



Marine ECS Forum 2025

2ND ANNUAL FORUM FOR EARLY CAREER SCIENTISTS IN MARINE SCIENCE

**Program
Book**



**11-13
APRIL**

**INSTITUTE OF OCEANOGRAPHY
AND ENVIRONMENT (INOS)**

UNIVERSITI MALAYSIA TERENGGANU

PROGRAM SCHEDULE

11 April 2025 (Friday)

Time	Activity	Venue
0830	Participant Registration	INOS Auditorium
0900	Opening Remarks by UMT	
0915	Morning Session 1 Chair Session – (Dr. Safuan UMT) - Presenter Id 01: Ms. Chan Jo Yi (Universiti Malaya) Presentation Title: Carbon Stocks of 2 Mangrove Forest - Presenter Id 02: Mr. Isyraf Haqim Bin Mohd Tamizam (Universiti Malaya) Presentation Title: eDNA Unveiled: Assessment of Essential Marine Resources of Pulau Ketam, Selangor, Malaysia - Presenter Id 03: Mr. Lai Jia Yong (Universiti Malaya) Presentation Title: Seasonal Variations of Microbial Diversity in The Sediment of An Eroding Mangrove in Kapar, Selangor	
1015	Group Photo / Coffee Break	Al Safa Laboratory Foyer
1100	Morning Session 2 Chair Session – (Dr. Wei Lun XMUM) - Presenter Id 04: Miss Adriana Dania Binti Hemizan (Universiti Malaysia Terengganu) Presentation Title: Estimating Carrying Capacity at Sea Turtle Nesting Beaches at Pulau Redang, Terengganu - Presenter Id 05: Mr Nicholas Tolen (Universiti Malaysia Terengganu) Presentation Title: Spatiotemporal Abundance and Residency of Juvenile Blacktip Reef Sharks at Chagar Hutang Bay, A Potential Shark Nursery Site in Malaysia - Presenter Id 06: Mr. Mohammad Ikhmal Siddiq Bin Jefri Din (Universiti Malaysia Terengganu) Presentation Title: Monitoring Sediment Exchange and Shoreline Changes at Johor, Malaysia: Impacts of Coastal	INOS Auditorium

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	Structures on Sediment Dynamics	
1200	Lunch Break	Al Safa Laboratory Foyer
1430	<i>Afternoon Session 1</i> <i>Chair Session – (Dr. Fadzil UM)</i> • Presenter Id 07: Mr. Muhammad Adam Bin Muhammad Rasib (Universiti Kebangsaan Malaysia) Presentation Title: Marine Biodiversity Assessment and Environmental Dna Database Development for Sustainable H-Otec in Malaysia • Presenter Id 08: Mr. Abdul Azim bin Amirudin (Universiti Kebangsaan Malaysia) Presentation Title: High-Resolution Regional Climate Modeling for Extreme Weather Analysis in Peninsular Malaysia • Presenter Id 09: Mr. Frasier Hoo (Xiamen University Malaysia) Presentation Title: Current Situation, Challenges and Way Forward of Jellyfish Study in Malaysian Adjacent Waters (Indonesia, Singapore & Thailand)	INOS Auditorium
1530	Session Break	Free & Easy
1545	<i>Afternoon Session 2</i> <i>Chair Session – (Dr. Liew Ju Neng UKM)</i> • Presenter Id 10: Mrs. Jolin Lau Hui Hsing (Xiamen University Malaysia) Presentation Title: Antioxidant Activity of Marine Microalgae Isochrysis Galbana, Chaetoceros Calcitrans, And Nannochlorum Sp.: Identification and Quantification of Phenolic Compounds • Presenter Id 11: Mr. Lim Chen Xie (Xiamen University Malaysia) Presentation Title: Co-Culturing of Bacillus	INOS Auditorium



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	Amyloliuefaciens and Trichoderma Longibrachiatum for Improvement of Chili Crops Presenter Id 12: Mr. Shu Jin Xiang (Xiamen University Malaysia) Presentation Title: Investigating the Probiotic Effects of Lactic Acid Bacteria from Kombucha and Kefir on The Growth and Health of Nile Tilapia	
1645	<i>End of Day 1</i>	

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12 April 2025 (Saturday)

Time	Activity	Venue
0900	Registration Day 2 Morning Session 1 Chair Session – (Prof. Han Lei XMUM) • Presenter Id 13: Mrs. Ekaterina Efimova (Xiamen University Malaysia) Presentation Title: Diversity Of Endophytic Fungi in Sonneratia Alba Using Metagenomics • Presenter Id 14: Mrs. Azyyati Abdul Aziz (Universiti Malaysia Terengganu) Presentation Title: Dissolved Inorganic Nutrient and Chlorophyll-A Dynamics in Kelantan-Terengganu Waters: Monsoon–Upwelling Effects and Stable Isotope Evidence of Nitrogen Uptake • Presenter Id 15: Ms. Nur Khatibah binti Md Yunos (Universiti Malaysia Terengganu) Presentation Title: Pioneering Reflectance Spectroscopic Analysis of Ceramic Sherds from The Bidong Shipwreck	INOS Auditorium
1000	Session Break (Morning Tea)	Al Safa Laboratory Foyer
1030	Morning Session 1 Chair Session – (Dr. Maizah UMT) • Presenter Id 16: Ms. Nur Nabilah binti Ahmad Ariffian (Universiti Malaysia Terengganu) Presentation Title: Zooplankton Food Web Dynamics During Austral Summer in The Indian Sector of The Southern Ocean • Presenter Id 17: Ms. Mas Nurul Alia Binti Mas Lanasrie (International Islamic University Malaysia) Presentation Title: Integrating Stakeholders'	INOS Auditorium

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	Knowledge and Attitudes on Co-Design and Zoning of Marine Protected Areas: A Case Study in Tioman Island Presenter Id 18: Ms Siti Nur Nadhirah Mohd Zamri (Universiti Sultan Zainal Abidin) Presentation Title: Diversity and New Records of Copepod in Commercial Marine Fishes from Malaysian Waters	
1200	Lunch Break	Al Safa Laboratory Foyer
1415	Parallel Workshop I Speaker: Professor Dr. HAN Lei Workshop Title: Unravelling Debates on the Abyssal Upwelling in the Indo-Pacific Ocean	INOS Auditorium
1415	Parallel Workshop II Speaker: Agensi Nuklear Malaysia Workshop Title: Introduction to Stable Isotope Malaysia	Marine Informatics & Satellite Oceanography Laboratory (OSIM)
1615	<i>End of Day 2</i>	

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13 April 2025 (Sunday)

Time	Activity
0830	Gather at Tapak Konvo UMT
0845	Depart to Merang Jetty (UMT Bus)
0915	Depart to Chagar Hutang
1000	Checkpoint 1: Chagar Hutang Turtle Sanctuary • Turtle Science Talk • Sea Turtle Analysis Experience • Beach Cleanup
1200	Checkpoint 2: Teluk Dalam • Snorkeling • Lunch
1300	Checkpoint 3: Pulau Lima
1400	Checkpoint 4: Little Maldives
1500	Depart to Merang Jetty
1545	Arrive at Merang Jetty
1645	Arrive at UMT

