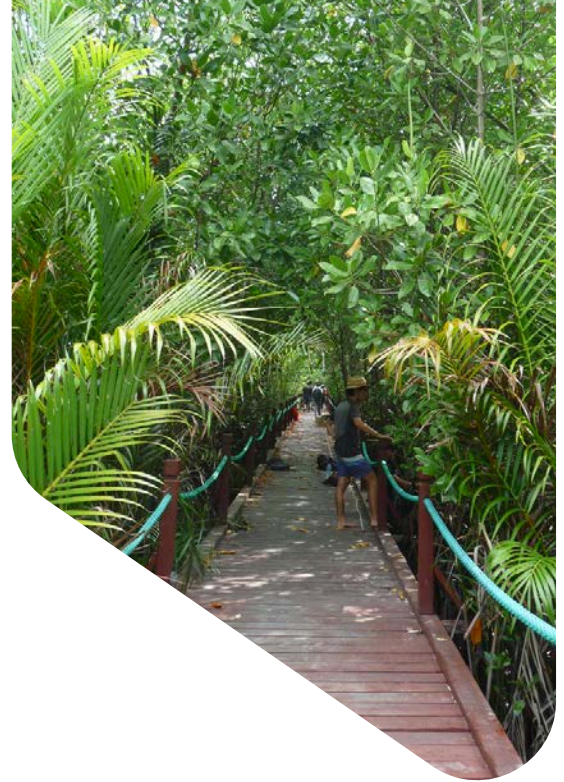
OUR ACHIEVEMENTS

The accomplishments of MARU have been recognised through several cutting-edge findings, National and International collaborations and research grants. Some success stories are -

1. First of its kind research in mangroves:
    a. Carbon stock analysis from 10 m deep soil cores. The results showed up to 100 mC ha-1 even at 10 m depth. Deep coring revealed five times higher carbon stock than previous estimates.
    b. Shifts in the historical management of Matang Mangrove Forest Reserve (MMFR) (1902-2019) were reviewed from a series of successive 10-year working plans and offered recommendations for future.
    c. The vegetation growth of Rhizophora forest - meant for poles and charcoal production based on 30-year forest rotation at the MMFR - was found to be sustainable from the silvicultural point of view.
2. Holds the record of collecting mangrove tree structural measurements for more than 20 years from various states in Peninsular Malaysia as well as Sabah and Sarawak.

OUR IMPACT

With great perseverance over 25 years, MARU has a strong hold in mangrove research for Malaysia and now emerging as a potential partner to the global universities. Our novel observations are of great scientific interest and helpful to the local, regional and national level governance of the mangrove ecosystems. The involvement in IUCN Mangrove Specialist Group is an added value to the MARU's reputation.

OUR NETWORK

International:
• University Libre Brussels, Belgium
• Vrije Universiteit Brussel, Belgium
• University of Ruhuna, Sri Lanka
• University of Florence, Italy
• The University of Hong Kong, Hong Kong
• Aberystwyth University, UK
• Nanyang Technological University, Singapore
• Adikavi Nannaya University, India
• King Mongkut's University of Technology Thonburi, Thailand

National:
• Forestry Department of Peninsular Malaysia, Malaysia
• Universiti Putra Malaysia, Malaysia
• Universiti Kebangsaan Malaysia, Malaysia
• Majlis Pengurusan Taman Negeri Terengganu

CURRENT PROJECTS

- Evaluating the impact of hydrographical and sedimentological changes on livelihood supporting core mangroves at Setiu Wetlands (Terengganu) due to shifted river mouth (RM 143,000) (Sep 2022 – Aug 2025)
- The relation of coastal-mangrove changes and adjacent land-use as erosion protection (RM 60,000) (Aug 2023 - Jul 2025)
- Understanding impacts of encroachment towards food security drivers by using information processed meiobenthos population dynamics (RM 165,000) (Oct 2023 - Sep 2025)
- Monitoring and Optimizing The Design Quality Of Mangrove Restoration Towards Sustainable Coastal Ecosystem Management In The Asean Region (RESCuE-2) (RM 95,050) (Jun 2023 – May 2026)
- Biodiversity assessment of mangroves at Sungai Pulai (Johor) in relation to (un)disturbed environmental settings (RM 96,000) (Jan 2024 – Dec 2026)

