The 16th International Conference on Hydrodynamics

ICHD 2026 Conference Program

April 14-18, 2026 | Macao, China

Organized by

澳門科技大學 MACAU UNIVERSITY OF SCIENCE AND TECHNOLOGY

創新工程學院 Faculty of Innovation Engineering

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Message from LOC Chair

The 16th International Conference on Hydrodynamics (ICHD 2026) will be held in Macao from April 15 to 18, 2026, organized by the Macau University of Science and Technology (MUST). ICHD was first held in Wuxi, China in 1994. Since then, it has taken place in Hong Kong, Seoul, Yokohama, Tainan, Perth, Ischia, Nantes, Shanghai, St. Petersburg, Singapore, Egmond aan Zee, Incheon, Wuxi, and Rome. Over the years, ICHD has established itself as a significant forum for academics, researchers, engineers, and professionals working in fields related to hydrodynamic science and technology.

ICHD 2026 has attracted a lot of interest, and we can expect to host 200+ participants exchanging the latest findings on cutting-edge research as well as themes related to the sustainable development of the Guangdong-Hong Kong-Macao Greater Bay Area. Apart from the keynote lectures by world-leading experts, parallel sessions will be held on topics that include:

- AI for Fluid Mechanics
- Hydrodynamics of Autonomous Systems
- Ship Hydrodynamics
- Renewable Energy
- Cavitation/Multiphase Flow
- Wave Hydrodynamics
- Eco-Hydrodynamics

ICHD 2026 will also feature a Theodore Yao-Tsu Wu Symposium in Honor of the 102nd Birthday of a giant in hydrodynamics. In addition, fundamental research issues related to climate resilience for coastal cities will also be addressed in a high-level Workshop on Extreme Impact on the Coastal Region from the Ocean.

We warmly invite you to join us at ICHD 2026 in Macao – a vibrant modern city with a rich cultural history of 400+ years of east meeting west. Together we explore the UNESCO-listed Historic Centre of Macao through technical tours and study trips, and experience the importance of flood protection in this vulnerable coastal city. The conference will also include exhibitions from industry sponsors, government agencies, and academic groups.

We look forward to welcoming you in Macao.

Joseph Hun-wei Lee FREng FHKEng HonFHKIE
Chairman of the University Advisory Committee
Chair Professor and Director of the MWR Key Laboratory of River Basin Digital Twinning
Macau University of Science and Technology
Chair of ICHD 2026

Conference Committee

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Prof. Mohammed Ghidaoui, The Hong Kong University of Science and Technology, China
Prof. Marilena Greco, Norwegian University of Science and Technology, Norway
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Prof. Yasunori Watanabe, Hokkaido University, Japan
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Prof. Zhifeng Yang, Guangdong University of Technology, China
Prof. Zhiming Yuan, University of Strathclyde, UK

Local Organizing Committee

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Co-Secretary Dr. Weiquan Jiang
Dr. Yibin Liu
Mr. Eric Zhang

Conference Venue

Venue of the Opening Ceremony

MGM MACAU, Peninsula

(美高梅酒店，澳門半島)

Address: Avenida Dr. Sun Yat-Sen, n.º 1101, Macao, China

N.B. The venue is at MGM Macau, **not** MGM Cotai.

Conference Venue

Macau University of Science and Technology

Address: Avenida Wai Long, Taipa, Macao, China

Conference Rooms – MUST Campus

Room	April 15	April 16	April 17
N101	14:00-18:00	09:30-18:00	09:30-11:00
O601	14:00-18:00		
O602	14:00-18:00		
O604	14:00-18:00		
O801		11:00-18:00	11:00-13:00
O802		11:00-18:00	11:00-13:00
O803			11:00-13:00
O804		09:00-18:00	11:00-13:00

MUST Campus Map 科大校園圖

更多詳情
More details

A 行政大樓 Administration Building

B 教學大樓 Academic Building

C 教學大樓 Academic Building
- 學生便利店 Convenience Store
- 電腦店 Computer Shop
- 咖啡閣 Coffee Corner

D 會議廳 Conference Hall

E 活動中心 Recreational Complex
- 點聚 Food Connection
- 實驗室 Laboratory

FG 宿舍 Dormitory

H 科技大樓 Science and Technology Building
- 科大醫院 University Hospital
- 中葡機制與實驗全國重點實驗室 State Key Laboratory of Mechanism and Quality of Chinese Medicine
- 澳門藥物及健康應用研究院 Macau Institute for Applied Research in Medicine and Health

I 足球/田徑運動場 Athletic Field / Stadium
- 金木工設計實驗室 Metal & Wood Arts Design Lab

J 室內體育館 Gymnasium

KQ 澳門國際學校 The International School of Macao (TIS)

LM 宿舍 Dormitory
- 公寓式酒店 Guest House
- 教學及實習酒店 Training Hotel

N 圖書館大樓 Library Building
- 圖書館 Library
- 季節 The Seasons
- 咖啡閣 Coffee Corner
- 銀行 Bank
- 郵箱 Post Box

O 教學大樓 Academic Building
- 廚藝天地 Food Studio

P 宿舍 Dormitory
- 學生便利店 Convenience store
- 生活百貨店 Mini shop
- 餐廳 Restaurant
- 銀行 Bank
- 康研坊 MUST Hub
- 科大點綻 - 體驗學習廊 MUST LIKE - A Hub for Experiential Learning
- 藝術廣場 Art Square

R 綜合教學大樓 Academic Complex
- 影視廳 Movie Hall
- 禮堂廳 Grand Auditorium
- 咖啡閣 Coffee Corner

Program at a Glance

Day 0 Tuesday, April 14

Time	Activity	Venue
14:00–20:30	Registration & Welcome Reception	**N101 Lobby MUST Campus**

Day 1 Wednesday, April 15

Time	Activity	Venue
	Opening Ceremony	
09:30–10:10	***Opening Address by*** • President of MUST • Government and Industry Representatives • Representative from Executive Committee of ICHD • Chair of Local Organizing Committee	**MGM MACAU Grand Ballroom, Level 1**
10:10–10:30	*Group Photo / Coffee Break*	
	Keynote Lectures *Chair: Prof. Joseph Lee & Prof. Hua Liu*	
10:30–11:10	***Hydrodynamics of Marine Fog*** ***Prof. Harindra Joseph Fernando,*** *University of Notre Dame*	**MGM MACAU Grand Ballroom, Level 1**
11:10–11:50	***Data-Driven Large-Eddy Simulation for Time-Accurate Prediction of Turbulent Flows: Turbulence Modeling and Shape Optimization*** ***Prof. Guowei He,*** *Institute of Mechanics, Chinese Academy of Sciences*	
11:50–12:20	***Adaptive Coastal Digital Twins for Resilience*** ***Dr. Sai Czander Ravela,*** *Massachusetts Institute of Technology*	
12:20–14:00	*Lunch Break*	
	Parallel Sessions	**MUST Campus**
14:00–15:45	**Theodore Y. Wu Symposium**	**N101**
	Ship Hydrodynamics	**O602**
	Eco-Hydrodynamics	**O601**
	Hydrodynamics of Autonomous Systems	**O604**
	Ship Hydrodynamics and Water Waves (Hengqin[1])	
15:45–16:00	*Coffee Break*	
16:00–18:00	**Theodore Y. Wu Symposium**	**N101**
	Ship Hydrodynamics	**O602**
	Eco-Hydrodynamics	**O601**
	Renewable Energy	**O604**
	Ship Hydrodynamics and Water Waves (Hengqin[1])	
16:30–20:30	**ICHD Executive Committee Meeting and Dinner (by Invitation)**	

[1] This session will be held by MUST Innovation Technology Research Institute in the Guangdong-Macao In-Depth Cooperation Zone in Hengqin.