**Time and checkpoint may change according to weather conditions*

***Please wear appropriate attire for hot weather and wet activities including swimming and snorkeling. Snorkeling sets and life jackets are provided.*



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LIST OF ORGANIZING COMMITTEES

1. Prof. Dr. Zainudin Bachok, UMT
2. Assoc. Prof. Dr. Maizah Mohd Abdullah, UMT
3. Assoc. Prof. Dr. Mohd Uzair Rusli, UMT
4. Dr. Mohd Safuan Che Din, UMT
5. Prof. Dr. Han Lei, XMUM
6. Assoc. Prof. Dr. Ng Wei Lun, XMUM
7. Assoc. Prof. Dr. Liew Ju Neng, UKM
8. Dr. Wee Cheah, UM
9. Dr. Muhammad Arif Bin Samshuri, UKM
10. Lim Chen Xie, XMUM
11. Frasier Hoo Anak Syeward, UPM
12. Siti Nur Nadhirah (Unisza), UNISZA
13. Isyraf Haqim Mohd Tarmizam, UM
14. Mohammad Ikhmal Siddiq Bin Jefri Din, UMT
15. Puteri Nurfarah Adawiyah Binti Taslin, UMT
16. Siti Nur Hanani Binti Zainuddin, UMT
17. Alia Syafiqah Binti Abdul Hamed, UMT
18. Noradiha Farahin Binti Ibrahim, UMT
19. Siti Solihah Rasdei, UMT
20. Ahmad Irsyad Bin Ahmad, UMT
21. Tuan Ahmad Mustaqim Bin Tuan Rosdan, UMT

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LIST OF ADVISORY PANELS

No.	Name	Affiliation	Expertise/ Research Keywords	Email
1	Prof. Dr. HAN Lei	CAMS, Xiamen University Malaysia	Physical Oceanography	lei.han@xmu.edu.my
2	Prof. Dr. Luo Ya Wei	CAMS, Xiamen University China	Biological Oceanography	yawei.luo@xmu.edu.my
3	Assoc. Prof. Dr. Ng Wei Lun	CAMS, Xiamen University Malaysia	Mangrove biodiversity, Molecular ecology	weilun.ng@xmu.edu.my
4	Assoc. Prof. Dr. Maizah Mohd Abdullah	FSSM, Universiti Malaysia Terengganu	Marine Ecology	maizah@umt.edu.my
5	Assoc. Prof. Dr. Izwandy Idris	INOS, Universiti Malaysia Terengganu	Benthic Invertebrate Diversity and Ecology	izwandy.idris@umt.edu.my
6	Dr. Mohd Safuan Che Din	INOS, Universiti Malaysia Terengganu	Coral Ecology	chedinmohdsafuan@umt.edu.my
7	Assoc. Prof. Dr. Liew Ju Neng	FST, Universiti Kebangsaan Malaysia	Climatology	juneng@ukm.edu.my
8	Assoc. Prof. Dr Mohammed Rizman bin Idid	IOES, Universiti Malaya	Marine Biodiversity and Coastal Studies	rizman@um.edu.my
9	Dr. Mohd Fadzil Firdzaus Bin Mohd Nor	IOES and IAS, Universiti Malaya	Meteorology	fadzil.mnor@um.edu.my
10	Dr. Norshida Ismail	FBFI, Universiti Sultan Zainal Abidin	Parasitology, Invertebrate Biology	norshida@unisza.edu.my
11	Dr. Wan Mohd Syazwan bin Wan Solahudin	Faculty of Science, Universiti Putra Malaysia	Marine Ecology and Biodiversity	mhdsyazwan@upm.edu.my

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LIST OF PRESENTATIONS

ID No.	Presenter Name	Institution	Presentation Title	Email
01	Chan Jo Yi	Universiti Malaya	CARBON STOCKS OF 2 MANGROVE FOREST	chanjoyi0526@gmail.com
02	Isyraf Haqim Bin Mohd Tamizam	Universiti Malaya	EDNA UNVEILED: ASSESSMENT OF ESSENTIAL MARINE RESOURCES OF PULAU KETAM, SELANGOR, MALAYSIA	isyrafhq96@um.edu.my
03	Lai Jia Yong	Universiti Malaya	SEASONAL VARIATIONS OF MICROBIAL DIVERSITY IN THE SEDIMENT OF AN ERODING MANGROVE IN KAPAR, SELANGOR	jiayonglai@um.edu.my
04	Adriana Dania Binti Hemizan	Universiti Malaysia Terengganu	ESTIMATING CARRYING CAPACITY AT SEA TURTLE NESTING BEACHES AT PULAU REDANG, TERENGGANU	p5830@pps.umt.edu.my
05	Nicholas Tolen	Universiti Malaysia Terengganu	SPATIOTEMPORAL ABUNDANCE AND RESIDENCY OF JUVENILE BLACKTIP REEF SHARKS AT CHAGAR HUTANG BAY, A POTENTIAL SHARK NURSERY SITE IN MALAYSIA	nicholas.tolen@gmail.com
06	Mohammad Ikhmal Siddiq Bin Jefri Din	Universiti Malaysia Terengganu	MONITORING SEDIMENT EXCHANGE AND SHORELINE CHANGES AT JOHOR, MALAYSIA: IMPACTS OF COASTAL STRUCTURES ON SEDIMENT DYNAMICS	p5794@pps.umt.edu.my
07	Muhammad Adam Bin Muhammad Rasib	Univeriti Kebangsaan Malaysia	MARINE BIODIVERSITY ASSESSMENT AND ENVIRONMENTAL DNA DATABASE DEVELOPMENT FOR SUSTAINABLE H-OTEC IN MALAYSIA	p154606@siswa.ukm.edu.my
08	Abdul Azim bin Amirudin	Universiti Kebangsaan Malaysia	HIGH-RESOLUTION REGIONAL CLIMATE MODELING FOR EXTREME WEATHER ANALYSIS IN PENINSULAR MALAYSIA	p115833@siswa.ukm.edu.my
09	Frasier Hoo	Universiti Putra Malaysia	CURRENT SITUATION, CHALLENGES AND WAY FORWARD OF JELLYFISH STUDY IN MALAYSIAN ADJACENT WATERS (INDONESIA, SINGAPORE & THAILAND)	gs72350@student.upm.edu.my
10	Jolin Lau Hui Hsing	Xiamen University Malaysia	ANTIOXIDANT ACTIVITY OF MARINE MICROALGAE ISOCHRYSIS GALBANA, CHAETOCEROS CALCITRANS, AND NANNOCHELOSUM SP.: IDENTIFICATION AND QUANTIFICATION OF PHENOLIC COMPOUNDS	mmb2409002@xmu.edu.my
11	Lim Chen Xle	Xiamen University Malaysia,	CO-CULTURING OF BACILLUS AMYLOLIQUEFACIENS AND TRICHODERMA LONGIBRACHIATUM FOR IMPROVEMENT OF CHILI CROPS	mmb2309003@xmu.edu.my

