

INOS

INSTITUTE OF OCEANOGRAPHY
& ENVIRONMENT

OCEAN CELEBRATIONS

OCEAN DECADE

WORLD OCEAN WEEK

ICONIC 'ANIMOJI' FOR OCEAN LITERACY

REEF RESTORATION

Research focuses on the coral restoration involving coral transplanting to speed up the recovery process of a lost reef

MANGROVE HORSESHOE CRAB

Scientific explanation for mangrove species range shift towards the East and West coasts of Malay Peninsula



EDITORIAL

The Year 2021 is unique for all of us. This year marked the beginning of United Nation Decade of Ocean Science 2021-2030 that will provide a common framework to ensure that ocean science can fully support countries' actions to manage the Oceans sustainably.

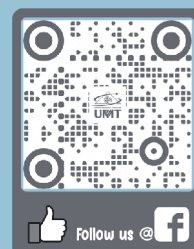
As an oceanography institution, we need to strategize our effort to fulfill our responsibility and to make sure the vision of the decade can be realized. Our mission is to provide the best research in answering global and local issues by involving all stakeholders through the process.

In this issue, we highlight our way of celebrating the ocean by conducting various activities that involve various stakeholders, involving school children, the community, industry, and researchers.

MORE ARTICLES:

Reef Conservation and Restoration Towards Sustainable Ecosystem - 5

Science Writing Workshop | Museum Collections and Their Importance Towards Citizen Science - 7



AN ELEGANT 'WORLD OCEAN WEEK' ONLINE CELEBRATION

Jun is always special for us in INOS. June 8 is the date of World Oceans Day and UMT has made the World Oceans Day celebration an annual university event since 2013, and part of our tradition is the celebration at UMT which is known as WOW (World Oceans Week).

This year program is very different because every thing will be conducted online. And surprisingly, a local activity has turn into international program. We engaged with more than 2000 students and communities throughout Malaysia including from the UK, Australia, Indonesia, Brunei, and Indonesia. These participants have acquired a variety of knowledge related to the ocean and it is presented in a way that is quite unique, different and very entertaining. Most of the students and the community expressed their admiration and gratitude for the initiative of UMT which is seen as very creative and innovative in conveying messages and knowledge related to the importance of the ocean to humans.

Unlike previous years, UMT this time introduced a new concept of the WOW program, which is the delivery of marine literacy awareness messages through a work in the form of storytelling 7 Chapters of BOOK (Beauty of Oceans Knowledge). A variety of interesting ocean-related materials are casually presented in the form of short videos, TikTok videos, as well as easy-to-understand infographic posters prepared by lecturers, researchers, and UMT students themselves and shared to the official Facebook page @officialUMT every day for 7 consecutive days. The concept of one chapter one day, with 3 daily series of sharing namely in the morning slot, noon, and evening slot. The program was concluded with online quiz.

WORLD OCEANS WEEK 2021
@UNIVERSITI MALAYSIA TERENGGANU

BACKGROUND OF WOW2021@UMT
WOW2021@UMT program is hosted by UMT in conjunction with the global World Oceans Day (WOD), a campaign on the ocean by UNESCO. WOD is celebrated on June 8th every year and officially declared by the United Nations (UN) commencing in early 2009.

WOW2021 THEME
THE OCEAN: LIFE AND LIVELIHOODS

7 CHAPTERS in BEAUTY OF OCEAN KNOWLEDGE (BOOK)

DATE	CHAPTER	SLOTS
TUESDAY 08 JUNE	CHAPTER 1: THE OCEAN: WHERE IT ALL BEGINS	3 SLOTS: @10.00am, @01.00pm, & @05.00pm
WEDNESDAY 09 JUNE	CHAPTER 2: WEIRD WONDERS OF THE OCEAN	3 SLOTS: @10.00am, @01.00pm, & @05.00pm
THURSDAY 10 JUNE	CHAPTER 3: THE CHARMING OCEAN	3 SLOTS: @10.00am, @01.00pm, & @05.00pm
FRIDAY 11 JUNE	CHAPTER 4: OCEAN THREATS	3 SLOTS: @10.00am, @01.00pm, & @05.00pm
SATURDAY 12 JUNE	CHAPTER 5: THE OCEAN & HUMAN	3 SLOTS: @10.00am, @01.00pm, & @05.00pm
SUNDAY 13 JUNE	CHAPTER 6: NATURAL HISTORY REPOSITORIES	3 SLOTS: @10.00am, @01.00pm, & @05.00pm
MONDAY 14 JUNE	CHAPTER 7: UMT CONTRIBUTIONS	3 SLOTS: @10.00am, @01.00pm, & @05.00pm
MONDAY 14 JUNE	Ocean Literacy Campaign	09.00am - 04.00pm
WEDNESDAY 16 JUNE	WORLD SEA TURTLE DAY CELEBRATION UMT	08.00am - 10.00pm