OUR TEAM

- **Assoc. Prof. Dr. Behara Satyanarayana**
- **Prof. Dr. Mohd Fadzil Bin Mohd Akhir**
- **Assoc. Prof. Dr. Izwandy Bin Idris**
- **Assoc. Prof. Dr. Ong Meng Chuan**
- **Assoc. Prof. Dr. Maizah Mohd Abdullah**
- **Assoc. Prof. Dr. Yusof Shuaib Bin Ibrahim**
- **Assoc. Prof. Dr. Fatin Izzati Minhat**
- **Dr. Siti Mariam Muhammad Nor**
- **Dr. Nursalwa Baharuddin**
- **Dr. Wan Nurzalia Wan Saelan**
- **Dr. Siti Tafzilmeriam Binti Sheikh Abdul Kadir**
- **Mohd Rodila Bin Ibrahim**

CENTRE FOR OCEAN GOVERNANCE

Develop excellence in transdisciplinary research and networking through Science-Policy Nexus for innovative and integrated Ocean Governance.

OUR FOCUS

- Strengthen partnerships with government agencies, private sectors & NGOs in promoting integrated and resilient ocean governance
- Promote ecosystem-based approach in marine resource management through sustainable ocean economy (Blue Economy)
- Enhance capacity building via Research & Training, Education & Awareness, and Knowledge Transfer on the sustainable use of the ocean and its resources

OUR ACHIEVEMENTS

International Representation:
• Serves as commission member to the IUCN World Commission on Environmental Law since 2014 (sub-specialising in Ocean, Coastal, and Coral Reefs Specialist Group, and Water and Wetlands Specialist Group)
• Represents Malaysia to UNEP COBSEA Expert Group on Marine Litter Monitoring via appointment from the Ministry of Natural Resources, Environment and Climate Change (NRECC).
Advisory Roles:
Biodiversity beyond National Jurisdiction (BBNJ)
• Department of Maritime Affairs of the Ministry of Foreign Affairs, for the negotiation on matters relating to) at the UN,
Marine Spatial Planning
• Working with Kuala Terengganu City Council, Terengganu State Government, Xiamen University China and PLANMalaysia on the drafting, adoption and implementation of the Terengganu Marine Spatial Planning
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OUR IMPACT

Bridging the Science and Policy for Informed Decision and Policy Making

Translating Ocean Knowledge and Technology for National Interests

Enhancing Ocean Literacy through Public Advocacy and Capacity Building

OUR NETWORK

COG's networks are at local, national and international levels including MBKT, Terengganu State Government, National Security Council, Royal Malaysian Navy, Department of Fisheries, PLANMalaysia, Ministry of Foreign Affairs, Ministry of Natural Resources and Environmental Sustainability, NAHRIM, WWF-Malaysia, MIMA, UNEP-COBSEA, IUCN World Commission on Environmental Law, Economic Research Institute for ASEAN and East Asia (ERIA), China Oceanic Development Foundation, Xiamen University China, IPB University Indonesia, and ANCORS of University of Wollongong and University of New England, Australia

CURRENT PROJECTS

- Capacity Building of Local Communities And Service Providers In Responsible Waste Management and Community-led Tourism Practices – UNDP-MBKT/2022-24
- Country Data Collection, Policy Analysis and Stakeholders Network Support phase 22– ERIA/2023-24
- Kajian Penilaian Sosio-ekonomi Nelayan di Selat Johor – DOFN/2024
- Synergizing Science-to-Action through Evidence-based Decision Making via Marine Spatial Planning, Integrated Marine Data Management, and Well Regulated Marine Scientific Research – HICoE/2023-25
- Elucidating the Vertical Coral Reef Zonation via Assessment of Hard Coral Community For Ecological Zoning of the Marine Park, Malaysia, Marine Protected Area Blueprint (Phase 2) – DOFM/2024
- Kajian Impak Tukun Tiruan terhadap Sosioekonomi Tempatan: Pantai Timur – DOFM/2024
- Kajian Risiko Rasuah dalam Sektor Perikanan – SPRM/2023-24
- Kajian Baseline Ancaman Aktiviti Rekreasi Kepada Taman Laut