Day 2 Thursday, April 16

Time	Activity	Venue
	Keynote Lectures *Chair: Prof. Harindra J. Fernando & Prof. Ye Li*	**MUST Campus**
09:30–10:10	***Fish-Inspired Hydrodynamics: From Biological Swimming to Engineered Underwater Vehicles*** ***Prof. Marilena Greco,*** *Norwegian University of Science and Technology*	**N101**
10:10–10:50	***On Wave Breaking and Instabilities*** ***Prof. Frederic Dias,*** *Ecole normale supérieure Paris–Saclay (ENSPS)*	
10:50–11:05	*Coffee Break*	
	Parallel Sessions	**MUST Campus**
11:05–12:35	**High-level Workshop: Extreme Waves/Disaster Management**	**N101**
	AI for Fluid Mechanics	**O801**
	Renewable Energy	**O802**
	Cavitation/Multiphase Flows	**O804**
12:35–14:00	*Lunch Break*	
14:00–15:45	**High-level Workshop**	**N101**
	Interdisciplinary Problems	**O801**
	Wave Hydrodynamics	**O802**
	Cavitation/Multiphase Flows	**O804**
15:45–16:00	*Coffee Break*	
16:00–17:45	**High-level Workshop**	**N101**
	Interdisciplinary Problems	**O801**
	Wave Hydrodynamics	**O802**
	Cavitation/Multiphase Flows	**O804**
18:00–21:00	***Conference Banquet***	

Day 3 Friday, April 17

Time	Activity	Venue
	Keynote Lectures *Chair: Prof. Huan-Feng Duan*	**MUST Campus**
09:30–10:10	***Time Reversibility and Subwavelength Control of Waves and Their Applications*** ***Prof. Mohamed Salah Ghiduaoi,*** *The Hong Kong University of Science and Technology*	**N101**
10:10–10:50	***Eco-Hydraulics: Waves, Currents and Jets in Nature-Based Design*** ***Prof. Michele Mossa,*** *Polytechnic University of Bari*	
10:50–11:05	*Coffee Break*	
	Parallel Sessions	**MUST Campus**
11:05–12:35	**Industrial Flows**	**O801**
	AI for Fluid Mechanics	**O802**
	Wave Hydrodynamics	**O803**
	Interdisciplinary Problems	**O804**
12:35–14:00	*Lunch Break*	
	Technical/Culture Visit	
14:00–17:30	***Route 1*** • National Observation and Research Station of Coastal Ecological Environments in Macao • Key Laboratory of River Basin Digital Twinning of Ministry of Water Resources • Hac Sa Beach Nourishment and Conservation	
	Route 2 • Coloane Flood Protection Works • Inner Harbour Flooding • The Historic Centre of Macao	

Day 4 Saturday, April 18

Time	Activity
09:00-12:30	Macao Study Trip: Self-Guided Exploration

Keynote Speakers

Prof. Harindra Joseph Fernando

Departments of Civil & Environmental Engineering and Earth Sciences and Aerospace and Mechanical Engineering, University of Notre Dame, USA

10:30–11:10, April 15, 2026 *MGM MACAU - Grand Ballroom, Level 1*

Bio.: Harindra Joseph Fernando is currently the Wayne and Diana Murdy Endowed Professor of Engineering and Geosciences at University of Notre Dame. He was educated at the University of Sri Lanka (BS), the Johns Hopkins University (MA, PhD) and was a post-doctoral fellow at Caltech. His academic career started at the Arizona State University in 1984, and was a professor of mechanical and aerospace engineering and the Director of the Board of Regents' Environmental Fluid Dynamics Center during 1992-2010. He joined University of Notre Dame in 2010. He is a Fellow of the American Society of Mechanical Engineers (ASME), American Physical Society (APS), American Meteorological Society (AMS), American Association for the Advancement of Science (AAAS), American Geophysical Union (AGU) and International Association of Hydro-Environment Research (IAHR). He was elected to the European Academy in 2009. He received docteur honoris causa from University of Grenoble, France, in 2014 and Doctor of Laws Honoris Causa from University of Dundee, Scotland in 2016. He is the Editor-in-Chief of the Journal of Environmental Fluid Dynamics and is on the editorial boards of Theoretical and Computational Fluid Dynamics, Non-Linear Processes in Geophysics and the Proceedings of the Royal Society A (London). He conducts theoretical, experimental, numerical and field experimental research on various environmental flows. He was a Principal Investigator of many international field experiments, including MATERHORN, PERDIGAO, CASPER, ASIRI, ASIRI-RAWI, MISO-BOB, IFFExO, C-FOG and FATIMA (https://efmlab.nd.edu/)

Speech Title: Hydrodynamics of Marine Fog

Abstract: Marine fog is defined as a turbulent air layer contiguous the ocean surface, laden with ~ 1-30 microns sized water droplets, characterized by the Meteorological Optical Range (i.e., visibility) less than 1 km. Fog disrupts transportation, poses security threats, disorients human perception and impacts communications and ecosystems. Net deposition of water vapor on hygroscopic aerosols in near-saturated marine environments leads to marine fog through collusion of dynamic, thermodynamic and physicochemical processes. On larger scales, temperature inhomogeneities of synoptic [low-pressure, colder] weather systems break down to the dissipation (Obukhov-Corrsin) scales, providing an entrée for marine-fog genesis. Evolving fog droplets and their aerosol nuclei are embedded in the smallest (Kolmogorov) eddies of atmospheric turbulence, and a host of two-phase microphysical process involving deposition/evaporation on/from the droplets, droplet surface tension, and eddy straining motions affect the growth, maturation and dissipation (i.e., lifecycle) of fog. This presentation will describe some major findings of a five-year (2021-26) multidisciplinary, multi-investigator, integrative project dubbed Fatima (Fog and turbulence interactions in the marine atmosphere) on marine fog. Ship and land/platform-based field observations in Grand Banks, Sable Island (an islet in the region where warm Gulf Stream and cold Labrador waters mix) and Hibernia Oil Platform

in 2022 as well as multi-ship and aircraft observations in the Yellow Sea (off-coast of the Republic of Korea) in 2023, all accompanied by high-resolution and numerical weather prediction (NWP) model simulations, elicited new meteorological and [bio]physicochemical processes associated with fog lifecycle. The results elicited new physical processes, and indicated some commonly used concepts on fog dynamics need revisiting. This work was funded by the Grant N00014-21-1-2296 of the US Office of Naval Research, administered by the Marine Meteorology and Space Weather Program.

Keynote Speakers

Prof. Guowei He

Lab of Nonlinear Mechanics, Institute of Mechanics, Chinese Academy of Sciences, China

11:10–11:50, April 15, 2026 *MGM MACAU - Grand Ballroom, Level 1*

Bio.: Dr. Guowei He is a professor and the academic director of Institute of Mechanics, Chinese Academy of Science. He is an elected academician of Chinese Academy of Science and a fellow of America Physical Society. He is the current president of Chinese Society of Theoretical and Applied Mechanics and associated editor of APS journal "Phys. Rev. Fluids". His research interests include: turbulence statistical theory and computational modeling, large eddy simulation of turbulence-generated noise and machine learning.