National QUIZ Competition on 7 Chapters of BOOK
09.00am - 04.00pm

WORLD SEA TURTLE DAY CELEBRATION UMT
08.00am - 10.00pm

Footer:
• The BOOK will provide you 7 chapters on daily basis during WOW. • A Chapter A Day which includes 3 interesting fun facts of the day.
• Daily facts will be published in 3 slots at: Slot 1 @ 10.00am, Slot 2 @ 1.00pm, and Slot 3 @ 5.00pm on @OfficialUMT Facebook

For more content on the 7 Chapters of BOOK, please visit:
<https://www.facebook.com/hashtag/wowumt2021>

FRIENDLY 'ANIMOJI' ICON FOR OCEAN LITERACY



Ocean Literacy Character and different is that the WOW UMT program this time brings the appearance of UMT's ocean icon, 'Cik Cu' and her friends, an animoji characters brought in by the lecturers and students of UMT to attract younger generation with creative approach. Cik Cu and friends act as story tellers in each Chapter of BOOK and this new approach is fresher and successful in attracting students and the younger generation who will inherit the sustainability of nature and the ocean. The right target group for the purpose of improving marine literacy.

LAUNCHING OF THE OCEAN DECADE ACTIVITIES IN UMT

United Nations General Assembly proclaimed 2021 to 2030 as the United Nations Decade of Ocean Science for Sustainable Development – the "Ocean Decade". INOS has join a collective global movement to create the Ocean we Want!

This nationwide program started last March was part of Ministry of Environment and Water effort to initiate a national movement by enhancing visibility of government support towards the ocean decades movement.

During UMT's program, more than 1000 students from all over Malaysia learnt a lot about the oceans and did it in a fun and exciting way, thanks to UMT's recent initiative in organizing the United Nations Decade of Ocean Science@Universiti Malaysia Terengganu. The event was part of UMT's effort to promote ocean literacy among the community.

Two sessions were held during the event, the morning session themed "Ocean Literacy – Securing the Future through Education" and the afternoon session themed "Ocean Future – the Science we Need for the Ocean we Want". The sessions were conducted by several UMT researchers well versed in all thing's oceans.

In the morning session, the researchers created three different slots on ocean literacy and ocean connectivity with authentic student activities to promote engagement and personal connections. The slots involved around 850 students, including pre-schoolers, primary and secondary school students, as well as youths from all over Malaysia.

A lecture by eminent scientist in the worlds was organized in the afternoon entitled 'Science and Education Requirement at the Verge of the UN Decade of Ocean Science for Sustainable Development' was delivered by Dr Arico Salvatore, Head of Ocean Science, IOC UNESCO. Another lecture entitled 'Delivering Ocean Forecast Service for Ecosystem and Humanity' was given by Professor Dr Fangli Qiao, Vice Chairman, IOC-WESTPAC.

The session was then followed by an interactive forum entitled 'Ocean Decades: Shaping Researchers' Mindset for Right Action', with invited panellists from UMT and Universiti Malaya. The event highlighted the need for more ocean literacy programmes that can guide informed decision making, the exact spirit within the UN Decade of Ocean Science for Sustainable Development 2021-2030.

Other than conducting highly important research in the field of oceanography, researchers in INOS always feel that it is high time to connect the people to ocean. In a hope that the people can becoming more ocean literate, a prerequisite for becoming better 'sea'tizens.