OUR TEAM

- **Prof. Dr. Wan Izatul Asma binti Wan Talaat**
- **Dr. Abdul Rahman bin Abdul Latip**
- **Prof. Madya Dr. Nazli bin Aziz**
- **Dr. Mohd Safuan Che Din**
- **Dr. Afiq Durrani bin Mohd Fahmi**
- **Dr Khaira binti Ismail**
- **Prof. Madya Dr. Tuan Nurul Sabiqah binti Tuan Anuar**
- **Prof. Madya Dr. Hayatul Safrah binti Salleh**
- **Prof. Madya Dr Rumeaida binti Mat Piah**
- **Dr Zikri bin Mohamad**

SEA TURTLE RESEARCH UNIT

Research Group

Sea Turtle Research Unit (SEATRU) is dedicated to the conservation biology of sea turtles. Our mission is to be a beacon of knowledge in sea turtle conservation . Through translational, multidisciplinary research, we aim to deliver community benefits and enhance stakeholder involvement in sea turtle conservation.

OUR FOCUS

Our efforts are centred on three foundational pillars:

- **Science:** We endeavour to pursue excellence in our interdisciplinary, collaborative, and action-oriented research.
- **Conservation:** We engage deeply in complex, often controversial issues involving endangered sea turtles. We are evidence-based, transparent and nonpartisan.
- **Community:** We advocate educating the public to be aware of the ethical management in conserving our natural heritage towards sustainable economic growth.

OUR ACHIEVEMENTS

- As one of the oldest research groups at UMT since 1984, this group has produced numerous conservation talents within the country and has received various prestigious recognitions. These accolades include the UNEP Global 500 Roll of Honour (2001), UNEP's Who's Who of Women and the Environment (2006), and the prestigious ISTS International Sea Turtle Society Lifetime Achievement Award (2019).
- Introduced the sea turtle volunteer program in 1998 at Chagar Hutang Beach, which has become a cornerstone of financial and human resources strength, joined by over 5,000 individuals.
- Since 1996, the annual Turtle Camp program has been conducted, specifically aimed at shifting the psychographics of the children of Redang Island from consuming turtle eggs to protecting turtles.
- Since 2018, we have been exploring the concept of 'scientific tourism' in collaboration with Berjaya Hotels and Resorts through the establishment of 'The First Public Viewing Lab in Malaysia' at The Taaras Beach and Spa Resort in Redang.

OUR IMPACT

Successfully concluded the campaign to halt the commercial sale of turtle eggs in open markets following the amendment of the Terengganu Turtle Enactment 1984 (Amendment 2022), through the STOP program in close collaboration with the Department of Fisheries Malaysia.

Sustaining the conservation project at Chagar Hutang Turtle Sanctuary since 1993, which has become a field research station that provides opportunities for numerous researchers from various disciplines to conduct studies and training.

Opened up tourism product opportunities to the Redang Island Boat Operators Association through the 'Outdoor Classroom' project, which has become a must-visit destination for tourists to Redang Island. This special space was constructed in collaboration with the Kuala Terengganu Rover Scouts.

OUR NETWORK

- Berjaya Hotels & Resort (Taaras Turtle Lab)
- Laguna Redang Resort (Marine Awareness Program)
- Jabatan Pendidikan Negeri (Ocean Literasy)
- Excell Team Resources (Run with PENYU)
- Petronas Kertih Port (Blue School Project)
- RHB Islamic Bank (Ocean HOPE)
- Pusat Pemulihan Dalam Komuniti-PPDK Wakaf Tapai (BATIKITA)
- MISC Marine (Heart of the Ocean)
- Yayasan Bank Rakyat (Conservation Training Module)
- Aquaria KLCC (Angsana Turtle Lab)
- Fisheries Research Institute Rantau Abang
- National Museum of Marine Biology and Aquarium, Taiwan
- International Sea Turtle Society

CURRENT PROJECTS

- In scientific work, we concentrate on the energetics of sea turtle hatchlings during their nest escaping process, and how this energy consumption may affect the hatchling's performance to swim in the open sea. This study now entered the new niche area by incorporating animal energetics data into simulation modelling software to predict oceanic dispersal of our hatchlings.

