



## *Institute of* **OCEANOGRAPHY & ENVIRONMENT**



# *Ocean Future through* **MARINE SPATIAL PLANNING**

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### **Scaling up Coral Reef data**

Our team at INOS made a significant effort in updating the status of the coral reefs in Malaysia by developing our own standard operation procedure known as Coral Video Transect (CVT) technique.

### **Jellyfish Blooms along Terengganu**

February this year, the public was astounded when large quantities of small blue jellyfish were washed towards the shore of Terengganu. Our scientist provide a detail explanation

# VICE CHANCELLOR'S REMARK

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I am excited to see this e-newsletter from INOS. It is important to share our scientific findings to the wider audience.

Institute of Oceanography and Environment (INOS) as Higher Education Centre of Excellence (HICoE) has a great responsibility to ensure the success of the national agenda in Marine Science research-based knowledge. It is time for INOS to focus on high-impact research. Focus on the issue of oceanography, marine biodiversity, endangered marine mammals and marine governance must be strengthened, and research output that reflects the nation importance.

I recommend INOS to guide and develop the young talents of marine science researchers in this country. We need to raise the image of INOS to be seen as a national-class marine research institutions and leading the regional research in the South China Sea.

**Nor Aieni Mokhtar**

VICE CHANCELLOR, UMT



## Editorial

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# OCEAN FUTURE THROUGH MARINE SPATIAL PLANNING

By Wan Izatul Asma

Marine Spatial Planning (MSP) is a process that brings together multiple users of the ocean to make informed and coordinated decisions about how to sustainably use marine resources, spatially and temporally.



Through planning and mapping process of a marine ecosystem, the cumulative effect of maritime industries on our seas are measured to proactively minimize conflicts between industries in the same sea area by proper zoning. The MSP process should result in a spatial vision and a comprehensive management plan for a marine area.

INOS has been working with WWF-Malaysia and Terengganu State Government to introduce MSP in the coastal and marine areas of Terengganu beginning the year 2016. As a federated state in the Peninsular Malaysia subjected to jurisdictional boundaries due to division of powers jurisdictions under the Federal Constitution, realising the complication in coastal and marine spatial planning, INOS was first commissioned by WWF-Malaysia to study the potential of implementing MSP in Terengganu in 2017

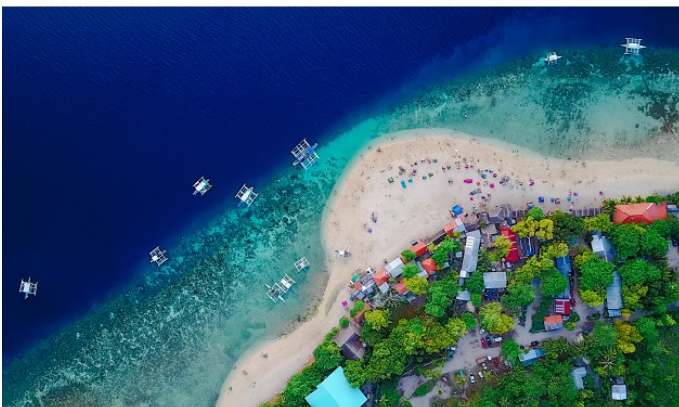
## HOW TO MAKE 'MSP' WORKS IN MALAYSIA?

Through meticulous step-by-step consultative process, MSP would be able to assist decision makers in managing the marine space in a more sustainable manner through proper considerations of multiple users and zoning.

Collaborative works were made with PLANMalaysia as the main government agencies for spatial planning that has functions at all the three levels of government – federal, state and local governments, which may be the best solution to materialise the proposed plan to implement MSP.

INOS has conducted two series of workshops to train stakeholders on MSP and its step-by-step process Terengganu, and to come up with the Development Master Plan for the islands.

MSP was utilised to make recommendations to the State Government. The adoption of the recommendations based on MSP is manifested from the decision made to designate Tenggol Island as a State Park, which would accord double protection on the pristine marine ecosystem of the island.