“ THE SCIENCE WE NEED FOR THE OCEAN WE WANT ”



MANGROVE HORSESHOE CRABS SHOWED A NEW LOCATION FOR THEIR POPULATION GENETIC BREAK IN PENINSULAR MALAYSIA

The East-West differentiation for both marine and estuarine flora and fauna in Peninsular Malaysia is a well-known and immensely documented phenomenon explained from the Sunda shelf flooding during the Holocene. However, precise geographic location of the genetic break as well as potential contact zones of the migrating animals between South China Sea and Malacca Strait remains unexplored.



Fig. 1: Male *Carcinoscorpius rotundicauda* collected from Balok sampling site in State Pahang on the east coast of Peninsular Malaysia.

During the global de-glaciation period, the flooding of the Sunda shelf facilitated mangrove species range shift towards the East and West coasts of Malay Peninsula. Currently, Peninsular Malaysia has ca. 110,952 ha of mangrove cover of which nearly 17,570 ha (3%) distributed along the East coast and 93,382 ha (15%) on the West coast. The horseshoe crabs that existing since 450 million years are commonly called as living fossils. Among the three Asian horseshoe crab species, *Carcinoscorpius rotundicauda* (Latreille, 1802) is known as a mangrove horseshoe crab due to its preference to live and nest close to mangrove habitats (Fig. 1). The present study based on *C. rotundicauda* haemolymph (n = 152) and eggs (n = 190) samples collected from west (Kuala Sepetang in State Perak), east (Balok in State Pahang) and southern coast (Pendas in State Johor) (Fig. 2) has examined the land barrier effect of Peninsular Malaysia in-depth and found novel observations (Fig. 3). First of all, the west-coast *C. rotundicauda* populations are genetically different from the south- and east-coast populations. Second, the actual genetic break of these populations lies within the Strait of Malacca in-between Perak and Selangor as first order barrier and in-between Selangor and Malacca as second order barrier, instead of the southern tip of Peninsular Malaysia. This confirms a historical/recent connectivity of *C. rotundicauda* on the east with *C. rotundicauda* on the south and south-west in Peninsular Malaysia. Third, convergent ocean current in the Strait of Malacca is possibly playing a strong role for genetic diversity among *C. rotundicauda* populations, rather than the land barrier effect of Peninsular Malaysia alone (for details, please read Fairuz-Fozi et al. (2021): Aquatic Conservation: Marine and Freshwater Ecosystems: 1–11).



Fig. 2: (A) Collection of freshly deposited eggs from mangrove sediment and, (B) haemolymph samples from adult *Carcinoscorpius rotundicauda* during the fieldwork