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Id No.	Presenter Name	Institution	Presentation Title	Email
12	Shu Jin Xiang	Xiamen University Malaysia	INVESTIGATING THE PROBIOTIC EFFECTS OF LACTIC ACID BACTERIA FROM KOMBUCHA AND KEFIR ON THE GROWTH AND HEALTH OF NILE TILAPIA	mmb2309004@xmu.edu.my
13	Ekaterina Efimova	Xiamen University Malaysia	DIVERSITY OF ENDOPHYTIC FUNGI IN SONNERATIA ALBA USING METAGENOMICS	mmb2309001@xmu.edu.my
14	Azyyati Abdul Aziz	Universiti Malaysia Terengganu	DISSOLVED INORGANIC NUTRIENT AND CHLOROPHYLL-A DYNAMICS IN KELANTAN-TERENGGANU WATERS: MONSOON-UPWELLING EFFECTS AND STABLE ISOTOPE EVIDENCE OF NITROGEN UPTAKE	mizazy@gmail.com
15	Nur Khatibah Md Yunos	Universiti Malaysia Terengganu	PIONEERING REFLECTANCE SPECTROSCOPIC ANALYSIS OF CERAMIC SHERDS FROM THE BIDONG SHIPWRECK	p5952@pps.umt.edu.my
16	Nur Nabilah Ahmad Ariffian	Universiti Malaysia Terengganu	ZOOPLANKTON FOOD WEB DYNAMICS DURING AUSTRAL SUMMER IN THE INDIAN SECTOR OF THE SOUTHERN OCEAN	nabilahariffian@gmail.com
17	Mas Nurul Alia Binti Mas Lanasrie	Universiti Islam Antarabangsa	INTEGRATING STAKEHOLDERS' KNOWLEDGE AND ATTITUDES ON CO-DESIGN AND ZONING OF MARINE PROTECTED AREAS IN MALAYSIA: A DESKTOP STUDY IN TIOMAN ISLAND	mas.alia@live.iium.edu.my
18	Siti Nur Nadhirah Mohd Zamri	Universiti Sultan Zainal Abidin	DIVERSITY AND NEW RECORDS OF COPEPOD IN COMMERCIAL MARINE FISHES FROM MALAYSIAN WATERS	nadhirahmz11@gmail.com

Presenter ID: 01



STAND STRUCTURE AND BLUE CARBON STOCKS IN TWO MANGROVE FORESTS WITH DIFFERENT GEOMORPHOLOGICAL SETTINGS

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Mangrove forests play a pivotal role in global carbon cycling, acting as significant carbon sinks due to their high primary productivity and carbon sequestration capacity. To date, information on total ecosystem carbon (TEC) stocks in Malaysia still remains unclear across different forest stand structures and geomorphological settings. This study compares the stand structural dynamics and TEC generated in two mangrove ecosystems of different geomorphological settings: estuarine and fringing, in Peninsular Malaysia. This study also aims to formulate a mangrove health index and assess health of mangrove forest under the context of different settings as well as the evaluate impact of land use on its carbon stock. Two study sites were selected representing estuarine and fringing forest, which were Kapar (Klang, Selangor) and Merlimau (Melaka) respectively. The carbon stock and stand structure assessment leverages a methodology that included field-based measurements and lab work and statistical analysis to contrast and compare the carbon stored in these varied environments. Preliminary results on species diversity have shown that of Kapar (Estuarine, number of species: 11) is higher compared to Merlimau (Fringing, number of species: 9), however, Merlimau is shown to have more prominent zonation with species being clearly defined in each zone. In terms of total vegetation biomass, Kapar produces a higher total biomass with an average of $150.30 \pm 14.97 \text{ Mg ha}^{-1}$ in comparison to Merlimau that has an average of $139.62178 \pm 14.96734 \text{ Mg ha}^{-1}$. Similar pattern is observed for carbon storage yield, with Kapar ($75.15157556 \pm 10.44061 \text{ Mg ha}^{-1}$) also having a higher carbon storage yield than Merlimau ($69.81088778 \pm 7.48367 \text{ Mg ha}^{-1}$). Although Kapar and Merlimau are considered as Estuarine and Fringing mangroves, they do not represent ALL estuarine and fringing mangroves in Malaysia, more estuarine and fringing sites could be incorporated in order to get a better look between the settings. Therefore, additional verification needed to be done with information gathered from literature in order to verify the differences in carbon stocks. Despite that, getting a glimpse of the correlation between geomorphological settings and biodiversity can aid in prioritizing conservation efforts and implementing adaptive management strategies. Decision-makers can use the insights gained from your research to implement measures tailored to the specific needs of estuarine and fringing environments. This may include habitat restoration, land-use planning, and targeted conservation efforts aimed at preserving and enhancing carbon stocks in these critical ecosystems. Overall, these findings possess important implications to further aid in the management and conservation of mangrove forests in Malaysia, and for global efforts to mitigate climate change.

Keywords: Carbon stock, Stand structure, Geomorphological settings, Estuarine, Fringing

Presenter ID: 02



eDNA UNVEILED: ASSESSMENT OF ESSENTIAL MARINE RESOURCES OF PULAU KETAM, SELANGOR, MALAYSIA

ISYRAF HAQIM MOHD TAMIZAM*, SZE-WAN POONG, KAR-HOE LOH AND KISHNETH PALANIVELOO

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This proposal explores the resilience of marine ecosystems and the communities dependent on them amidst climate change, particularly focusing on Pulau Ketam, Selangor. The current issue addresses how rising temperatures and sea level rise influence marine biodiversity and the livelihoods of local populations about ecosystem sustainability of essential marine resources such as fish and crustacean. Previous studies highlight the vulnerabilities of coastal communities and the decreasing productivity of marine ecosystems, pointing out methodological limitations in traditional biodiversity assessments, which are often invasive and labour-intensive. This research builds on advancements in environmental DNA (eDNA) technology, offering a non-invasive, comprehensive tool for biodiversity monitoring and species identification. However, challenges such as insufficient genetic databases and regional variabilities in water characteristics impose further refinement of these methods. We employ methodology steps such as: historical data mining, real-time biodiversity assessment using eDNA. Sampling will include 21 stations and molecular analyses, such as metabarcoding, to assess species diversity, and the potential economic value of marine resources. By identifying commercially valuable species and understanding their population dynamics, the study seeks to enhance resource sustainability while addressing economic vulnerabilities. The integration of eDNA with traditional approaches may also reveal underutilized species and improve resilience planning for local communities. In sum, this research offers an insight into the ecological and socio-economic challenges faced by Pulau Ketam, proposing actionable strategies to mitigate climate change impacts and promote sustainable resource use and serve as a blueprint of eDNA for broader applications in coastal management and biodiversity conservation in Malaysia.