# JELLYFISH BLOOM ALONG TERENGGANU BEACH

by Azwarina Mohd Azmi Ramasamy

In early February this year, the public was astounded when large quantities of small blue jellyfish were washed towards the shore near Pantai Kekabu, Marang. These marine organisms known as Portuguese Man-of-War (Physalia physalis), Bluebottle, and locally known as Obor-obor Api (fire jellyfish), are non-native species to the area.

Those unfamiliar with the biological characteristics of these venomous animal would likely mistake it for a common jellyfish. Portuguese Man-of-War is a siphonophore, an animal made up of a colony of four kinds of highly modified individuals (zooids) working together and dependent on one another for survival. The tentacles contain stinging nematocysts, microscopic capsules loaded with coiled, barbed tubes that deliver venom capable of paralyzing and killing small fish and crustaceans. While the sting is seldom deadly to human, it packs a painful punch and causes welts on exposed skin.

Since the 1990s, scientists have forecasted the increased frequency and intensity of jellyfish blooms because of climate change, over-fishing, coastal eutrophication and other stressors.

Several samples of these rare jellyfish were sent to the South China Sea Repository and Reference Centre (SCSRRC) at INOS to be documented and analysed. While this species is more common in marine waters in the Indian, Pacific, and the biggest size is found in the Atlantic Ocean, we believe that they were washed onto our shores by strong north-eastern winds during the last monsoon season.

Acknowledgement: We would like to thank Kapten Abdullah and his team from Malaysia Civil Defence Force (APM) for sending the jellyfish samples to RRC.





## LABORATORY

### SCANNING ELECTRON MICROSCOPE FACILITY

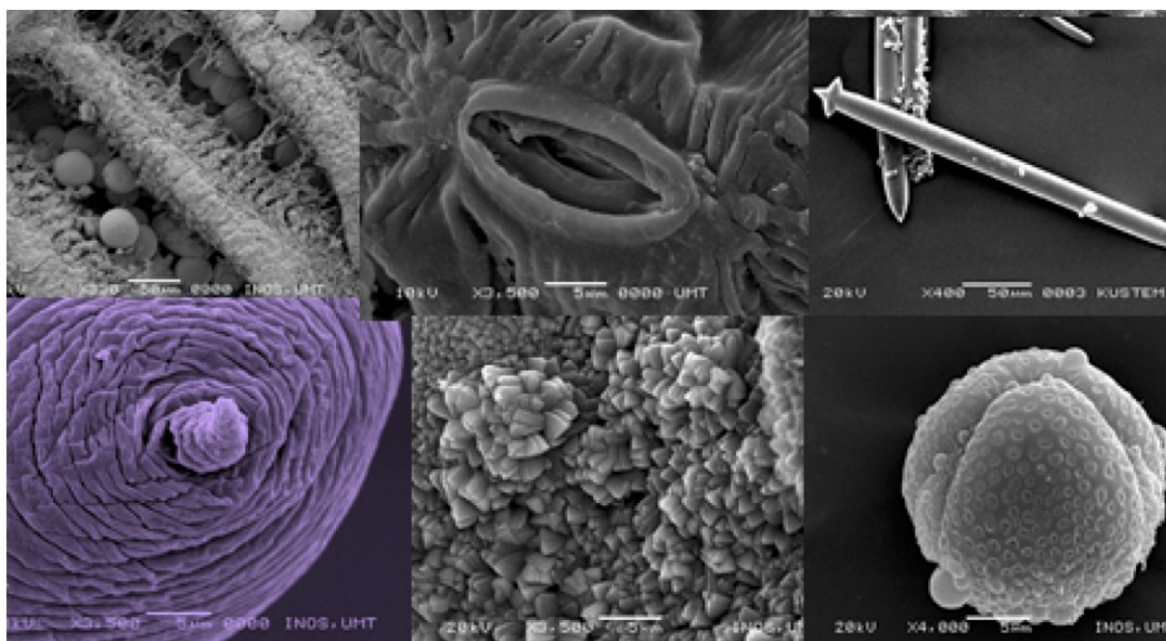
Scanning Electron Microscopy (SEM) is a beam of electrons that go through to detect the surface of a cell, tissue and any sample creating a detailed image of a 3D surface. It can achieve an optimum magnification of more than 100,000 times with high resolution, thus allowing viewing of fine ultrastructure. SEM also can be used to analyse the elements of a sample.