Speech Title: Data-driven Large-eddy Simulation for Time-accurate Prediction of Turbulent Flows: Turbulence Modeling and Shape Optimization

Abstract: Large-eddy simulation (LES) has been increasingly used to predict turbulent flows in naval hydrodynamics, such as flow-structure interaction and hydro-acoustics. These tasks require that LES should be time-accurate: it can correctly predict wavenumber-frequency spectra of velocity and pressure fields and their equivalent space-time correlations. The conventional turbulence models based on one single flow process suffers from their capability of representing the competitive balances of multiple flow processes, such as energy dissipation and random backscatter, attached and separated flows, and the numerical issues, such as stochastic and realization differentials. The machine learning method is potential to become the workhorse for turbulence modelling and numerical issues. In this talk, we present our recent work. (1) Data-driven turbulence models with random forcing: this class of models can be used to correctly predict wavenumber and frequency energy spectra and thus turbulence-generated noise; (2) Knowledge integrated additive (KIA) wall model: this model overcomes the issue of "catastrophic forgetting" in machine learning and can be used to numerically simulate attached and separated flows. (3) LES-based shape optimization: the regularized ensemble Kalman method is introduced to overcome the blow-up of model gradients due to the chaotic nature of turbulence and the LES used for reduction of turbulence-generated noise. The application of LES to the noise radiated from turbulent flows around underwater vehicles is also presented.

Keynote Speakers

Dr. Sai Czander Ravela

Department of Earth, Atmospheric, and Planetary Sciences, Massachusetts Institute of Technology, USA

11:50–12:20, April 15, 2026 *MGM MACAU - Grand Ballroom, Level 1*

Bio.: Dr. Sai Ravela is a Principal Research Scientist in MIT's Department of Earth, Atmospheric, and Planetary Sciences, where he directs the Earth Signals and Systems Group. His work in Climate Risk and Earth's Sustainability (CRISES) advances the Computational Sustainability Stack (CS^2)—a systems framework linking hazard, exposure, vulnerability, impact, and decision-making to build climate resilience — integrating physics-coupled machine learning for hazard downscaling, co-active observing systems for environmental monitoring, computer vision for exposure mapping, large language models for vulnerability assessment, agent-based impact modeling, and game-theoretic approaches for participatory decision-making.

Under his direction, ESSG develops interconnected efforts unified by COAST (Coactive Systems Theory for Estimation, Control, Learning, and Decision-Making), which links inference and information in complex adaptive systems, including CRISES, CAOS (adaptive sensing), SLOOP (photoID-based ecological observatories), STICS (geometry-driven inference for coherent fluids), and DOLS (Dynamics and Optimization of Learning Systems), a nonlinear stochastic theory of learning.

He is internationally recognized for pioneering CS^2 in coastal risk quantification in Bangladesh—combining hazard modeling, vulnerability mapping, and participatory decision-making — and is expanding this work across ASEAN. He is CTO and co-founder of WindRiskTech LLC (since 2005), has authored 125+ publications and patents, and received MIT's Infinite Kilometer Award for exceptional research and mentorship.

Speech Title: Adaptive Coastal Digital Twins for Resilience

Abstract: Resilience demands risk-coupled action. Yet risk remains poorly characterized where it matters most — at the scales, extremes, and compound interactions that drive impact. In coastal environments, this challenge is amplified by cyclone-driven hazards, including wind, rain, surge, and their cascading interactions, which remain difficult to resolve even with state-of-the-art climate models and their emulators.

Resolving extremes is fundamentally a representation problem. Neither parameterization nor emulation alone is sufficient to capture the mechanisms that generate tail risk. This talk presents an approach to adaptive coastal digital twins grounded in high-resolution, physically consistent risk quantification. We focus on cyclone-driven hazards and demonstrate three complementary pathways that combine physics and machine learning to resolve extremes beyond conventional models: (1) tropical cyclones, using physics-constrained equation discovery to recover parsimonious dynamical representations; (2) extratropical cyclones, using stochastic transport formulations to capture structure and evolution; and (3) extreme precipitation, using statistical–physical adversarial downscaling to represent tail behavior.

We further couple wind and rainfall to inundation, actively sampling the tails to identify and characterize the most damaging events, and extend these capabilities to forecasting—enabling, for example, prediction of peak inundation for an oncoming storm. We conclude with implications for adaptive coastal digital twins in Macao and South China, illustrating how these methods support decision-relevant, high-resolution representations of compound and cascading risks.

Keynote Speakers

Prof. Marilena Greco

Department of Marine Technology, Norwegian University of Science and Technology, Norway

09:30–10:10, April 16, 2026 *N101 - MUST Campus*

Bio.: Marilena Greco is Professor of Marine Hydrodynamics at NTNU, the Norwegian University of Science and Technology, and part-time Research Director at CNR-INM, the Institute of Marine Engineering, Italy. She was Specially Appointed Professor at Osaka University (2020–2021) and has been affiliated with two Norwegian Centres of Excellence: CeSOS (2004–2012) and NTNU AMOS (2013–2023). At NTNU AMOS, she was one of six key scientists responsible for establishing and leading the centre, which became internationally recognized in the field of autonomous marine operations and supported over 120 PhD graduates. Since 2025, she has served as NTNU secretariat for the NTNU–SJTU Joint Research Centre on Marine Technology. Her research spans marine hydrodynamics, nonlinear interface flows, fluid–structure interaction, hydroelasticity, slamming, water-on-deck, aquaculture, renewable marine energy, and bio-inspired marine concepts, combining theoretical, numerical, and experimental approaches. She has co-authored over 130 publications and has an H-index of 28 (Scholar). She is Associate Editor of the Journal of Fluids and Structures and serves on the editorial board of Applied Ocean Research. She has contributed to the scientific committees of several international conferences and has been a member of the ICHD Scientific Committee since 2023.

Speech Title: Fish-Inspired Hydrodynamics: From Biological Swimming to Engineered Underwater Vehicles

Abstract: Fish exhibit exceptional hydrodynamic performance, combining energy-efficient propulsion, agile manoeuvring, and adaptive environmental sensing. This keynote presents a multidisciplinary research effort, with a primary focus on marine hydrodynamics, aimed at exploring and characterizing biological swimming mechanisms to inform the design of next generation underwater vehicles and robots. Application areas include marine aquaculture, underwater monitoring, and autonomous exploration. The work integrates experimental, theoretical, and numerical approaches. Controlled experiments on live fish were conducted in swim tunnels using species representative of two different swimming modes. Configurations such as solitary and schooling arrangements were tested to analyse behavioural and hydrodynamic influences on swimming efficiency. These experiments also addressed boundary effects, body size, and critical swimming speed, factors relevant for both biological insight and aquaculture system optimisation. Complementing the experimental work, advanced numerical simulations were carried out using two-dimensional, self-propelled fish-like foils. These investigated the effects of body shape, motion strategies (e.g., prescribed undulation, rigid flapping, morphing bodies), and flow regimes on propulsive performance. Parametric analyses examined thrust generation, input power, recoil effects, and flow confinement, offering insights into how different features can influence locomotion and energy efficiency in engineered systems. Two pillars of ongoing research are also discussed. The first involves theoretical and numerical investigations using simplified

hydrodynamic and structural models to advance the understanding of stability and manoeuvrability as functions of body morphology, fin positioning, and material flexibility. These studies support design strategies for robotic platforms capable of tuning stiffness or adapting morphology to improve directional control and passive stability. The second pillar concerns bio-inspired flow sensing, modelled after the lateral-line system. A digital twin and signal-processing framework is introduced to investigate how distributed passive sensors mounted on a vehicle can interpret wake dynamics and detect upstream obstacles. Both simulations and experimental validations support the feasibility of such sensing strategies to enhance environmental awareness and obstacle avoidance in cluttered or low-visibility environments. This keynote will also present relevant findings from the state-of-the-art in the field, such as the role of added-mass in fish-like manoeuvring, and will outline potential future research directions. While significant progress has been made, further work is required to fully uncover the key hydrodynamic principles of biological swimming and effectively translate them into adaptable, efficient, and sustainable technologies for underwater applications.