REEF CONSERVATION AND RESTORATION TOWARDS SUSTAINABLE ECOSYSTEM



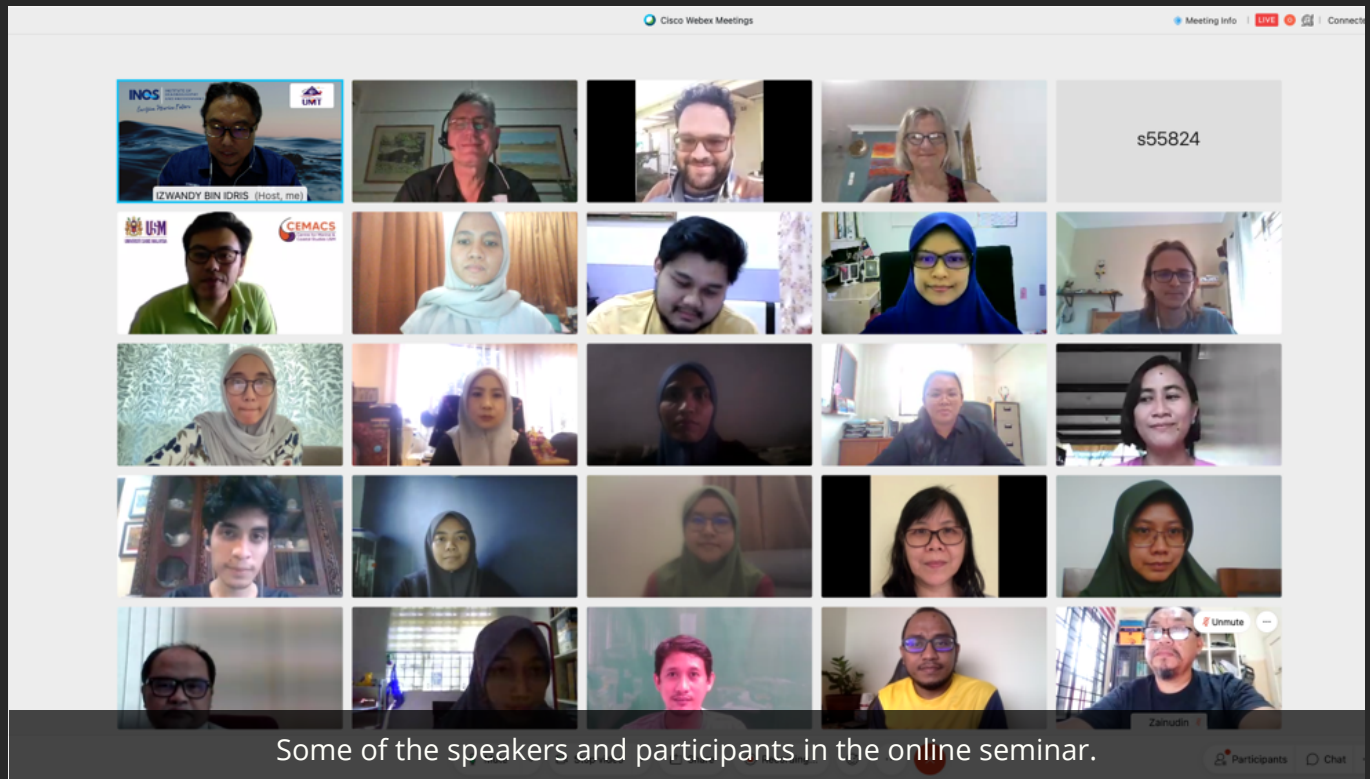
Coral reef plays multiple important roles throughout tropics. They provide key ecosystem goods and services such as fishes habitat, coastal protection and tourism aspects. The reefs benefit human in so many ways that support live hoods and in other major such as building materials and pharmaceuticals. However, coral reefs are declining as they are facing various natural and anthropogenic disturbances including global warming, storms, marine pollution, coral diseases and others. Continuation of coral reef loss leads unbalanced ecosystem and will affect not only components in reefs, but also human live hoods and economy. In response to global coral reef declination, coral restoration is among the effort that is being conducted worldwide to restore and recover lost reefs.

Back in early 2019, a tropical storm called Pabuk hit some part in South China Sea and affects islands in Terengganu waters. Coral reefs, mainly at shallow areas were destroyed and natural recovery of the reefs seems take longer period.

To boost the coral reef recovery, Universiti Malaysia Terengganu (UMT) together with International Petroleum Corp (IPC) collaborate to conduct a coral restoration project entitled “Coral Reef Conservation and Restoration Towards Sustainable Ecosystem” program on selected sites around Pulau Bidong and Pulau Kapas, Terengganu. The program focuses on the coral restoration involving coral transplanting to speed up the recovery process of a lost reef. A well-managed plan for coral restoration program will result a stable benthic condition to promote more recruitments, leads to high coral cover and restoration of other species of organisms associated with a reef. The plan includes site selection for coral restoration (nursery site), artificial structure design, coral fragments selection, nubbins maintenances and continuous monitoring on the nursery site. The conservation effort involve coral reef stakeholders such as marine park, commercial divers, fisherman and school students. Eventually, it will create powerful network between all level of public with researcher and have better restoring reef program as more supports reach in.