Keywords: environmental DNA, assessment, mangroves, climate change, proposal

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Presenter ID: 03



SEASONAL VARIATIONS OF MICROBIAL DIVERSITY IN THE SEDIMENT OF AN ERODING MANGROVE IN KAPAR, SELANGOR

JIAYONG LAI^{1*}, WEE CHEAH¹, SAHADEV SHARMA¹, REMPEI SUWA², SITI AISAH ALIAS¹, KISHNETH PALANIVELLOO¹

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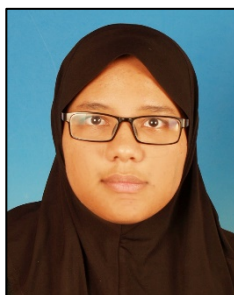
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Microbes in mangrove sediment are known to provide essential ecological functions symbiotically to the mangrove host, but erosion threatens the equilibrium of sediment microbes and their carbon storage ability. Our study found that inner plots of eroding sites exhibit higher (amplicon sequence variant) ASV counts and greater microbial diversity, with prokaryotes being more abundant than fungi across all samples. Chloroflexota dominates deeper bacterial communities, whereas Proteobacterota prevails in surface sediments (0 cm to 10 cm). The fungal community shows intriguing patterns: Ascomycota dominates surface sediment, while deeper sediments are dominated by Basidiomycota. Basidiomycota dominance is linked to lower C:N ratios, whereas higher ratios favor Ascomycota. Co-occurrence networks highlight specific taxa of bacteria and fungi acting as keystone species linking both kingdoms, indicating intricate microbial interactions. Prokaryote ASV counts and diversity are higher in the wet season compared to the dry season. Conversely, fungal ASV counts are higher in the dry season. This phenomenon is probably explained by the higher nutrient elements recorded in the dry season, which promotes the growth of fungal community with ample substrate to decompose, on the other hand, mangrove tree grows more vigorously in the wet season, limiting fungal community but benefit the symbiotic prokaryotes. This study enhances our understanding of the complex microbial dynamics and the influence of seasonal changes on microbial communities in eroding mangrove sediments.

Keywords: Mangrove, sediment microbes, eroding Mangrove, co-occurrence network analysis, microbial stability

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Presenter ID: 04



**ESTIMATING CARRYING CAPACITY AT SEA TURTLE NESTING BEACHES AT PULAU REDANG,
TERENGGANU**

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Chagar Hutang Turtle Sanctuary on Pulau Redang serves as a critical nesting site for sea turtles in Malaysia. Despite an increase in nesting activity over the past decades, a declining trend in hatching success suggests ecological limitations. This study aims to estimate the carrying capacity of Chagar Hutang, defined as the maximum number of sea turtle nests that can be supported without negatively affecting hatching outcomes. Long-term nesting data (1993–2023), environmental parameters, and predator abundance were analyzed to assess space constraints and density-dependent effects, while a mathematical model incorporating logistic growth principles and a modified Lotka-Volterra prey-predator framework was developed to simulate nesting dynamics. Results indicate that while nesting numbers have increased, the available nesting space has remained constant, leading to higher nest densities and reduced hatching success in recent years, and estimation revealed that current nesting levels are approaching or may have already exceeded the optimal threshold for sustainable hatchling production. Findings from this study will offer critical insights into whether Chagar Hutang has reached its carrying capacity, thus informing future conservation strategies to enhance nesting success and population recovery amid increasing ecological pressures.

Keywords: Carrying capacity, mathematical modeling, hatchery management, spatial ecology, endangered species

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Presenter ID: 05



SPATIOTEMPORAL ABUNDANCE AND RESIDENCY OF JUVENILE BLACKTIP REEF SHARKS AT CHAGAR HUTANG BAY, A POTENTIAL SHARK NURSERY SITE IN MALAYSIA.

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Effective conservation of reef sharks requires a better understanding of their abundance and residency in reproductive areas to identify and protect important pupping and nursery sites. This study focused on Young of the Year (YoY) blacktip reef sharks at Chagar Hutang Bay, Redang Island, Malaysia. A combination of baited remote underwater video (BRUV) and drone surveys were carried out from April to October 2023 to assess sharks' spatial and temporal abundance across different reef zones during the Southwest monsoon season. In addition, conventional mark and recapture and acoustic tagging studies were conducted between June 2023 to October 2024, to measure YoY size frequency and provide insights into the residency and site fidelity of tagged animals within the bay. The results from both BRUV and drone surveys revealed significantly higher abundances ($p < 0.001$) of YoY sharks along the shoreline compared to deeper inner-reef and forereef areas. We recapture tagged sharks (rate=33%) from 2-132 days at liberty (Mean=39.3, SD=35.5) at the same shoreline site. Acoustically tagged sharks with a Residency Index >30% showed high site fidelity to the bay's western side. This study highlights the critical role of Chagar Hutang as a nursery habitat for blacktip reef sharks, with strong evidence of their spatial and temporal preferences along the shoreline and significant site fidelity to specific areas within the bay. Essential data supporting Chagar Hutang Bay's designation as one of Malaysia's Important Shark and Ray Areas (ISRAs) emphasizes the need for targeted conservation measures to protect this vital habitat and its shark population.

Keywords: Reef Shark, nursery site, BRUV, mark and recapture, passive acoustic telemetry

Presenter ID: 06



MONITORING SEDIMENT EXCHANGE AND SHORELINE CHANGES AT JOHOR, MALAYSIA

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This study investigates shoreline dynamics and sediment exchange at Pantai Punggur, Johor, by utilizing unmanned aerial vehicle (UAV) photogrammetry for high-resolution monitoring. Traditional coastal monitoring methods are often limited by high costs, weather dependency, and operational complexity. This research presents a drone-based approach as a cost-effective and efficient alternative for shoreline detection and erosion analysis. Aerial images collected in August 2020 and 2021 were processed using Pix4D and Global Mapper to generate orthomosaics, digital surface models (DSMs), and shoreline lineations. Shoreline changes were extracted using NDWI techniques and analyzed through the Digital Shoreline Analysis System (DSAS). Results show measurable erosion and accretion trends along the coast, with UAV-based shoreline mapping demonstrating comparable accuracy to satellite-based SPOT6 MS data. The findings affirm the suitability of UAV technology for localized coastal monitoring and emphasize its potential for future sediment management and coastal resilience planning in Malaysia.

Keywords: Shoreline changes, Coastal erosion, UAV Photogrammetry, Sediment Exchange

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Presenter ID: 07



MARINE BIODIVERSITY ASSESSMENT AND ENVIRONMENTAL DNA DATABASE DEVELOPMENT FOR SUSTAINABLE H-OTEC IN MALAYSIA

MUAMMAD ADAM MUHAMMAD RASIB*, HERRYAWAN RYADI EZIWAR DYARI^{1,2,3} ABU BAKAR JAAFAR⁴ SURIYANTI SU NYUN PAU^{1,2,3}

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Hybrid Ocean Thermal Energy Conversion (H-OTEC) harnesses seawater temperature differentials to generate electricity. As the H-OTEC site in Port Dickson, Malaysia, enters its pre-commissioning phase, establishing baseline biodiversity data is crucial for ecological monitoring. This study employs 18S rRNA eDNA metabarcoding to assess marine metazoan biodiversity and develop a DNA reference bank for indicator species. Seawater samples (10L) were filtered (0.2 µm) and processed using the CTAB method for DNA extraction. High-throughput sequencing on Illumina generated 113,980 reads, identifying 73 genera, 64 families, and six metazoan phyla. Arthropoda dominated (85%), particularly Paracalanidae (45%) and Bestiolina (38%), indicating a diverse zooplankton community. DNA barcoding of commercial fish species targeted cytochrome c oxidase I (COI, 564 bp) for species in Serranidae and Lutjanidae. NCBI GenBank comparisons showed >99% identity, and phylogenetic analysis (MP, ML) provided strong bootstrap support (>75%) for *C. formosa*, *E. coioides*, *L. russellii*, and *P. maculatus*, though *C. boenak* had lower confidence (59%). These sequences are now available in GenBank. This research establishes a biodiversity baseline for H-OTEC and informs long-term monitoring of ecological impacts. Further studies should assess megafauna and red-listed species to enhance conservation in Malaysian waters.