# 20,000

*samples and counting*

# 100,000×

*magnification*



INOS's Electron Microscopy Unit was established in 2004 with two main facilities - EM Operation Lab and EM Biological/MaterialPreparation Lab. INOS EM Unit is equipped with a unit of JEOL Analytical Scanning Electron Microscope (SEM) Model 6360 LA, a preparation equipment including Auto Fine Coater and Vacuum Evaporator which were procured in 2003 at RM1 million. We have the capabilities to analyse more than 2,000 samples with over 200 registered users per year.

Since 2004, more than 100,000 electron micrographs have been taken from over 20,000 samples.

INOS SEM Unit also provides services and in-depth practical training in sample preparation, microscopy and microanalysis from basic to advanced levels for UMT researchers, other universities and private agencies. We also facilitate researchers from multiple fields to carry out their research through our equipment, as well as through our microscopy services.

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# SCALING UP CORAL REEF DATA IN SOUTH CHINA SEA

## ***USING 'CORAL VIDEO TRANSECT' TECHNIQUE DEVELOPED BY OUR RESEARCHERS***

*by Zainuddin Bachok*

South China Sea (SCS) is known as part of global biodiversity centre for marine organism especially coral reefs, which provide a number of ecosystem services, such as food from small-scale fisheries, income from tourism and shoreline protection against wave and erosion. However, recent report has estimated that the remaining coral reefs are currently being threatened, and many have already been lost, due to impacts of natural and anthropogenic factors.

A baseline serves as a guide for setting conservation and restoration of coral reefs. Unfortunately, scientists rarely have reliable information on baselines, because in most cases quantitative data are not collected until long after the resource has been altered. While some information is available from previous surveys, there are other reefs in Malaysia requiring further attention as no current data is available and some sites are without any data.

Our team at INOS made a significant effort in updating the status of the coral reefs in Malaysia for the recent years. These are needed to provide comprehensive information on the coral distribution and for better understanding of reef ecosystem condition in the region. Our comprehensive work were carried out at fringing reefs at around 15 islands throughout South China Sea.

We developed our own standard operation procedure known as Coral Video Transect (CVT) technique for reef sites survey. The images were then analysed by utilising software to quantify the percentage of benthic components at the reef ecosystem. Our data thus far has proven to provide a very important overview of the current reefs condition regionally.

These baseline data are essential and critical. It is particularly necessary to conserve and protect all life forms from facing various ecosystem threats. Only through solid and sound science, rational planning, and sturdy monitoring can strategic policies be developed, and INOS has always been committed towards providing the best for the national interest.





## POSTGRADUATE ADVENTURE

# BECOMING OCEAN MODELER

Special training at Ocean Institute, University of Western Australia

By Kok Poh Heng

Ocean modelling provides an easier approach to understand the state of the ocean by using a computer. It is the most powerful tool for oceanographers. Last year I was given an opportunity to work with researchers at the University of Western Australia for three months to learn more about ocean modelling, as a part of my doctoral studies.

Ocean modelling is a method providing the most effective ways in producing mass information about our oceans. For instance, it provides information not only the current sea condition, but also information on the past and future. These potential benefits allow researchers to explore scientific questions that could not be answered by field measurement.

During my stay at UWA, I was given the opportunity to work on the most advanced high-performance computer in the Southern Hemisphere, the 'Magnus Supercomputer' in Pawsey Super Computing Centre facility. We managed to simulate 18 years data on the South China Sea marine space (from 2000- 2018), which includes various parameters such as temperature, salinity, ocean current and sea surface height.

Special thanks to Dr. Sarath Wijeratne and Prof. Charitha Pattiaratchi, and my supervisor Assoc. Prof. Dr. Mohd Fadzil Akhir for making this journey possible. I hope that the model outputs can be used by other researchers to uncover the knowledge of the sea in our region that largely remains unknown.