Keynote Speakers

Prof. Frederic Dias

Ecole normale supérieure Paris–Saclay (ENSPS), France

10:10–10:50, April 16, 2026 *N101 - MUST Campus*

Bio.: Frédéric Dias received a PhD in Civil and Environmental Engineering from the University of Wisconsin, Madison, in 1986. He started his career in the US before coming back to France to join CNRS in 1990. In 2000, he moved to Ecole normale supérieure Paris–Saclay (ENSPS) and has been a Professor of Applied Mathematics since. In 2009, he went to University College Dublin (UCD) on leave to work on wave energy converters. He is leading the joint ENSPS/UCD wave group. Frédéric Dias has received four grants from the European Research Council: an advanced grant (AdG) in 2012 to work on extreme wave events, a proof of concept (PoC) grant in 2014 to work on wave measurement, a second AdG in 2019 to work on wave breaking and a second PoC grant in 2023 to use wireless wave sensor technology deployed on a connected buoy to measure and instantaneously transmit cheaply raw data of the sea state.

Frédéric Dias was elected as a member of the Royal Irish Academy in 2016, of the Academy of Europe in 2017 and of the Norwegian Academy of Science and Letters in 2019. In 2014, Frédéric Dias has been awarded the Emilia Valori prize for applications of science by the French Academy of Sciences. Frédéric Dias has been co-chief editor of the European Journal of Mechanics B/Fluids (1999-2023) and Secretary General of the International Union of Theoretical and Applied Mechanics (2008-2016). In 2025, Frédéric Dias became a member of the prestigious IUF (Institut Universitaire de France).

Speech Title: On Wave Breaking and Instabilities

Abstract: In the late 1970s and early 1980s, several papers dealing with instabilities of water waves were published. In 1978, Longuet-Higgins coined the terminology “superharmonic instability”. The distinguishing feature of that instability is that it is co-propagating with the wave. In other words, it has the same wavelength and the same speed as the wave. This feature is to be contrasted with subharmonic instabilities and the modulational (Benjamin-Feir) instability where the perturbation has a different wavelength and a different speed.

The link between wave breaking and instabilities has been made several times. But which instabilities are the most relevant for wave breaking?

The superharmonic instability develops into crest instability. For the case of unstable periodic Stokes waves, the wave-breaking scenario was observed in the numerical simulations of Jillians (1989). Jillians took the eigenfunction as a small perturbation to the Stokes wave and integrated in time. A microbreaker emerged from the superposition of a periodic travelling wave and a superharmonic unstable eigenfunction. Mansar et al. (2025) checked the robustness of the appearance of this crest instability leading to breaking. They added a perturbation to a large-amplitude unstable Stokes wave, which was then taken as initial data in a direct numerical solution of the Navier-Stokes equations, using the Basilisk numerical software package.

The talk will be devoted to the 3D instability of 2D waves as well as the instability of 3D waves. We will present a theory for breaking of 3D water waves, based on instability of short-crested Stokes waves travelling in deep water. We find that these waves are susceptible to a crest instability at large amplitude, with a dipole structure of the eigenfunctions that varies periodically along the crest. Studying the full 3D problem numerically, with the unstable eigenfunctions as initial data, leads to overturning crests that generate the structure of a microbreaker, similar to what has been observed in the open ocean.

This talk will be in the spirit of Prof. T. Wu, who deeply engaged in the science of wave phenomena using mathematics and physics to understand complex behaviors in waves.

Keynote Speakers

Prof. Mohamed Salah Ghidaoui

The Hong Kong University of Science and Technology, China

09:30–10:10, April 17, 2026 *N101 - MUST Campus*

Bio.: M.S. Ghidaoui earned his BASc, MASc, and Ph.D. in Civil Engineering from the University of Toronto, Canada, in 1989, 1991, and 1993, respectively. Since July 1993, he has been a member of the Department of Civil Engineering at the Hong Kong University of Science and Technology (HKUST), where he currently serves as Chair Professor in Civil and Environmental Engineering and the Named Chinese Estates Professor of Engineering. Ghidaoui is the Vice-President for Asia and the Pacific of the International Association for Hydro-Environment Engineering and Research (IAHR). He is a Distinguished Fellow of IAHR and a Fellow of the Hong Kong Institute of Engineers (HKIE). He chaired IAHR's Fluid Mechanics Committee from 2013 to 2018 and was the editor-in-chief of the Journal of Hydraulic Research from 2016 to 2023, having previously served as its associate editor for 15 years. Additionally, he is an associate editor for the Journal of Hydraulic Engineering (ASCE) and the Journal of Hydro-environment Research (IAHR-APD). He is also on the editorial board of Theoretical & Applied Mechanics Letters (TAML) under the Chinese Academy of Sciences and The Chinese Academy of Theoretical and Applied Mechanics, and he served on the advisory board of the Journal of Hydroinformatics for 12 years. Ghidaoui's awards include the Arthur Ippen Award from IAHR, the Albert Berry Memorial Award from the American Water Works Association, the Hilgard Award for best paper (runner-up) from the Journal of Hydraulic Engineering (ASCE), the Outstanding Faculty Award at HKUST, two teaching excellence awards, and a silver medal at the recent International Exhibition of Inventions in Geneva, Switzerland. He holds five US patents related to TR.

Speech Title: Time Reversibility and Subwavelength Control of Waves and Their Applications

Abstract: Waves have distinctive properties that enable intriguing applications, such as cloaking, super-resolution imaging, defect detection, and noise and vibration control. In this lecture, the speaker will focus on two key properties: time reversibility and subwavelength control. He will use experimental and numerical examples to demonstrate and explain these properties across various types of waves. Following this, he will present findings from the application of these techniques in over 15 real-world projects related to water supply and drainage systems. Additionally, the speaker will discuss recent research on subwavelength control of coastal gravity waves using Helmholtz resonators and highlight their significant potential for coastal engineering applications.

Keynote Speakers

Prof. Michele Mossa

Department of Civil, Environmental, Land, Building Engineering and Chemistry, Polytechnic University of Bari, Italy

10:10–10:50, April 17, 2026 *N101 - MUST Campus*

Bio.: Michele Mossa is Full Professor of Hydraulics at the Polytechnic University of Bari, Italy, where he has been serving since 1999, and he is also associated with CNR – National Research Council of Italy through research collaboration activities. Prof. Mossa holds a PhD in Hydraulic Engineering for Environment and Land from the Polytechnic of Milan and an MSc (cum laude) in Civil Engineering from the Polytechnic University of Bari. His main research interests lie in environmental, maritime, and ecohydraulics, with a strong focus on fluid mechanics, wave – vegetation and jet – wave interactions, environmental flow processes, and Earth system applications, contributing significantly to the understanding of flow – ecosystem coupling and to the development of nature-based solutions. He has played an active leadership role within the International Association for Hydro-Environment Engineering and Research (IAHR), serving as Chair of the IAHR Technical Committee on Ecohydraulics, Chair of the IAHR Education and Professional Development Section, and currently as a co-opted member of the Committee on Education and Professional Development. He is also Associate Editor of the Journal of Hydraulic Research, Journal of Ecohydraulics, Environmental Fluid Mechanics, a member of the Editorial Board of Scientific Reports (Nature), and Scientific Director of the Coastal Engineering Laboratory (LIC). He is a Fellow of IAHR and a recipient of the IAHR M. Selim Yalin Lifetime Achievement Award (2025). He has authored 145 journal articles, 93 book chapters, 62 conference papers, 14 scientific monographs/books, 2 edited volumes, and 7 patents. He is listed among the top 2% of scientists worldwide in his field according to the Stanford University ranking.