Keywords: DNA barcoding, indicator species, ecological monitoring, renewable energy

Presenter ID: 08



HIGH-RESOLUTION REGIONAL CLIMATE MODELING FOR EXTREME WEATHER ANALYSIS IN PENINSULAR MALAYSIA

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High resolution climate simulations have become increasingly important in recent climate change studies. This approach enables the exploration of the “gray zone”, referring to resolutions finer than 10 km where model uncertainties persist. This study aims to assess the added value of high-resolution simulations over Peninsular Malaysia using the RegCM4 regional climate model driven by the Fifth Generation European Centre for Medium-Range Weather Forecasts (ECMWF) Reanalysis (ERA5). A two-domain, one-way nested configuration was employed. The first domain covers Southeast Asia with a 25 km resolution, while the second domain covers Peninsular Malaysia at a 5km resolution. Observational datasets from the Climate hazards Group InfraRed Precipitation with Station (CHIRPS) and Climate Hazards Group Infrared Temperature with Stations (CHIRTS) were used as reference data for precipitation and temperature, respectively. The analysis covers the period from 1990 to 2014, with extreme climate indices calculated using the Expert Team on Climate Change Detection and Indices (ETCCDI). The selected extreme precipitation includes RX1day, RX5day, CWD, CDD and SDII while extreme temperature indices include TNN, TXN, TXX, TN90P and TX90P. The 5 km resolution model exhibits significant improvements in simulating rainfall distribution and characteristics particularly during DJF season in the northeastern region of Peninsular Malaysia. Additionally, it demonstrates superior performance in capturing extreme wet indices and enhancing the simulation of diurnal rainfall cycles. The high-resolution model also improves the representation of extreme temperature events over the high-altitude areas. These findings show that there is a necessity of fine scale simulations for studying climate patterns.

Keywords: Climate Model, RegCM4, High Resolution, Climate Extreme,

Presenter ID: 09



JELLYFISH RESEARCH IN MALAYSIA AND ADJACENT WATERS: CURRENT STATUS, CHALLENGES, AND WAY FORWARD

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In recent years, the global increase in jellyfish blooms has negatively impacted marine ecosystem and human health, although the blooms of commercially important jellyfish also support fisheries. These rising bloom incidents thus emphasize the urgent need for comprehensive scientific research to mitigate their impacts. This study reviewed the current status, trends, and challenges in jellyfish research by analysing 186 research publications, government reports, and newspaper archives published between 2001 and 2024 in Malaysia, Indonesia, Singapore and Thailand. The findings indicate that scientific publications on jellyfish have increased by 8.36 % over the past 23 years in these regions. Thailand recorded the highest number of jellyfish-related research (37.6 %), followed by Malaysia (29.6 %), Indonesia (21.5 %), and Singapore (5.4 %). Previous research predominantly focused on medical and biochemical applications (30.1 %) and food sciences (24.2 %), while studies on jellyfish taxonomy (16.1 %) and ecology (14 %) remain relatively scarce. Jellyfish from Class Cubozoa and Hydrozoa were relatively less studied compared to their Scyphozoa counterpart. Notably, all studies focused on the free-swimming medusae life stage, with no records of the less conspicuous benthic stages. Key challenges hindering the advancement of jellyfish research include their transparent, fragile nature and high spatiotemporal variability that complicates in situ detection. Jellyfish diversity in this region also likely underestimated due to persistent taxonomic ambiguities, phenotypic plasticity and intraspecific variations. Unresolved species identification and limited ecological understanding have prevented effective monitoring, early detection, and real-time management of blooms' impacts. To address these gaps, this study emphasizes the need for more robust morphological and molecular approaches to resolve jellyfish taxonomy. Future monitoring of jellyfish blooms should incorporate long-term ecological surveys and advanced environmental DNA (eDNA) techniques to enhance detection, species identification, and impact assessments.

Keywords: blooms, cnidaria, ecology, monitoring, taxonomy

Presenter ID: 10



ANTIOXIDANT ACTIVITY OF MARINE MICROALGAE ISOCHRYSIS GALBANA, CHAETOCEROS CALCITRANS, AND NANNOCHLORUM SP.: IDENTIFICATION AND QUANTIFICATION OF PHENOLIC COMPOUNDS

JOLIN HUI HSING LAU¹, SOOK CHIN CHEW^{1,2}, NORAZIRA ABDU RAHMAN¹

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Marine microalgae are becoming recognized as valuable sources of natural antioxidants because of their variety of phenolic compounds and rapid growth capabilities. This study investigates the antioxidant activity and phenolic profiles of three marine species— *Nannochlorum* sp., *Chaetoceros calcitrans*, and *Isochrysis galbana*— through spectrophotometric and chromatographic analyses. Antioxidant capacities were evaluated using 2,2-diphenyl-1-picrylhydrazyl (DPPH) and 2,2'-azino-bis (3-ethylbenzothiazoline-6- sulfonic acid) (ABTS) assays, while total phenolic content (TPC) and total flavonoid content (TFC) were quantified colorimetrically. Among the species, *Nannochlorum* sp. exhibited the highest TPC (21.72 ± 0.81 mg gallic acid equivalents per gram) and TFC (22.99 ± 0.77 mg quercetin equivalents per gram), correlating with its strongest DPPH activity (30.39 ± 0.31 mg Trolox equivalents per gram). In contrast, *C. calcitrans* showed the highest ABTS activity (22.35 ± 1.66 mg Trolox equivalents per gram) and the highest total phenolic abundance, with dominant compounds including catechin (406.19 ± 1.45 micrograms per gram), 4- hydroxybenzoic acid, and gallic acid. *I. galbana* recorded the highest catechin concentration (416.55 ± 3.87 micrograms per gram), with ferulic acid and quercetin detected across all species. The use of ultra-high-performance liquid chromatography (UHPLC) allowed detailed analysis of species-specific phenolics, showing unique antioxidant patterns. These findings highlight the variety in the metabolism of marine microalgae and their potential as sustainable sources of bioactive compounds for food, dietary supplements, and cosmetic industries.

