



eMARINA

The quarterly newsletter of
The Hong Kong Joint Branch of The Royal Institution of Naval Architects
and The Institute of Marine Engineering, Science and Technology,
and The Hong Kong Institute of Marine Technology
皇家造船師學會暨輪機工程及海事科技學會香港聯合分會
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HKJB & HKIMT Activities

HKJB Annual General Meeting on 17th Jan. 2023 at Aberdeen Boat Club

The Annual General Meeting of the Hong Kong Joint Branch (HKJB) was held at the Aberdeen Boat Club on 17 January 2023. Despite some of our members being infected with COVID-19, the meeting was attended by 25 members. During the meeting, HKJB Chairman Mr. Simon Chen and Honorary Treasurer Mr. K F Tang presented a comprehensive annual report on the work done and the financial status of



HKJB in 2022.

The fifth wave of COVID-19 in 2022 had restricted members' physical participation in the activities organized during the first quarter of 2022 and our physical presence outside Hong Kong.

In February 2022, China introduced global ocean governance through the "Blue

Partnership." The Hong Kong University of Science and Technology (HKUST), the Hong Kong Branch of the Southern Marine Science and Engineering Guangdong Laboratory (Guangzhou), and the Department of Ocean Science of the Southern Marine Science and Engineering Guangdong Laboratory (Guangzhou) jointly led the efforts in technological development. They aimed to introduce the "Industry-University-Research" approach to help technological advancement in resolving problems and conserving and sustaining the use of all marine resources. Five summits would be organized, and three of them on Blue Marine Economy (held on 23 June 2022), Applied Fundamental Research (held on 17 September 2022), and Incubation & Commercialization (held on 6 December 2022) were successfully completed in 2022.



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Another important activity was the conclusion of the 2021-2022 STEM x Marine Vehicle Design and Construction Competition on 4 June 2022. To continue to foster and develop the younger generation's interests in the maritime industry in Hong Kong, the 2022-2023 STEM x Marine Vehicle Design and Construction Competition was launched on 23 November 2022 to keep up the momentum.

Despite the travelling restrictions imposed on local residents to go abroad, the Chairman took the opportunities of his business visits to the Mainland and Taiwan to maintain our ties with Guangdong Society of Naval Architecture and Marine Engineering (GDSNAME), Fujian Society of Naval Architects and Marine Engineers (FSNAME), Shanghai Society of Naval Architects and



Marine Engineers (SSNAME), Liaoning Society of Naval Architects and Marine Engineers (LSNAME) and Taiwan Society of Naval Architects and Marine Engineers (TSNAME). With physical participation in the conferences and events organized by the learned societies, we were able to strengthen our ties with our local partners like ICS Hong Kong Branch, HKIMT, HKIE-MMNC Division, Hong Kong Branch of Southern Marine Science and Engineering GD Laboratory and HKUST.



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There were seven such summits, webinars, conferences and events after the fifth wave of the pandemic in 2022. They included the Blue Marine Economy Summit (on 23 June 2022), GDSNAME Webinar on Marine Smart Technology, Chairmen's Cocktail Reception (on 15 September 2022), Applied Fundamental Research Summit (on 17 September 2022), Green Shipping and



THE OPENING



Marine Technology (on 26 November 2022), Cross Strait Conference on Nautical Technology and Ocean Engineering (on 1 December 2022 which was the first time that such a joint webinar was held with the Fujian Society of Naval Architects and Marine Engineers (FSNAME)) and Incubation and Commercialization Summit (on 6 December 2022). Reports on these

events could be found in the eMARINA published in 2022.



A Special Council Committee Meeting was held after the AGM to elect new office bearers for the 2023 HKJB Committee according to the regulatory requirements of HKJB. Mr. Kaushik Roy was elected unanimously by the Committee Members as the new HKJB Chairman for 2023-2024. Our heartiest congratulations to Mr. Roy for his Chairmanship! Other office bearers, Mr. Leslie Lee as Vice Chairman, Mr. K F Tang as Honorary Treasurer, Ms. Yoyo Chan as Honorary Secretary and Mr. Jeff Woo as Honorary Assistant Secretary were also elected accordingly.