Speech Title: Eco-Hydraulics: Waves, Currents and Jets in Nature-Based Design

Abstract: Nature-based solutions are increasingly integrated into coastal and river engineering, from vegetated shorelines to restored wetlands and eco-engineered channels. While vegetation is widely recognized for reducing wave energy, its influence extends far beyond wave attenuation. It fundamentally alters currents, turbulent mixing, and the spreading of jets and plumes, with important implications for coastal protection, sediment stability, and water quality.

Over the past decade, eco-hydraulics has moved from qualitative descriptions to predictive, physics-based understanding. Research has clarified how vegetated canopies dissipate wave energy, modify flow structure, and reshape turbulence. These changes affect both advective transport and diffusive mixing, controlling how sediments, nutrients, and pollutants are redistributed in natural and engineered environments.

Recent advances include improved modelling of finite-amplitude wave attenuation, better characterization of vegetation drag and canopy geometry, and new insights into how jets spread and dilute when interacting with vegetated currents. Scaling relationships now link plant properties to measurable hydrodynamic effects, providing guidance for numerical modelling and engineering design.

By connecting hydrodynamic mechanisms to practical decision-making, this lecture shows that eco-hydraulics is not only an ecological perspective, but a necessary component of resilient coastal design and effective environmental management.

Parallel Sessions

PS01-A Theodore Y. Wu. Symposium

Session Chair: **Prof. Hua Liu**, Shanghai Jiao Tong University

14:00–15:45, April 15, 2026 N101

Paper Info.
Recent Advances in Physics and Modeling of Tsunamis Prof. Hua Liu, Shanghai Jiao Tong University
Dispersion Relation of Hydroacaustic Waves in an Inviscid Fluid Covered by a Thin Elastic Plate Prof. Dongqiang Lu, Shanghai University
Extreme Environmental Conditions for Deepwater Offshore Floating Structures Dr. Tao Wang, Aker Solutions
Analysis of High-Precision KCS Bow Wave Breaking Measurement Results Prof. Wentao Wang, China Ship Scientific Research Center
Numerical Investigation of Propeller Performance During Execution of Transient Maneuvers of ONR Tumblehome Dr. A. Nath, Memorial University of Newfoundland
Study on Fluid Dynamics of Flying Fish During Taxiing Mr. Xinyang Chen, Shanghai Jiao Tong University
On the Pore-Pressure Variation Features During the Dewatering Sand Column Experiments Mr. Jiangzhou Chen, Zhejiang University

PS01-B Theodore Y. Wu. Symposium

Session Chair: **Prof. Dongqiang Lu**, Shanghai University

16:00–17:30, April 15, 2026 N101

Paper Info.
Green Functions and Super Green Functions With Surface Tension and Viscous Effects in Time-Domain Solutions Dr. Xiaobo Chen, Bureau Veritas Marine & Offshore
A Nonlinear Model for Grid Waves Prof. Zhi Zong, Fuyao University of Science and Technology
Cavitation Vortex Ring Inception and Potential in Liquid Ejection Prof. Shuai Li, Harbin Engineering University

Esistance of a Kcs Model With Air Lubrication: Experimental Analysis in Calm Water and Waves

Prof. Zhi-Ming Yuan, University of Strathclyde

Analysis of Extreme Water Waves Based on Peregrine Solutions of Schrödinger Equation

Asst. Prof. Xingya Feng, Southern University of Science and Technology

A Physical Experiment on Ventilated Cavity Flows Around an Axisymmetric Slender Body in Gravity-Driven Vertical Water Tunnel

Mr. Chang Shu, Shanghai Jiao Tong University

PS02-A Ship Hydrodynamics

Session Chair: **Prof. Kwok Wing Chow**, The University of Hong Kong

14:00–15:45, April 15, 2026 O602

Paper Info.
Investigation on Nonlinear Hydroelastic Responses of Ultra Large Container Ships Prof. Chao Tian, China Ship Scientific Research Center
Hydrodynamic Characteristics Study of Propellers for Underwater Vehicles Assoc. Prof. Xiaoqing Tian, Hangzhou Dianzi University
Numerical Investigation of the Effects of Bulbous Bow Shapes on Wave-Making Resistance Assoc. Prof. Wei Zhang, Harbin Institute of Technology (Weihai)
Study on the Estimation of the Form Factor in the Holtrop-Mennen Method for Predicting the Resistance of Full-Scale Ships Mr. Dongyun Kim, Seoul National University
Vortex Structure Evolution of Propeller Wake Based on Large-Eddy Simulation Mr. Yongzhe Wu, Shanghai Jiao Tong University
Pitch-Plane Hydrodynamic Modeling and Parameter Identification via Virtual-Captive CFD for a Supercavitating Underwater Vehicle Mr. Sezer Kefeli, Istanbul Technical University
A Numerical Investigation of the Centrifugal Hydrodynamic Resistance Term in Maneuvering Mr. Nikos Petikidis, Norwegian University of Science and Technology

PS02-B Ship Hydrodynamics

Session Chair: **Prof. Chao Tian**, China Ship Scientific Research Center

16:00–18:00, April 15, 2026 O602

Paper Info.
A Study on the Interaction Among Hull, Diesel Engine and Propeller of a Twin-Screw Ship During Zigzag Maneuvers Prof. Zao-Jian Zou, Shanghai Jiao Tong University
Experimental Study on Three-Dimensinal Velocity and Pressure Fields of Ship Propeller Wake Flows Dr. Wenxuan She, Zhejiang University
Numerical Investigations of Reynolds Numbers Effect on Propeller Open Water Characteristics Dr. Wei Jin, Everllence

Comparison of Real-Scale Ship Resistance for Surface Roughness Models

Dr. Shuguang Wang, Seoul National University

Open-Water Performance, Blade Loading Distribution and Wake Characteristics of Toroidal Propellers Based on Vortex Lattice and RANS Simulations

Mr. Shen-Ao Wang, Shanghai Jiao Tong University

A CFD Investigation on Wall Roughness Effects in Full-Scale Ship Resistance Simulation of the Jores1 Tanker

Dr. Tangjian Mo, Harbin Engieering University

Unsteady Thrust and Wake Dynamics of a Pump-Jet Propulsor Under Hull Wake Ingestion

Mr. Yu Zhang, Beijing Institute of Technology

Hydrodynamic Wake Analysis of Fixed-Depth Underwater Moving Bodies With Ultra-Low-Frequency Oscillation Near Layered Water Gravity-Wave Interface