Keywords: Microalgae, Phenolics, Antioxidants, UHPLC, Cosmeceuticals

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Presenter ID: 11



CO-CULTURING OF *BACILLUS AMYLOLIQUEFACIENS* AND *TRICHODERMA LONGIBRACHIATUM* FOR IMPROVEMENT OF CHILI CROPS

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Crop quality and resistance against pathogens are essential for sustainable agriculture. In Malaysia, chili is a key cash crop that faces significant yield and quality losses due to plant pathogens. To address these challenges, this research explores the potential of co-culturing Plant Growth-Promoting Rhizobacteria (PGPR) and Plant Growth-Promoting Fungi (PGPF) to enhance chili crop quality and disease resistance. The study involves inoculating chili plants with two groups of biocontrol agents: *Bacillus amyloliquefaciens* and *Trichoderma longibrachiatum*. The objectives include introducing these beneficial microbes into chili plants, screening plants against pathogens, analyzing plant health, and investigating genes associated with growth promotion and pathogen suppression. Chili plants will be grown under four treatments: control, positive control, *B. amyloliquefaciens*, *T. longibrachiatum*, and a combination of microbes. Physical parameters such as plant height will be measured, along with nutritional contents including phenolic, tannin, and chlorophyll levels. Furthermore, specific genes involved in the synthesis of indole-3-acetic acid (IAA) and siderophores in both microorganisms will be identified, and the presence of these compounds will be evaluated using spectrophotometry and chrome azurol S (CAS) agar media. It is expected that co-culturing with these beneficial microorganisms will enhance chili plant growth and improve immunity against pathogens. Ultimately, this research aims to provide valuable insights into eco-friendly disease management strategies for sustainable chili production, reducing reliance on harmful chemicals while promoting environmentally friendly agricultural practices.

Keywords: Co-culture; *Bacillus amyloliquefaciens*; *Trichoderma longibrachiatum*; Chili crop; Disease resistance

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Presenter ID: 12



INVESTIGATING THE PROBIOTIC EFFECTS OF LACTIC ACID BACTERIA FROM KOMBUCHA AND KEFIR ON THE GROWTH AND HEALTH OF NILE TILAPIA

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The aquaculture sector in Malaysia, despite receiving government support, continues to face significant challenges due to fish diseases, highlighting the need for sustainable solutions beyond conventional methods. This study investigates the potential of *Lactobacillus paracasei*, derived from kefir grains, and *Komagataeibacter xylinus*, derived from kombucha, as probiotic agents to enhance tilapia health and growth. The safety of these strains was assessed using a brine shrimp lethality assay, while their antagonistic activity against pathogens was evaluated through the agar well diffusion method, measuring inhibition zones. Nile tilapia (*Oreochromis niloticus*) were acclimatized and fed experimental diets supplemented with live *Lactobacillus* sp. over 56 days. The feeding trial included multiple groups with varying probiotic concentrations and a control group without supplementation. Fish growth performance was evaluated based on length, weight, and specific growth rate (SGR), alongside histopathological analysis of muscle tissue. Results indicated that *L. paracasei* posed no significant threat in the brine shrimp lethality assay at concentrations of 10⁶, 10⁷, and 10⁸ CFU/mL. In antagonistic activity tests, *L. paracasei* supernatant demonstrated an average inhibition zone of 16.56 ± 2.07 cm, compared to 0 cm for the negative control (MRSB) and 28.89 ± 1.27 cm for the positive control (chloramphenicol). In vivo studies revealed improved feed conversion ratios (FCR) in probiotic-supplemented groups (2.049 for 10⁷ CFU/mL and 2.415 for 10⁸ CFU/mL) compared to the control group (2.402). These findings suggest that *L. paracasei* supplementation positively influences tilapia growth and health, underscoring its potential as a sustainable probiotic in aquaculture.

Keywords: Aquaculture, Nile tilapia, probiotics, *Lactobacillus paracasei*, *Komagataeibacter xylinus*

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Presenter ID: 13



DIVERSITY OF ENDOPHYTIC FUNGI IN SONNERATIA ALBA USING METAGENOMICS.

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Sonneratia alba is a mangrove tree that plays an integral role in the unique coastal ecosystems. Despite their ecological significance, these trees and their microbial communities—particularly endophytic fungi—remain vastly understudied. These fungi, which live symbiotically within plant tissues, contribute significantly to ecosystem functions. In this study, we explore the taxonomic diversity of fungal communities in three distinct samples of *Sonneratia alba* (S1M, S2M, and S3M) from Morib Beach, Selangor, Malaysia, using metagenomic analysis. Among these, S2M exhibits the highest biodiversity, as evidenced by a higher number of identified fungal taxa. There is an overlap between S1M and S2M of ten endophytic fungal taxa. Taxonomic profiling further indicates a strong dominance of Ascomycota in the fungal communities, while Basidiomycota are significantly underrepresented. At the class level, Dothideomycetes constitute the most abundant group, accounting for 94% of total OTUs, whereas Eurotiomycetes contribute notably to S1M and S2M. At the genus level, *Phyllosticta* emerges as the absolute dominant taxon. Overall, this study highlights the advantages of metagenomic analysis in unveiling the hidden diversity of mangrove fungi, emphasizing its advantages over traditional culture-based methods. By capturing a broader range of fungal taxa, including rare and previously undetected species, metagenomics provides a more accurate and unbiased assessment of fungal biodiversity in these ecologically vital habitats.

Keywords: endophytes, mangroves, amplicon sequencing, DNA barcoding.

\Presenter ID: 14



DISSOLVED INORGANIC NUTRIENT AND CHLOROPHYLL-A DYNAMICS IN KELANTAN-TERENGGANU WATERS: MONSOON-UPWELLING EFFECTS AND STABLE ISOTOPE EVIDENCE OF NITROGEN UPTAKE

AZYYATI ABDUL AZIZ^{1*}, NURUL HUDA AHMAD ISHAK², FAZLIANA MUSTAJAP², POH HENG KOK³, KU NOR AFIZA ASNIDA KU MANSOR³, KU MOHD KALKAU SAR KU YUSOF², MUHAMMAD IZUAN NADZRI¹ AND SUHAIMI SURATMAN^{1,4}

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Seasonal monsoons and coastal upwelling play key roles in shaping nutrient dynamics and primary productivity in marine ecosystems. This study investigated the dynamics of dissolved inorganic nutrients (nitrite, nitrate, ammonium, phosphate), chlorophyll-a, temperature, and salinity in response to monsoonal variability in Terengganu and Kelantan waters (4.0°N - 6.5°N, 102.3°E - 106.0°E). Multidisciplinary oceanographic surveys were conducted across 27 stations, with nitrogen uptake investigations at four stations using the ¹⁵N-labeled stable isotope tracer incubation technique to quantify nitrate and ammonium uptake rates. During the northeast monsoon, significantly higher nutrient and chlorophyll-a concentrations ($p < 0.05$) were observed, largely due to enhanced river discharge and stronger wind-driven vertical mixing. Conversely, coastal upwelling between 4.0°N and 5.0°N during the southwest monsoon was marked by a surface temperature decrease (29.85 to 24.89°C) and shoaling of the thermocline and halocline. However, its weak intensity limited the upward transport of deep nutrient-rich waters to the surface waters. An onshore-offshore gradient was evident, with declining nutrient and chlorophyll-a concentrations seaward, reflecting reduced terrestrial inputs. Nitrogen uptake results indicated regenerated production dominated, with ammonium uptake (0.20–25.0 nM N h⁻¹) surpassing nitrate (0.09–4.23 nM N h⁻¹), yielding low f -ratios (< 0.5). These findings suggest that phytoplankton growth in these oligotrophic waters was primarily sustained and fueled by regenerated nitrogen rather than new nitrogen inputs during our study period. This study revealed how monsoonal patterns and limited upwelling influenced nutrient availability and phytoplankton biomass, offering insights for managing fisheries and ecosystems.