- In addition, we are also working in understanding how prey-predator relationship at our sea turtle research station, enabling better conservation practices. In the field we utilise remote sensing technology (acoustic and satellite telemetry, archival tags) to investigate the movement patterns and behaviours of predatory animals such monitor lizards and black tip reef shark.

OUR TEAM

- **Assoc. Prof. Dr Mohd Uzair Rusli (Lead Marine Wildlife Conservation)**
- **Dr Faizah Aplop (Lead Turtle Digital)**
- **Dr Ummu 'Atiqah Mohd Roslan (Turtle Math)**
- **Dr. Kalsitinoor Set (Turtle Tourism)**
- **Assoc. Prof. Dr. Azizul Yadi Yaakop (Conservation Marketing)**
- **Syamsyahidah Samsol (Turtle Health)**
- **Mustaqim Rosdan (SEATRU ADD Lab)**
- **Emilia Md Noor (SEATRU Tech Startup)**
- **Nasyrul Adly Afandy (SEATRU Data Centre)**
- **Aziz Mustafa (Lead Turtle Ranger)**

REMOTE SENSING & MARINE INFORMATICS

Research Group

Conduct research in the fields of remote sensing, geospatial science and their applications: in developing new methodologies of digital image processing and spatial data analysis primarily for mapping organisms occurring in the marine environment, and in the development of satellite and UAV-based Integrated Coastal Management Systems for Sustainable Development.

OUR FOCUS

Using remote sensing data and methods to study coastal wetland ecosystems, including coral reefs, seagrass beds, estuaries, and mangroves; developing numerical models for predicting impact of sea level rise, and mapping coastal habitats.

OUR ACHIEVEMENTS

The research team has developed robust image processing methods, including rulebased classification, pixel- and object-based classification, sub-pixel analysis, ensemble classifiers suitable for mapping coastal communities in complex marine environments.

Methods developed by this team is now adopted by different stakeholders including marine park, coastal zone management agencies in Malaysia.
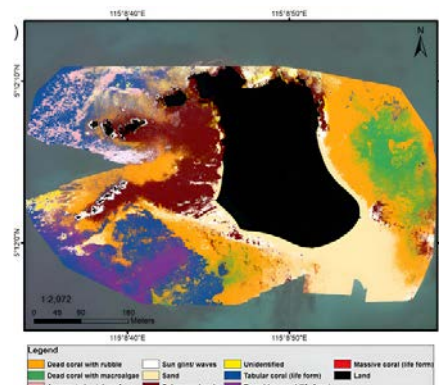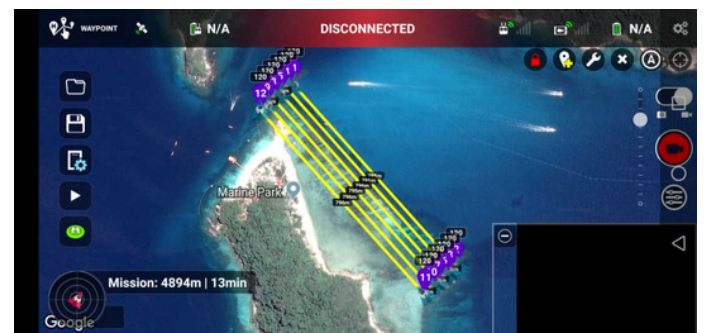
OUR IMPACT

The lab is dedicated to providing access to remote sensing data and analytical techniques necessary for comprehending coastal dynamics along Malaysia's coastal areas, hence serving the remote sensing community, coastal zone managers, and society at large. In the areas of multispectral and UAV remote sensing, coastal resource inventory, ecological impact assessment, and coastal zone ultrahigh resolution remote sensing, significant progress has been accomplished at both national and international for developing impactful remote sensing methods through join collaborations.