Assoc. Prof. Qiang Yu, Shanghai Maritime University

PS03-A Eco-Hydrodynamics

Session Chair: **Prof. Mengzhen Xu,** Tsinghua University

14:00–15:30, April 15, 2026 O601

Paper Info.
Mangrove Dynamics Along the Pearl River Estuary and Its Ecological Effects Prof. Mengzhen Xu, Tsinghua University
CFD Modelling of Flexible Coastal Structures: From Grey to Green Asst. Prof. Yuzhu Pearl Li, National University of Singapore
On the Modeling of the Hydrodynamic Drag of Mangroves Dr. Khang Ee Pang, Singapore Institute of Technology
Generalized Dispersion Theory for Migration of Confined Micro-Swimmers Subject to Anisotropic Diffusion Asst. Prof. Mingyang Guan, Institute of Mechanics, Chinese Academy of Sciences
Dispersion of Microplastics in Nearshore Zones: An Eulerian-Lagrangian Approach Mr. Abbasali Rahmani Khajouei, The Hong Kong Polytechnic University
Identification and Evolution of Three-Dimensional Wake Vortex Structures During Zebrafish Maneuvering Asst. Prof. Mengchen Gao, University of Chinese Academy of Sciences

PS03-B Eco-Hydrodynamics

Session Chair: **Prof. Michele Mossa**, Polytechnic University of Bari

16:00–17:45 April 15, 2026 O601

Paper Info.
Lattice Boltzmann Modeling of Vegetation-Water Dynamics in Arid Ecosystems: Pattern Formation and Climate-Driven Transitions Prof. Hefang Jing, North Minzu University
An Integrated Method for Evaluating Reservoir Hydrodynamics Enhancement Under Operational Regulation: A Case Study of Danjiangkou Reservoir Assoc. Prof. Pingan Luo, Changjiang River Scientific Research Institute
Root Morphology Impacts Flow and Turbulence Ms. Luoning Zhang, National University of Singapore
High-Frequency In-Situ Monitoring and Explainable Machine Learning for Algal Bloom-Risk Forecasting and Driver Analysis in Danjiangkou Reservoir Ms. Xiaomeng Li, Changjiang River Scientific Research Institute

Development Patterns of Mangroves in Artificial Coastal Zones and Their Impacts on Invertebrate Populations

Mr. Bangjie Sun, Macau University of Science and Technology

Application of eDNA in the Ecological Study of Artificial Wetlands in Macao

Ms. Yi Zhou, Macau University of Science and Technology

Hydrodynamic Focusing of an Imaging Flow Cytobot (IFCB) for Automatic Algal Species Identification

Dr. Jiuhao Guo, The Hong Kong University of Science and Technology

PS04-A Hydrodynamics of Autonomous Systems

Session Chair: **Prof. Claudio Lugni**, University of Naples Federico II

14:00–15:30, April 15, 2026 O604

Paper Info.
Estimation of Slowly-Varying Flow Fields via Factor Graph Optimization for AUV Docking Mr. Xiaohan Liu, Shanghai Jiao Tong University
Real-Time UUV Motion State Estimation and Dynamic Prediction via Deep Learning Models Mr. Haomiao Nie, Shanghai Jiao Tong University
Physics-Constrained Neural Networks for Directional Wave Spectrum Estimation from Ship Motion Data Mr. Yunchi Zhang, Harbin Engineering University
Analysis of Propulsion and Hydrodynamic Performance of Bionic Flexible Membrane Dr. Zhenqi Li, Harbin Engineering University
CFD Simulation and Flow Field Analysis for Motion Control of USV Docking into Mother Vessel Mr. Junjie Wang, Huazhong University of Science and Technology
Design and Field Experiments of a Robotic Automated Imaging System for Harmful Algal Bloom (HAB) Monitoring Research Asst. Prof. Qingsong Qiao, Macau University of Science and Technology

PS05-A Renewable Energy

Session Chair: **Prof. Ye Li**, Southern University of Science and Technology

16:00–17:45, April 15, 2026 O604

Paper Info.
Hydrodynamic Investigation of a Floating Wind Turbine: Insights From Intermediate-Scale Tests at MaRELab Dr. Sara Russo, Institute of Marine Engineering, National Research Council
Hydrodynamic Performance of a Novel Multifunctional Floating Offshore Wind Turbine Platform With Heaving Plates Under Extreme Seas Mr. Luis Daniel Luna Aguilar, Università degli studi della Campania Luigi Vanvitelli
A Computational Framework for Crack Simulation of a Wind Turbine Blade Subjected to Fluid-Structure Interaction Effects Dr. Gong Chen, Sun Yat-sen University
Development of a Fully Coupled Aero-Hydro-Servo-Elastic Model Based on a Time-Domain Hobem Solver and Openfast Dr. Baoyu Liu, Harbin Engineering University
Coupled Aero-Hydrodynamic Response of a Floating Offshore Wind Turbine Under Strong Wind and Regular Waves Ms. Ningge Fan, Sun Yat-sen University
Influences of Actuator and Sensor Artefacts on Boundary Consistency in Real-Time Hybrid Test of Offshore Wind Turbines Mr. Wei Huang, Dalian University of Technology
Bow Form Optimization and Motion Response Analysis of Offshore Wind Crane Vessel Based on F-Spline and Frequency-Domain Potential Flow Theory Mr. Wenyi Zhu, Sun Yat-sen University

Hengqin Ship Hydrodynamics and Water Waves

Session Chair: **Prof. Jiang Lu**, China Ship Scientific Research Center

14:00–16:00, April 15, 2026 MUST Science and Technology Innovation Technology Research Institute, Hengqin

Paper Info.
An Assessment on the Effective Attack Angle of a Full Scale Shaft Bracket Under Cavitation Condition Prof. Yantao Cao, China Ship Scientific Research Center
Influence of Flow Structures on Ship Roll Damping Across Various Speeds Dr. Dong Zhang, China Ship Scientific Research Center
Numerical Investigation of the Slamming Characteristics of a Trimaran Section During Water Entry Dr. Songtao Chen, China Ship Scientific Research Center
Numerical Simulation of Free-Surface Wave Evolution Under Forced Pressure Using the High Order Spectral Method Dr. Kun Zheng, China Ship Scientific Research Center
A Hybird Neural Network Model of Ship Motion Based on Voyage Data Ms. Tianhua Wang, China Ship Scientific Research Center
Study on Flow Memory Effect of Irregular Ship Roll Motion by LES Mr. Ben Zhi, China Ship Scientific Research Center
Numerical Simulation of Flow Interaction Between Underwater Vehicle and Body of Revolution Mr. Yuhan Wu, China Ship Scientific Research Center
Parametric Rolling Characteristics of Ships in Short-Crested Irregular Waves Mr. Yanwen Shi, China Ship Scientific Research Center

Hengqin Ship Hydrodynamics and Water Waves

Session Chair: **Prof. Yantao Cao**, China Ship Scientific Research Center

16:00–18:00, April 15, 2026 MUST Science and Technology Innovation Technology Research Institute, Hengqin

Paper Info.
A Newly Proposed Method of Directly Calculating the 3-D Time-Domain Green Function of Infinite Depth and Its Application for Paramatric Roll With a Hybrid Method Prof. Jiang Lu, China Ship Scientific Research Center
Full-Scale PIV Measurement Around Stern Appendages of Ship Prof. Guoping Zhang, China Ship Scientific Research Center

Numerical Predictions of Vertical Motions for a Trimaran Advancing in Regular Waves Using a 2.5D Multi-Domain HOBEM

Dr. Mengxiao Gu, China Ship Scientific Research Center

An Improved A*-Based Routing Method for a Wind-Assisted VLOC on the China-Brazil Route

Dr. Siyu Tang, China Ship Scientific Research Center

Evaluating the Impact of Shaft Power Limitation on EEXI Compliance and Economic Performance of Different Ship Types Based on Comprehensive Fleet Data