Keywords: Oligotrophic marine, stable isotope analysis, nitrate uptake, phytoplankton productivity, upwelling dynamics.

Presenter ID: 15



**PIONEERING REFLECTANCE SPECTROSCOPIC ANALYSIS OF CERAMIC SHERDS FROM THE
BIDONG SHIPWRECK**

Nur Khatibah Md Yunos^{1*}, Pan Hui-Juan², Shouye Yang³, Elena Ifandi⁴, Mohd Nur Ismail⁵, Effi Helmy Ariffin¹,
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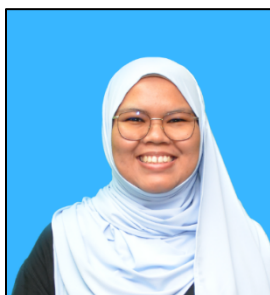
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The Bidong Shipwreck, located off the east coast of Peninsular Malaysia, is a significant underwater archaeological site that provides insights into Southeast Asian maritime trade from the 16th century. This study investigate the color reflectance properties of ceramic sherds retrieved from the wreck, to enhance comprehension of their variability, post-depositional modifications, and production techniques. This study employs rapid and cost-effective color reflectance analysis to assess the sherd interior, exterior and powder sample. The spectral data were transformed into CIELAB color space, showing significant correlation patterns among the sample type. These variations indicate that future research may utilize diverse measured surfaces for enhanced interpretation in ceramic color study. The interior is optimal for glaze study, the exterior closely corresponds with the ceramic body, and the powdered sample is utilised for assessing overall color properties. Varimax-rotated principal component analysis (VPCA) utilizing visible (VIS), near-infrared (NIR), and full range spectra identified a total of 29 component loadings. The resulting component loadings show distinct spectral patterns, which were compared to the USGS spectral libraries to identify and interpret the significant minerals linked to each component. This study demonstrates the utility of color reflectance analysis in archaeological ceramic studies to understand historical trade and preservation dynamics of underwater cultural property.

Keywords: South China Sea, Underwater cultural heritage (UCH), Minerals, Varimax-rotated principal component analysis (VPCA)

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Presenter ID: 16



ZOOPLANKTON FOOD WEB DYNAMICS DURING AUSTRAL SUMMER IN THE INDIAN SECTOR OF THE SOUTHERN OCEAN

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Stable isotope analysis (SIA) is a valuable tool for understanding the trophic ecology of zooplankton in the Southern Ocean (SO), yet the Indian sector remains understudied. This study investigates the $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values of key zooplankton taxa across three transects to assess trophic structure and identify an appropriate baseline for trophic level estimation. A general enrichment in $\delta^{13}\text{C}$ values was observed from particulate organic matter (POM) to primary and secondary consumers, though considerable overlap occurred among some taxa. $\delta^{15}\text{N}$ values showed a continuous rather than discrete stepwise increase, reflecting the complexity of trophic interactions. *Rhincalanus gigas* exhibited the most consistent and lowest $\delta^{15}\text{N}$ values, making it the most suitable baseline reference compared to salps. Estimated trophic levels for *Themisto gaudichaudii*, *Thysanoessa macrura*, *Calanus propinquus*, and *Metridia* spp. ranged between 2.5 and 3.0, indicating a relatively short and consistent food chain. Notably, *T. gaudichaudii*, an opportunistic carnivore-omnivore, displayed $\delta^{13}\text{C}$ values comparable to *R. gigas*, suggesting dietary flexibility and potential exploitation of seasonal productivity peaks. These findings underscore the dynamic and interconnected nature of the Southern Ocean food web, influenced by environmental factors such as water masses, ice dynamics, and seasonal variability. Continued research is essential to unravel zooplankton's complex ecological roles and interactions in this rapidly changing region.

Keywords: Antarctic ecosystem, copepod, baseline reference level, trophodynamic, *Salpa thompsoni*

Presenter ID: 17



INTEGRATING STAKEHOLDERS' KNOWLEDGE AND ATTITUDES ON CO-DESIGN AND ZONING OF MARINE PROTECTED AREAS IN MALAYSIA: A DESKTOP STUDY IN TIOMAN ISLAND

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Marine ecosystem is under ever-growing threats from overfishing, pollution and other unregulated human activities. In Malaysia, one of the major challenges in managing Marine Protected Areas (MPAs) including in Tioman Island is the lack of clear and inclusive zoning plan. Conflicting uses within this zone threaten the marine biodiversity and weaken conservation efforts. Stakeholders' knowledge and attitudes is important to integrate with existing information related to marine biodiversity and human activities to co-design and rezoning the MPA in Tioman Island. This study aims to assess stakeholders' perception on the co-design MPA zoning and to identify user's conflicts and marine activity patterns through focus group discussion (FGD). These objectives are important to recommend inclusive zoning area for MPA in Malaysia based on stakeholder input. Potential stakeholders that will be participating in these FGD such as from government agencies, non-governmental organization (NGO), dive operators, local fisherman, business owners and local community leaders. A desktop study analysis was conducted to identify research gaps and relevant information from the successful case study in order to co-design the better MPA for Malaysia. Reviewed articles that related to MPA zoning and co-design from relevant sources will be used for the desktop studies. The outcomes from this study will contribute towards a better understanding of stakeholders' needs, inform zoning recommendations and set a stage for more inclusive and sustainable marine management on Tioman Island.

Keywords: MPA, co-design, focus group discussion, zoning, Tioman Island

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Presenter ID: 18



DIVERSITY AND NEW RECORDS OF COPEPOD IN COMMERCIAL MARINE FISHES FROM MALAYSIAN WATERS

SITI NUR NADHIRAH MOHD ZAMRI¹, AHMAD SYAZNI KAMARUDIN¹, NORSHIDA ISMAIL^{1,2}

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Parasitic copepods represent important ectoparasites impacting marine fish health, influencing both wild populations and fisheries productivity. This study investigated copepod diversity associated with 14 commercial marine fish species collected from Malaysian coastal waters. Seven copepod species were identified across five fish hosts, including new national records: *Caligus asymmetricus*, *Caligus cybii*, *Caligus infestans*, and *Cybicola armatus* from *Scomberomorus commerson*. Other identified copepods include *Lernanthropus latis* from *Lates calcarifer*, *Caligus callyodoni* from *Scarus* sp., *Caligus alepicolus* from “Selar papan”, and *Caligus hoplognathi* from *Lutjanus erythropterus*. These findings significantly expand the existing knowledge of copepod distribution and diversity in Malaysia, providing essential baseline data to support parasite management and fisheries sustainability.

Keywords: *Scomberomorus commerson*, *Cybicola armatus*, taxonomy, morphology

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Marine ECS Forum 2025 2ND ANNUAL FORUM FOR EARLY CAREER SCIENTISTS IN MARINE SCIENCE

WORKSHOP 1:

How Does the Bottom
Ocean Water Return Home?