INOS SEMINAR SERIES | MUSEUM COLLECTIONS AND THEIR IMPORTANCE TOWARDS CITIZEN SCIENCE



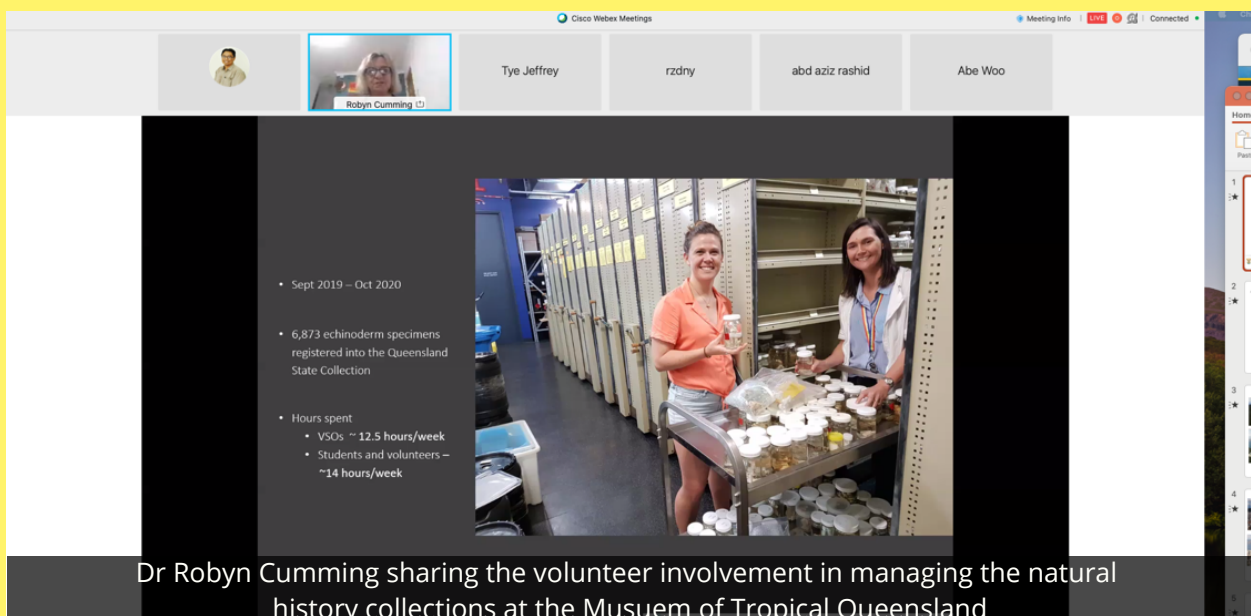
Some of the speakers and participants in the online seminar.

The recent online INOS Seminar Series (27th May 2021) focused on the natural history museum and how it inculcates the spirit of citizen science. In this seminar, three international speakers were invited to share their experience, knowledge and thought on the role of volunteers and their contribution to the advancement of natural history science via volunteerism. The speakers are Dr Robyn Cumming and Mr Tye Andrew Jeffrey from the Museum of Tropical Queensland, Townsville, Australia and Dr Pedro Henrique Negreiros de Braganca from the South African Institute for Aquatic Biodiversity, Makhanda, South Africa. Both Dr Cumming and Mr Andrew highlighted the role of volunteers towards science and research. At the same time, Dr Pedro explained how natural history collections work as windows for understanding the biological impacts of global change.

The volunteering program is one of the best outreach programs for a citizen to become a museum collection assistance. Volunteers provide much-needed skills that help to push the organization's mission further and foster community identity and ownership. Volunteering program also benefited the museum, science, and research by skilled volunteer and increased skills diversity. Volunteers also benefitted from formal and informal training given by the museum staff and the opportunity to be involved in several scientific fieldworks and community projects. These create a win-win situation for both the institution and citizen.

Meanwhile, Dr Pedro explained the value of museum collections represented by the specimens and associated information housed at the collection. The good specimens can be used for years and define a baseline to guide conservation, restoration, and species-replacement efforts. Specimens in the collection also serve as evidence of biological diversity across time and space. Dr Pedro also shares several challenges faced by natural history museums globally and why these obstacles should not be used to minimize their function, purpose, and existence.

The seminar was attended by more than 80 participants with a mixture of locals and internationals, including Australia, India, Indonesia, the Philippines, and South Africa. Overall, the seminar has successfully achieved its target in both contents and audiences. At the same time, it highlighted the South China Sea Repository and Reference Centre as the leading marine natural history repository in Malaysia.





INOS

WELCOMES

**Prof. Dato' Dr.
Nor Aieni bt Mokhtar**

**DISTINGUISHED RESEARCH
FELLOW**

INOS is proud to welcome our former Vice Chancellor as our new Distinguished Research Fellow. Dato' Nor Aieni brings wealth of experience from her previous years in ministry, administrating national oceanography directorate. Her experience leading UMT, a marine focused university for 6 years will certainly strengthen our institute. She will leads and ignite the Oceanography Research Cluster in UMT and at the same time organising effort in communicating National Ocean Policy framework with relevant stakeholders and making it a national reality. We will give our full support and wish her all the best.