Ms. Shinan Zhou, China Ship Scientific Research Center

Study on Data Enhancement Methods for Ship Seakeeping Performance Prediction

Ms. Yiming Qiang, China Ship Scientific Research Center

Data-Driven Approach for Predicting Ship-Scale Effective Wake on Propeller Plane

Mr. Wei Liu, China Ship Scientific Research Center

Study on Tip Vortex Cavitation Inception Prediction Model and Scale Effect Considering the Influence of Water Quality

Prof. Yihong Chen, China Ship Scientific Research Center

PS06-A High-Level Workshop: Extreme Waves/Disaster Management

Session Chair: **Prof. Ye Li**, Southern University of Science and Technology

11:05–12:35, April 16, 2026 N101

Paper Info.
Strategic Thoughts on the Evolution, Governance and Protection of the Pearl River Estuary Ms. Ling Yi, Pearl River Water Resources Commission of the Ministry of Water Resources
Integrated Shoreline Management Strategy to Cope With Climate Change Mr. Wing-hong Cheung & Mr. Tak-shing Tsui, Civil Engineering and Development Building, Hong Kong SAR
Numerical Modelling for Evaluation of Entrainment Probability at a Coastal Power Plant Intake Under Storm Tides Prof. Haiwen Zhang, China Institute of Water Resources and Hydropower Research
Large-Eddy Simulation of Wave Overtopping Flow on a Seawall Asst. Prof. Hao Chen, Newcastle University
Coordinated Multi-System Recovery Framework for Flood-Damaged Underground Metro Stations: A Climate Adaptation Strategy Ms. Haiyun Li, The Hong Kong Polytechnic University
Interaction Between Two Solitary Waves on Sediment Transport in Surf and Swash Zones Asst. Prof. Huabin Shi, University of Macau

PS06-B High-Level Workshop

Session Chair: **Prof. Frederic Dias**, Ecole normale supérieure Paris–Saclay (ENSPS)

14:00–15:45, April 16, 2026 N101

Paper Info.
Climate Resilience in Hong Kong: A Case Study of the Lei Yue Mun Packaged Stormwater Pump Station Ir. Andy Kwok, Binnies Hong Kong Limited
Bimodal Wave Evolution and Statistics of Extreme Waves Over Sloping Topography Prof. Zhen Wang, Beihang University
Evolution of Gravity-Capillary Waves Under Wind Forcing and Dissipation Prof. Zeng Liu, Huazhong University of Science and Technology
Data-Driven Approaches for Forecasting Ship Motions Based on Historic Motion Data Dr. Hui Liang, Technology Centre for Offshore and Marine, Singapore (TCOMS)
On the Generation of Strongly-Nonlinear Rogue Waves Assoc. Prof. Yuchen He, Institute of Mechanics, Chinese Academy of Sciences

Hybrid AI–Physics for Tropical Cyclone Hazards: From Long-Term Climate Risk to Skillful Short-Term Forecasting

Dr. Jiangchao Qiu, Massachusetts Institute of Technology

Evolving Application of Computational Hydraulic Models for Flood Management From Drainage Planning to Real-Time Flood Forecast

Mr. Chui Si-kay & Ms. Yip Chui-ying, Drainage Services Department, Hong Kong SAR

PS06-C High-Level Workshop

Session Chair: **Prof. Joseph Hun-Wei Lee**, Macau University of Science and Technology

16:00–18:00, April 16, 2026 N101

Paper Info.

Weather Research Forecast Modelling and Pseudo-Global Warming Technique for Projection of Tropical Cyclones from South China Sea impacting Hong Kong, and Simulation on Increase in Storm Surge and Wave Heights

Mr. Terence Leung, Ove Arup & Partners Hong Kong Limited

A New Engineering Approach for Prediction of Design Extreme Sea Levels for the Guangdong-Hong Kong-Macao Greater Bay Area

Dr. Jie Hu, Surbana Jurong Consultants Pte. Ltd.

Seiches in an Impounded River Reach Between Two Dams

Prof. Zhongyong Yang, China Three Gorges University

Mountain Dam-Break Flood Evacuation Route Planning With Population Distribution Considerations: A Case Study

Assoc. Prof. Lian Liu, China Three Gorges University

Comparative Study on the Spatiotemporal Evolution Characteristics of Energy Induced by Typical Typhoons in the Northwestern Pacific Ocean

Mr. Hanhan Lin, Beijing Jiaotong University

Experimental Study on the Influence of Connection Systems on Hydrodynamic Responses of Floating Photovoltaic Arrays Under Extreme Waves

Ms. Zijie Shi, Zhejiang University

AI-Based Real-Time Storm Surge Forecasting in Macau: A Case Study of Super Typhoon Ragasa

Mr. Qinghua Lin, Macau University of Science and Technology

Integrated 3D Modeling of Storm Surge and Urban Flooding During 2025 Typhoon Ragasa

Dr. Yibin Liu, Macau University of Science and Technology

PS07-A AI for Fluid Mechanics

Session Chair: **Prof Huan-feng Duan,** The Hong Kong Polytechnic University

11:05–12:50, April 16, 2026 O801

Paper Info.
Normalized Tensor Basis Neural Network for Reynolds Stress Modeling in Wall Bounded Turbulence Dr. Zelong Yuan, National University of Singapore
Missing Data Compensation in Unsteady Flow Fields Using a U-Net Hybrid Generative Adversarial Network (UH-GAN) Dr. Yonghao Wang, Harbin Engineering University
An Efficient Data-Driven Reduced-Order Modeling Framework for Unsteady Flow Prediction Mr. Xianglong Li, University of Macau
Bayesian Optimized XGBoost Model for The Fast Forecast of Dynamic Environment During Typhoons Mr. Zhiheng Yang, Tsinghua University
Reconstructing Compound Flood Dynamics in Coastal Cities: An Adversarial Learning Framework for Inundation Map Super-Resolution Mr. Ruiyi Yang, The Hong Kong Polytechnic University
A Physics-Informed Neural Network Model for Calculating Internal Solitary Waves With a Free Surface Mr. Jiayao Xie, Beijing Normal-Hong Kong Baptist University
Decomposition-Based Slamming Force Predictions Using Deep Neural Network Mr. Xupeng Sui, University of Southampton

PS09-A Interdisciplinary Problems

Session Chair: **Prof. Adrian Wing-Keung Law**, National University of Singapore

14:00–16:00, April 16, 2026 O801

Paper Info.
Experimental Study of Turbulence Mechanisms in Open-Surface Flows With Surface Coverage Heterogeneity Dr. Xiaodong Liu, National University of Singapore
Numerical Simulation of Flow Around Tandem Square Cylinders With Varying Spacing Ratios Assoc. Prof. Cheng Zeng, Hohai University
Experimental and Numerical Study on Water Entry of a Wedge Into Level Ice-Covered Water Mr. Zehui Ou, Harbin Engineering Univercity
Effects of Synthetic Jets on the Wake Dynamics of Twin Circular Cylinders in Tandem Arrangement Mr. Boyi Huang, Dalian University of Technology
Experimental Study of Water Entry Flow and Load Characteristics of Semi-Closed Axisymmetric Body Dr. Le Shen, Shanghai Jiao Tong University
Influence of Particle-Fluid Flow on Dynamic Responses of Hydraulic Transport Riser in Deep-Sea Mining Systems Dr. Jianing Li, Tianjin University
Investigation of Hydrodynamic Load Characteristics for Seaplane Water Entry at Different Pitch Angles Mr. Jiahe Liu, Shanghai Jiao Tong University
Oriental Water Valley Lab: An Open Research Platform Supporting Research From Water Hammer to Fundamental Fluid Science Mr. Xiangji Chen, Zhuzhou Southern Valve Co.,Ltd