OUR NETWORK

- Intergovernmental Oceanographic Commission of UNESCO (IOC/UNESCO)
- Asia-Pacific Network (APN)
- Government agencies
- National Research and Innovation Agency (BRIN Indonesia),
- National Marine Data and Information Services-China (NMDIS)
- Asia-Ocenia GEO (AOGEO)
- Yayasan Penyelidikan Antartika Sultan Mizan (YPSM)
- Malaysian Space Agency (MYSA)

CURRENT PROJECTS

- Enhancing coastal risk reduction science and practice by considering climate, ecosystems and communities in the tropical region.
- Remote Sensing Big Data analytics for detailed geological mapping in exposed zones of dry valleys, South Victoria Land, Antarctica.
- Harnessing Earth Observation (EO) to Enhance Decision-Making for Eutrophication and Harmful Algal Bloom (EuHAB) Impact Mitigation and Adaption.
- Various Coastal Mapping projects in Terengganu, Kedah, Johor, Pahang and Perak.

OUR TEAM

- **Prof. Dr. Aidy @ Mohamed Shawal M Muslim**
- **Assoc Prof. Dr. Amin Beiranvand Pour**
- **Gs. Dr. Mohammad Shawkat Hossain**
- **Mr. Idham Khalil**
- **Gs. Muhammad Izuan Nadzri**
- **Gs. Nurul Hidayah Mat Zaki**
- **Mr. Mohd Azam Mat Yaacob**
- **Mr. Mohd Nasir Mohamad**

REPOSITORY & REFERENCE CENTRE

RRC is a main and the best reference and repository centre for marine collection in Malaysia to support the research and education in marine science.

OUR FOCUS

- To managing and preparing the marine natural history collection from Malaysian Waters for research, reference, exhibition and education

- To record the collection in the proper and accessible database using international standard cataloguing system

- To establish networking and linkages with other museums and education institutions

OUR ACHIEVEMENTS

- 100,000 registered specimens in the collection valued up to RM15.5 million

- Recognition by the Australian Governemnt for specimen exchange

- OBIS Node Malaysia - under UNESCO and IODE

- Recognition as the largest marine specimen collection in Malaysia by NRES

OUR IMPACT

- 90 types of specimens are currently under RRC care

- Publications - books, journal articles, visits by foreign researchers

- Postgraduate students - MSc, PhD students using specimens deposited at RRC (taxonomy projects)

- Undergraduate program - practical sessions

- UMT visibility in biodiversity research in particular marine - attachment, research visit, internships

OUR NETWORK

- Kagoshima University Museum, Japan

- Australian Museum, Sydney, Australia

- Lee Kong China Natural History Museum, Singapore

- MyMuse (Museums and Galleries of Malaysian Public Universities)

CURRENT PROJECTS

- Malaysia Biodiversity Information System (MyBIS)

- Ocean Biodiversity Information System (OBIS

- MAQIVE - Malaysia Aqua Archive

- Curatorial Volunteer Club: Citizen Science Ambassadors for Marine Natural History Resources

OUR TEAM

- **Assoc. Prof Dr Izwandy Idris**
- **Azwarina Azmi Mohd Ramasamy**
- **Ahmad Fakhrurrazi Mokhtar**
- **Noratikah Ab Manaf**

  Associate
- **Assoc. Prof Dr Seah Ying Giat**
- **Assoc. Prof Dr Muhammad Hafiz Borkhanuddin**
- **Dr Melissa Beata Martin**

MARINE POLLUTION & GEOCHEMISTRY

Research Group

MPG group is aimed towards understanding the fate and transport of different forms of inorganic and organic pollutants in coastal a

OUR FOCUS

- Study the sources, sinks and transformations of pollutants as well as physical transport mechanisms. In addition, our work also focuses on Planet Earth in terms of the internal and surface processes, mineral resources and paleoclimate reconstruction.
- The field-based data are combined with laboratory experiments and computational approaches to better understand the complex interactions of pollutants between different environmental compartments.

OUR ACHIEVEMENTS

- It is our intention to use the findings to improve our understanding of the marine environment, leading towards better environmental management and preservation in the future and implement policies necessary to protect associated stakeholders.