## INTERNATIONALIZATION



**103** overall students  
since 2014

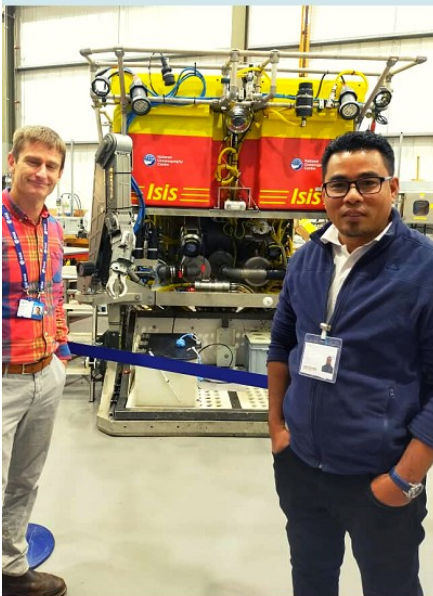
**36** no. of countries,  
they from

### INOS REMAINS AS THE BEST CHOICE TO THE TROPIMUNDO STUDENTS

by Behara Satyanarayana

We have successfully entered into the sixth year of receiving international students from various parts of the world under the Erasmus Mundus Master in Tropical Biodiversity and Ecosystems programme (TROPIMUNDO). The current TROPIMUNDO cohort comprises of 18 students from 14 countries altogether.

Among the courses offered this year are Tropical Oceanography, Remote Sensing and GIS, Conservation of Marine Endangered Species, Estuarine and Mangrove Ecology, Lake and Terrestrial Ecology and Mangrove Field School. UMT remains as the top choice among the TROPIMUNDO students because of the diversity of the courses and the various expertise available.



### OCEAN MAPPING PARTNERSHIP IN THE UK

by Azizi Ali

A great opportunity was provided by the National Oceanography Center, Southampton, UK, one of the leading oceanography institutions in the world. This started when UMT signed a memorandum of understanding (MoU) with NOC at the end of 2019. This partnership has allowed both institutions to work closely together in many areas of research.

Dr. Azizi Ali and Mr. Roslan's attachment in NOC is part of the ACCORD (Addressing Challenges of Coastal Communities through Ocean Research for Developing Economies) project. Through the collaboration with Dr. Tim Le Bas and Dr. James Strong, the work includes seabed surveying skills, marine habitat mapping and ocean glider management. This collaboration is very valuable and in line with our development strategy that was set under the ocean mapping research group.



# DIRECTOR'S NOTE

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I am pleased to present to you the first INOS e-newsletter edition. It reflects our strong commitment in oceanography research activities, joint forces with our committed team and partners around the world in driving the success of our scientific endeavours. In this inaugural edition, we will share some of our interesting scientific findings and brief stories of our research journey.

People now depends on the oceans more than before. However, issues like climate change, marine pollution, ocean acidification etc. have collectively and gradually degrading our marine and coastal environment. As the leading national institution in marine science, INOS must excel at quickly adapting to this challenging time, and produce notable research outputs to meet the pressing needs of the country. These will be fulfilled through our commitment in research, teaching and services.

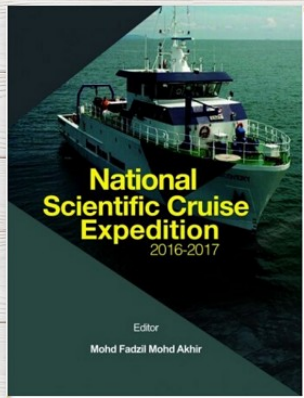
We understand that this will be a very difficult year but I am confident that we will brave through this together and come out even stronger.

On behalf of INOS family, I would like to take this opportunity to express our heartfelt thanks and gratitude to all the frontliners in fighting the Covid-19 pandemic. You are indeed our national heroes.

**Mohd Fadzil Akhir**

DIRECTOR





## INOS NEW BOOK

### NATIONAL SCIENTIFIC CRUISE EXPEDITION 2016/17

EDITOR  
MOHD FADZIL AKHIR

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WEBSITE

## JOURNAL HIGHLIGHT

### *Tropical storm Pabuk damage on the reef of Pulau Bidong*

by Nurhidayah Roseli

Malaysia may be safe from any tropical cyclone due to its location near the equator, but the Tropical Storm Pabuk that hit South China Sea in January 2019 sent a huge message, that our region is still vulnerable to such disaster.