Dinner was served immediately after the AGM and Special Council Committee Meeting. We were very thankful to our past Chairman for making this arrangement at the Aberdeen Boat Club! It was our



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honour and privilege to be there to enjoy a wonderful night together. The scenic views and the cozy environment were a bonus! Members socialized freely at this perfect time and place to meet old friends and get acquainted with new ones. We exchanged and shared our happy or sad experiences during the pandemic. Professional knowledge and views were also exchanged during the process. No one left before the closing time of the venue!



(Reported by Leslie Lee and Simon Chen)



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Frontier Research Summit on 23 March 2023 at HKUST

HKIMT and HKJB delegates attended the Frontier Research Summit at Hong Kong University of Science and Technology (HKUST) on 23 March 2023. This was the fourth Summit of the Marine Economy Summit Series organized by the Southern Marine Science and Engineering Guangdong Laboratory (Guangzhou), the Hong Kong Branch of the Southern Marine Science and Engineering Guangdong Laboratory (Guangzhou) and the Department of Ocean Science in HKUST. Members who are interested in previous Summits can obtain the information from the previous issues of eMARINA.



Speakers for the different sessions in the Summit are from local universities, government departments, classification societies, ship management companies, Consul General of Australia in Hong Kong and Macau, Consul General of Republic of Poland in Hong Kong as well as other technology enterprises and associations. The discussions were on the following topics:

(a) Marine Functions and Services

Mr. CHENG Liang was one of the speakers in this session. He is the General Director of Yun Zhou. Yun Zhou is a company which specializes in unmanned surface vessels (USV). Mr. CHENG introduced the several types of USVs and ISOODs (Intelligent Swift Ocean Observing Devices) manufactured by his company.

It was interesting to note that Yun Zhou categorized their autonomous USV levels into six which begins at Level 0 - remote control level, Level 1 - program control Level, Level 2 - planning level with semi-autonomous capability, Level 3 - task level with autonomous capability in simple scenes, Level 4 - behavioral level autonomous capability in complex scenes, Level 5 - decision making level with highly autonomous capability and Level 6 - collaborative level with completely autonomous capability. These levels were quite different from the categorization of IMO Maritime Autonomous Surface Ships (MASS) which had only four degrees of autonomous levels, namely, Degree 1 - some operations may be automated and at times be unsupervised but with seafarers on board ready to take control, Degree 2 - ships are controlled and operated from another location and seafarers are available on board to

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take control and to operate the shipboard systems and functions, Degree 3 - the ship is controlled and operated from another location and no seafarers are on board and Degree 4 - ships are able to make decisions and determine actions by themselves.



MASS is devised for the autonomous operation of cargo ships. Its categorization is based on the autonomous operation and control of systems on board a ship with or without seafarers. USV is designed with no seafarers and cargo. Its various designs are mainly for surveillance and cleaning up of the environment. It makes sense to

categorize the autonomous level of USVs on how intelligent they are to react with the environment in which they operate in!

Yun Zhou started their USV research and development way back in 2020. Technical research, functional design and data collection were conducted for the need to construct USVs during this year. In 2021, the company continued to conduct research and development of the various components needed in the construction of the vessel. 2022 was spent in the construction and testing of these vessels for areas such as geographical and hydrographic surveys, water pollution monitoring and control, regulatory enforcement, disaster rescue etc.

2023 is a fruitful year! USVs reaped the benefits of the developments in previous years. USVs have found their way into areas like sewage outlets investigation, water quality monitoring, harbor survey, radioactive activity tracking, scientific expedition, under water mapping, hydrographic survey, measurement of oil leaks, Antarctic survey, geomagnetic observation, marine scientific research, gravity and magnetic measurement cluster observation, offshore oil and gas operation and maintenance, Islands surveying, satellite calibration and bridge maintenance.

An Ocean Alpha project was set up by the company to serve major scientific research institutions, universities, and enterprises, in assisting their Antarctic scientific research, marine stereoscopic observation, offshore energy platforms operation and maintenance. Now, Ocean Alpha has branches

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in Beijing, Xian, Shenzhen, Yancheng and Singapore to engage with the industry to help boost the blue economy.

To date, the company's unmanned vessels have been used by the Government 24/7 for maritime patrolling, building a smart coastal defense in the regions and in protecting the environment.

(b) Marine Energy

This was a discussion session. Panelists and speakers were from Department of Chemical and Biological Engineering HKUST, Office for Attracting Strategic Enterprises, HKSAR Government, Mitsui OSK Lines Ltd. and Shenzhen Investigation and Research.