- Provide significant input on the current condition of pollution and ocean health in southern South China Sea region and marine pollution near coastal area

CURRENT PROJECTS

- To determine the spatial and temporal distribution of chemical compounds to fingerprint their origin based on their biomarker and isotope techniques.
- To assess fluxes of particles, biogeochemically important elements and representative contaminants from land sources through coastal zone.
- To study the toxicity of chemical pollutants on marine organisms and ecosystems.
- To study the paleoenvironmental changes based on the inorganic and organic proxies.
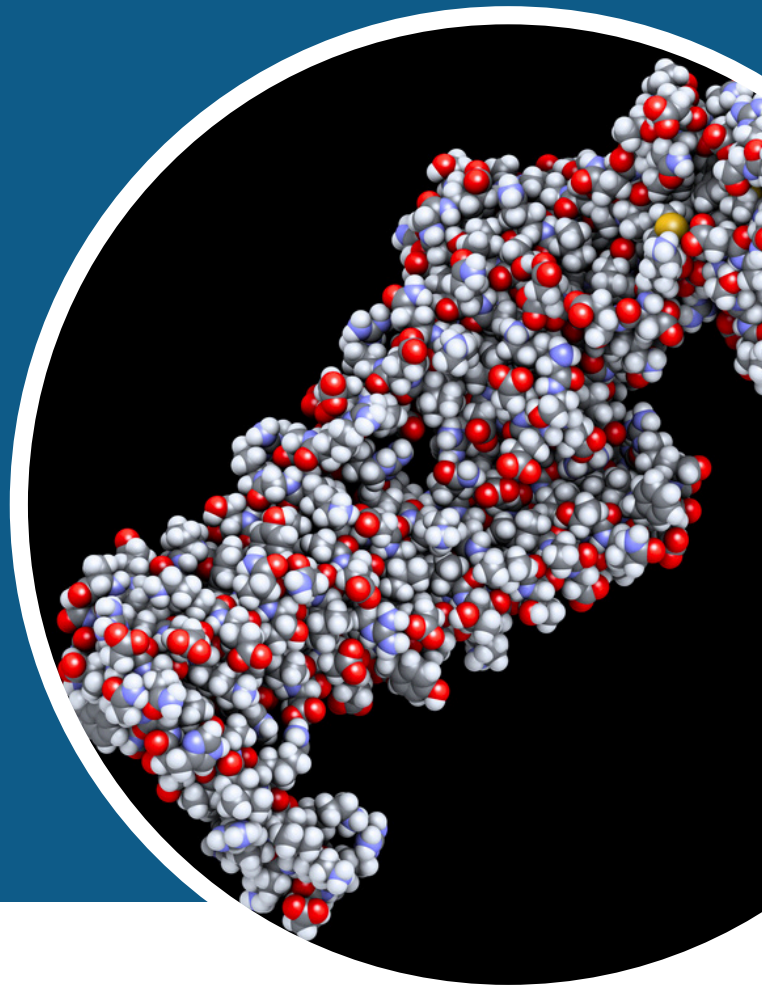
OUR TEAM

- **Prof. ChM. Dr. Suhaimi Suratman (INOS, UMT)**
- **Assoc. Prof. ChM. Dr. Ong Meng Chuan (FSSM, UMT)**
- **Assoc. Prof. ChM. Dr. Poh Seng Chee (FSSM, UMT)**
- **Assoc. Prof. Dr. Hasrizal Shaari (FSSM, UMT)**
- **Prof. Dr. Mohd Talib Latif (UKM)**
- **Assoc. Prof. Dr. Masni Mohd Ali (UKM)**

OCEAN MAPPING
Technical Unit

The Ocean Mapping Research Unit (OMRU) is dedicated to advancing the understanding of seafloor through cutting-edge research and innovative technologies.

OUR FOCUS

1. Bathymetric Mapping:

We specialize in high-resolution bathymetric mapping, utilizing advanced sonar systems, including multibeam and sidescan sonars.

2. Seabed Classification and Habitat Mapping:

OMRU is dedicated to the classification of seabed types and the mapping of benthic habitats. By analyzing acoustic backscatter data and integrating it

3. Subsea Infrastructure and Resource Exploration:

Our research supports the planning and management of subsea infrastructure, such as pipelines, cables, and offshore installations.