Upon receiving the news, our researchers went to the island to conduct survey. We manage to examine the physical changes to the coral reefs in Pulau Bidong with our previous data (August 2016) after the event (March 2019).

Physical data was obtained from 5-days Ocean Forecasting System (OFS) model outputs provided by our collaborator, the First Institute of Oceanography, China. From the model result, Pabuk storm brought strong winds (50mph) to the region and created strong currents (1m/s) as well as large significant wave heights (4m). The physical disturbances due to this storm were stronger than usual and had resulted in huge damage to the coral reef.

The live coral cover was significantly reduced, while the dead coral cover increased. Corals at shallower 3-metres depth were the most affected as compared to the corals at 8-metres depth.

More than 60% reduction of live coral cover was identified in 3-metres depth transects and up to 30% reduction was observed in 8-metres depth transects. This could have happened when strong waves moved toward the shallow areas and breaks, the concussion force from the breaking waves increases the mechanical force thereby causing the corals to break and die from abrasion by suspended particulate materials.

Our findings highlight a very important impact of tropical cyclones, which are previously uncommon in the region. With the increasing trend of sea temperature due to global warming, we would probably see more tropical cyclones developed in our region in the future. Thus, continuous report regarding corals health status and an improved ocean forecasting model would be a great support for the nation to face calamities, as well as data gaps in the future.

Cite the paper::

Safuan, C. D. M., Roseli, N. H., Bachok, Z., Akhir, M. F., Xia, C., & Qiao, F. (2020). First record of tropical storm (Pabuk-January 2019) damage on shallow water reef in Pulau Bidong, South of South China Sea. *Regional Studies in Marine Science*, 101216.





# Our Team

*Meet the dedicated team members of our institute*



A big group of people involves a lot of effort, oftentimes from different people. To have a successful group, people rely on a well-crafted partners and team player to ensure objectives are met on time and perfectly executed. INOS is consist of dedicated and well-trained personell that give their best for the best of the institute and university

Follow us: <https://www.facebook.com/inosumt/>

Website: <http://inos.umt.edu.my/?lang=en>

# Dear Researcher,

## HOW TO WORK FROM HOME, IF YOU'VE NEVER DONE IT BEFORE



### PREPARE A SCHEDULE AND STICK WITH IT

Start out by sticking to the same schedule, as if you actually go to work at the office.

Try to get up at the same time, and do all the things you would typically do to get ready for work.

### DRAW A BOUNDARIES

Pick a spot for your office. It doesn't have to have a door, but it should be away from distraction.

If kids are at home, they can work alongside their parents as if they were coming to the office with you. Give them assignments.



### TIME YOUR BREAK

Doing work in a long stretch are usually not productive, especially at home. Schedule your break for coffee or a short browsing on the internet.

Be back on your desk after 10-15 minutes. Discipline is key.

### DO NOT ISOLATE YOURSELF

Some of you will suffer from isolation. Proactively staying in touch with colleagues that could mean emailing, video conferencing/ calling, or picking up the phone.

Perhaps you can play nice music at the background, so you don't feel alone



JIBRAIL SAID, "INFORM ME ABOUT *IHSAN*." RASULULLAH ANSWERED, "IT IS THAT YOU SHOULD PERFORM YOUR DUTY AS THOUGH YOU COULD SEE HIM (ALLAH), FOR THOUGH YOU CANNOT SEE HIM YET HE SEES YOU."  
[MUSLIM]



### STOP, WHEN IT'S TIME

At 5pm, you better stop working. This is crucial because you're already being challenged in terms of your personal resources.

Recovery time from works is the key to maintain your productivity



### SUBMIT YOUR MANUSCRIPT NOW

1/3 of the world is in lockdown. This means editors, reviewers and authors have more time to do their publication duties.

This is the best time to submit your manuscript. If you don't do it now, you will miss out, because millions of others are on it.



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\*Adapted from: Jen A. Miller(2020) How to Work From Home, If You've Never Done It Before. Instead