Marine energy is the world's largest untapped renewable energy resource. These resources are also in abundance. The perpetual natural movement of waves, surface and underwater currents and tidal streams, water temperature difference between surface and depth and water salinity can be used to drive a turbine to generate electricity! Mr. ROY explained the developments in these areas and gave a brief insight into the advantages and shortcomings for each of these resources.



The main difficulties in tapping these resources are how to convert them into the desirable form of energy without polluting the environment! Marine energy is converted into electrical energy for our daily use. In capturing wave and tidal energy, offshore or onshore power plants may be installed. Noise pollution may result from running these plants disturbing wildlife as well as private and commercial vessels sailing in the area. It is also quite unsightly to see such structures in the middle of the ocean. Therefore, effective converters are badly needed!

For wave energy converter (WEC), the Frenchmen Pierre-Simon Girard was the forerunner way back in 1799 for his wave power patent. However, Yoshio Masuda was considered to be the father of modern WEC. He got the patent for such a machine to convert wave energy into electrical energy. As offshore devices, they are more expensive to maintain than their onshore equivalents. The unpredictable weather at sea increases the down time and costs of maintaining these machines. These technologies are not mature and are not yet commercially viable. Similar converters for currents and tidal streams have suffered the same fate!

Around the tropics and equator on earth, the water in the deep sea is cold and the surface is warm. This temperature difference can be harnessed and turned into electricity using heat pumps and turbines. At present, plants built are only able to generate a fraction of wind energy. Much must be done to make them commercially viable.

To enhance the power of salinity gradient, membranes are used. The Pressure Retarded Osmosis (PRO) uses a membrane to separate salt solution from fresh water. Freshwater flows through the membrane towards the sea water side. As a result, the pressure on the sea water side increases. The pressurized water is then used to spin a turbine to generate electricity. Reversed Electro Dialysis (RED) uses salt ions transported through the membrane. The salinity difference across the membrane is the driving force in transporting ions. As the compartments are filled alternately with sea water and freshwater, the electric potential generated is converted into electricity. PRO and RED are most suitable for use in estuaries where there is a supply of both fresh and salt water.

The renewable marine resources were quite new to the audience and people are curious about how they worked to generate electricity. Many questions were asked and explained during the discussion. Mr. ROY and other panelists shared their knowledge and experience on the subjects. Technological development is a never-ending quest. May be someday, ships can tap these marine renewable energies and sail the oceans without stopping to refuel!

(c) Blue Chemistry and Sustainability

The speakers for this session were from the Department of Chemistry, HKUST; Department of Civil and Environmental Engineering, HKUST and GBA Carbon Neutrality Association.

Marine blue chemistry and sustainability are at the heart of environmental, social and economic developments today. To achieve economic development but at the expense of deteriorating environment and having harmful effects to the society is simply not acceptable!

This summit awakened the HKIMT/HKJB members' conscience on the importance of sustainable supply of



energy, water and food. To achieve a renewable supply of these resources is the direction for frontier researchers in “saving the world”! Many of our members took an active part in the discussions that followed.

It is the Central Government’s policy to develop the Greater Bay Area (GBA) into an international innovation and technology hub, to build a global competitive modern industrial system with focus on ecological conservation and quality living. Therefore, the research topics presented by the speakers were the application of hydrogen fuel to merchant ships, offshore fish farms and the developing opportunities in GBA.

Photos and highlight videos taken during the summit are available at the following link:

https://gohkust-my.sharepoint.com/personal/edmondcheung_ust_hk/_layouts/15/onedrive.aspx?id=%2Fpersonal%2Fedmondcheung%5Fust%5Fhk%2FDocuments%2FPhoto%2DFrontier%20Research%20Summit%20%2823%20Mar%202023%29&ga=1. The next and last summit in the series is on “Advanced Industrial Technology Summit” which will be held at HKUST on 12 May 2023. Members may refer to the official websites for further details: <https://hkbgs.hkust.edu.hk/project>.

(Reported by Simon Chen and Leslie Lee)

HKJB & HKIMT Coming Activities

Date	Event
19 June 2023	Technical Seminar on How Marine Technical Decisions Influence Shipping Companies’ Commercial Result
24 June 2023	Dragon Boats Racing at Stonecutters Island
26 – 28 July 2023	INMEX China 2023 at Guangzhou

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