Unraveling Debates on the
Abyssal Upwelling in the
Indo-Pacific Ocean

Prof. Dr. HAN Lei

China-ASEAN College of Marine Science,
Xiamen University Malaysia (XMUM)



XIAMEN UNIVERSITY MALAYSIA
廈門大學 馬來西亞分校



12 APRIL

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02.00pm - 03.30pm



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Workshop Title:

How Does the Bottom Ocean Water Return Home? – Unraveling Debates on the Abyssal Upwelling in the Indo-Pacific Ocean

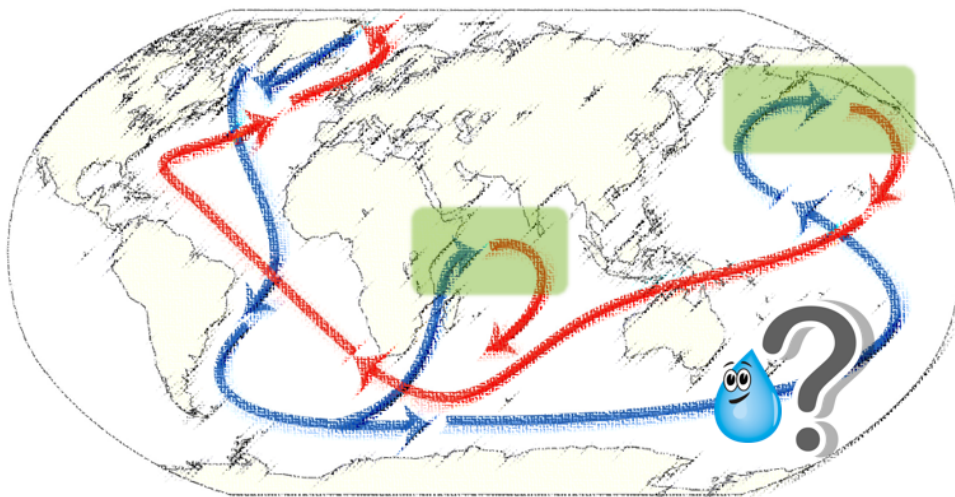
Speaker: Prof HAN Lei,

Affiliation: China-ASEAN College of Marine Science, Xiamen University, Malaysia

Abstract

While the sinking formation of Antarctic Bottom Water (AABW) is well understood, how this bottom water "returns home" through upwelling within ocean basins, particularly the Indo-Pacific, remains shrouded in uncertainty. In the 1960s, Munk's classic "Abyssal Recipes" theory sought to explain these abyssal flows, yet later observations exposed two significant conflicts with real-world data. In 2016, Ferrari, McDougall, and colleagues proposed the "Towards a New Abyssal Recipe" framework, introducing bottom boundary layer (BBL) upwelling to address Munk's inconsistencies. Drawing on recent evidence of a potential cooling trend in the deep ocean, this talk revisits these debates, offering a fresh interpretation of Munk's discrepancies and proposing a new mechanism for abyssal upwelling in the Indo-Pacific. It contributes to the ongoing quest to unravel how bottom waters complete their global journey.

"What road, can take me home?"



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Marine ECS Forum 2025
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IN MARINE SCIENCE







**Dr. Azilah
Abddul Malek**



**Nur Hafizati
Abdul Halim**



**Rafiah
Mohamed Roshidi**

WORKSHOP 2:

Introduction to
Stable Isotope Analysis (SIA)



12

APRIL

Biodiversity & Biological
Oceanography Laboratory

02.00am - 03.30pm



KEMENTERIAN SAINS,
TEKNOLOGI DAN INOVASI



NUKLEAR
MALAYSIA

Workshop Title:

Introduction to Stable Isotope Analysis (SIA)

Speaker: Dr. Azilah Abdul Malek, Nur Hafizati Abdul Halim and Rafiah Mohamed Roshidi

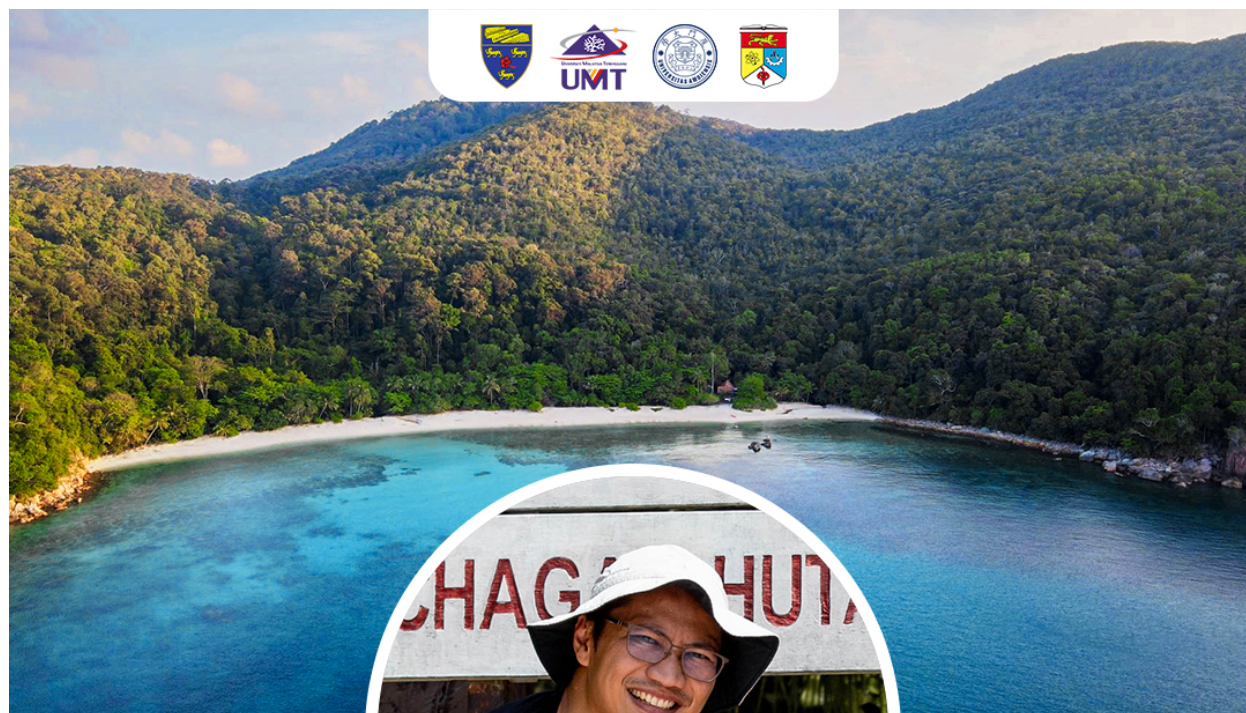
Affiliation: Stable Isotope Laboratory, Nuklear Malaysia

Abstract

Stable isotope analysis is a powerful scientific technique used to study the composition of targeted elements within various materials. Unlike radioactive isotopes, stable isotopes do not undergo radioactive decay, allowing them to serve as reliable markers in diverse fields of research. The stable isotope analysis can be used in various fields for instance ecology and environmental science, geology and paleoclimatology, archaeology and anthropology, agriculture, and many more. The samples from various field studies will be analyzed using a high precision device called the Isotope Ratio Mass Spectrometry (IRMS). This device measures the relative abundances of isotopes by ionizing the sample and separating the ions based on their mass-to-charge ratios. This workshop will provide a brief introduction on the stable isotope analysis, its applications, and services offered by the Agensi Nuklear Malaysia.



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