4. Oceanographic Studies and Data Integration:

OMRU integrates oceanographic data, such as currents, temperature, and salinity, with seafloor mapping results to study ocean dynamics.
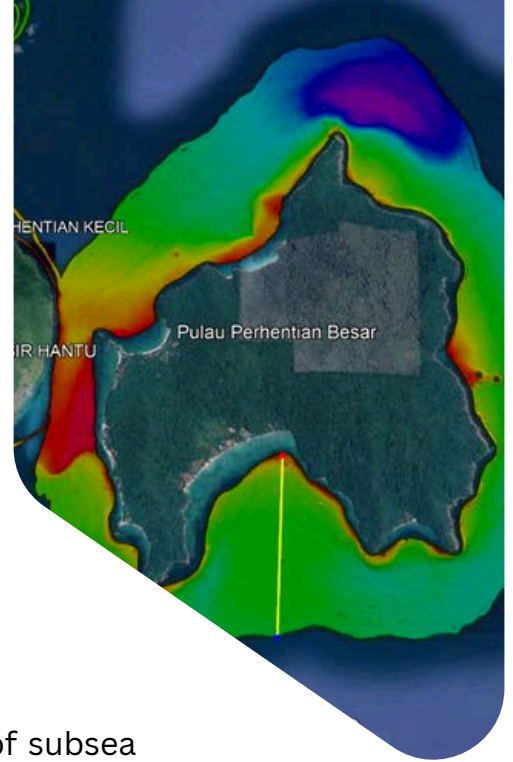
OUR ACHIEVEMENTS

- Conducted more than 100 survey projects

- Provide expertise to local and foreign researchers

- Provide expertise to the government and private sectors including oil and gas companies

- Has complete survey equipments such as multibeam system, side scan sonar, single beam and sub bottom system for seabed mapping work

MARINE PORTAL DATABASE

The Marine Portal Database is a centralized platform designed for the collection, storage, and management of marine data. It provides systematic access to diverse datasets, supporting research, analysis, and decision-making in marine science and conservation.

OUR FOCUS

- Ensure accessible and usable datasets for research and analysis.
- Support marine conservation efforts through organized data.
- Facilitate the storage and retrieval of diverse marine datasets.
- Maintain systematic and secure data management for scientific and environmental decision-making.

OUR ACHIEVEMENTS

- Accredited IODE Associate Data Unit
- Ocean Teacher Global Academy (OTGA) regional training centre in Ocean Data management

CURRENT PROJECTS

- DiLaut, development of real-time data platform for continuous long-term monitoring focusing on climate change impact

OUR TEAM

- **Prof Dr. Ts. Mohd Fadzil Mohd Akhir**
- **Prof. Gs. Ts. Dr. Aidy @ Mohamed Shawal bin M Muslim**
- **Gs. Nurul Hidayah binti Mat Zaki**
- **Mohd Nasir bin Mohamad**
- **Mohd Azam bin Mat Yaacob**
- **Che Mohd Kamarul Anuar bin Che Abdullah**

LABORATORY

INOS houses several specialized laboratories that is dedicated to oceanography research. We also provide educational, training, and research opportunities.

PHYSICAL OCEANOGRAPHY & HYDROGRAPHY LABORATORY

- Buoy monitoring
- Scientific cruise
- Physical ocean instrumentation
- Numerical modeling facilities and HPC

CHEMICAL OCEANOGRAPHY & MARINE POLLUTION LABORATORY

- Water Quality Analysis; services and assistance for chemical analysis and testing
- Chemistry Instrumentation
- MS ISO/IEC 17025 accredited laboratory

BIOLOGICAL OCEANOGRAPHY & BIODIVERSITY LABORATORY

- Biological Analysis Services (Phytoplankton, Zooplankton and Macrobenthos)

GEOLOGICAL OCEANOGRAPHY & NATURAL RESOURCES LABORATORY

- Rare earth elements
- Sediment Analysis

SATELLITE OCEANOGRAPHY & MARINE INFORMATICS LABORATORY

- Coastal Zone monitoring
- Marine Portal database
- GIS facility

SOUTH CHINA SEA REPOSITORY AND REFERENCE CENTRE (RRC)

- Repository and Research Hub
- Digital Resources and Archives
- Specimen Repository
- Preservation Services
- Research and Data Support
- Educational Services
- Consultation Services
- Conservation and Awareness Initiatives
- Collaborative Research and Partnerships

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