PS09-B Interdisciplinary Problems

Session Chair: **Prof. Mengzhen Xu**, Tsinghua University

16:00–17:45, April 16, 2026 O801

Paper Info.
Local Scour Around Varied-Configuration Pile Groups in Silty Seabed Under Steady Current: An Experimental Study Dr. Shengtao Du, Ningbo University
The Influence of Velocity Shear on Sediment Transport in Particle-Laden Flows Asst. Prof. Adam Yang, Dalhousie University

Simulation of a Single Particle in a 2-DOF Vibrating Riser

Asst. Prof. Mingzhu Wei, Institute of Mechanics, Chinese Academy of Science

Minimum-Dissipation Model and Symmetry-Preserving Discretization for Scalar Transport in a Turbulent Flow

Dr. Jing Sun, Southern University of Science and Engineering

A Numerical Analysis of Acoustic Release Behaviors of an Oscillating Bubble Subjected to Sound Fields

Ms. Xinyu Zhang, China Jiliang University

Guided Wave Dispersion Curves in Open Channels

Dr. Xiaoqing Sun, The Hong Kong University of Science and Technology

Integrated 3D Hydrodynamic and Statistical Modeling for Water Quality Risk Assessment in the Kai Tak Coastal Waters

Dr. Pengcheng Xu, Macau University of Science and Technology

PS05-B Renewable Energy

Session Chair: **Prof. Marilena Greco**, Norwegian University of Science and Technology

11:05–12:35, April 16, 2026 O802

Paper Info.
Hydrodynamic Peformance of an Integrated System Composed of a Dual-Chamber OWC and a Parabolic Breakwater Prof. Dezhi Ning, Dalian University of Technology
Coupled Aero-Hydrodynamic Analysis of a Hybrid Floating Wind–Wave Energy System Mr. Wenzheng Zhu, Sun Yat-Sen University
Numerical Modeling of Nonlinear Surge Response of a Tension Leg Platform Forced by Linear Waves Asst. Prof. Zitti Gianluca, Università Politecnica delle Marche
Operational Adaptability Analysis of a Jack-Up DP Floating Crane Vessel Under Typical South China Sea Conditions Dr. Yalong Ye, China Yantai Salvage
CFD-Based Coupled Dynamic Response Analysis of Shared-Mooring Floating Systems Mr. Yang Yi, North China Electric Power University
CFD-Based Investigation of the Hydrodynamics of a Floating Wind Turbine–Aquaculture Cage Integrated System in Regular Waves Mr. Jiaming Liu, Sun Yat-sen University

PS10-A Wave Hydrodynamics

Session Chair: **Prof. Dezhi Ning**, Dalian University of Technology

14:00–15:45, April 16, 2026 O802

Paper Info.
Numerical Simulation on the Internal Waves Generated by the Wake of a Moving Sphere in Stratified Fluids Based on Overlapping Dynamic Grid Technology Prof. Genshui Zhou, China Ship Scientific Research Center
Numerical Simulation of Cross Waves Using the Finite-Depth Irrotational Green–Naghdi Equations Dr. He Lin, Harbin Engineering University
Study on the Linear Dispersion Relationship of High-Level New Deep-Water IGN Model Mr. Zehang Wang, Harbin Engineering University
Efficient Simulation of Three Dimensional Oblique Nonlinear Regular Waves Ms. Zhihui Zhang, Harbin Engineering University
Quasi-Potential Model for Nonlinear Wind-Induced Water Waves Dr. Enwei Zhang, Institute of Mechanics, Chinese Academy of Sciences
Three-Dimensional Numerical Investigation of Fluid Resonance in Narrow Gap Between Twin Bodies in Proximity Dr. Ting Peng, Dalian University of Technology
Study on the Evolution Characteristics of Solitary Waves Over Linearly Equivalent Uneven Topography Ms. Mingxin Fu, Ningbo University

PS10-B Wave Hydrodynamics

Session Chair: **Prof. Haiwen Zhang**, China Institute of Water Resources and Hydropower Research

16:00–17:45, April 16, 2026 O802

Paper Info.
Higher-Order Bragg Resonance of Focused Wave Groups Over Periodic Submerged Steps Dr. Qian Wu, Hong Kong University of Science and Technology (Guangzhou)
Numerical Investigation of Wave Evolution on a Steep Slope by SPH Method Assoc. Prof. Zhijun Wei, Dalian University of Technology
Bubbles and Droplets in Nearshore Breaking Waves Over Limited Water Depth Dr. Yanchong Duan, National University of Singapore

A Highly Efficient Three-Dimensional Numerical Wave Solver for Coastal Engineering

Lecturer Guangwei Liu, Tianjin University

Wave Spectra Parameterization Considering Wave System Composition during Cyclones in the Northern South China Sea

Dr. Junzheng Li, Dalian University of Technology

A SPH-LMM Method for Modelling the Fluid-Structure Interaction of the Flexible Net Panel in Waves

Dr. Sen-Qi Cui, Ocean University of China

Numerical Study of Breaking Wave Dynamics and Wave Induced Force Characteristics on Tandem Horizontal Cylinders

Mr. Stephen Kyazze Muwanguzi, Shanghai Jiao Tong University

PS08-A Cavitation/Multiphase Flows

Session Chair: **Prof. Hua Liu**, Shanghai Jiao Tong University

11:05–12:35, April 16, 2026 O804

Paper Info.
Bulk Nanobubbles: Potential Cavitation Nuclei That Determine the Cavitation Nucleation Threshold? Dr. Mingbo Li, Shanghai Jiao Tong University
Dependence of Tip Vortex Characteristics of a Foil With Dimpled Tip on Load Conditions Dr. Li Yang, Zhejiang University
Investigation on Cavitation Inception and Bubble Dynamics in Electrolyte Solutions Mr. Junhao Cai, Shanghai Jiao Tong University
Investigation of Particle Size Distribution Effetc on Multiscale Cloud Cavitating Flow Mr. Ziyang Wang, Tsinghua University
Partially-Algebraic Two-Fluid Model (Patfm): An Efficient Computation Strategy of Solid-Liquid Two-Phase Flow With Fine Particles in Hydraulic Machinery Assoc. Prof. Chaoyue Wang, China Agricultural University
Numerical Analysis on Axisymmetric Cavity Flow Under Streamwise Gravity Using BIEM Mr. Ziyi Liu, Shanghai Jiao Tong University

PS08-B Cavitation/Multiphase Flows

Session Chair: **Prof. Xiaoliang Wang**, Beijing Institute of Technology

14:00–15:30, April 16, 2026 O804

Paper Info.
Experimental Study on the Migration Dynamics of the Near-Wall Bubble in a Dual-Bubble System Under Ultrasonic Field Assoc. Prof. Xiao Huang, Northwestern Polytechnical University
Gas–Liquid Interface-Driven Partition of Bubble Energy Dr. Yifan Dong, Huazhong University of Science and Technology
Study on the Bubble Dynamic Characteristics Induced by a Single-Opening Plate Ms. Yuanyuan Hu, Sun Yat-sen University
Numerical Study on Continuous Impact of Water Droplets With Different Spacing on Superhydrophobic Surfaces Dr. Hougui Chen, Ningbo University
Droplet Impact and Splitting on Circular Hydrophilic Patterns at Low Weber Numbers Mr. Mengqi Yan, Ningbo University

Experimental Study on the Spreading and Freezing Characteristics of Water Droplets Impacting Low-Temperature Surfaces with Dew and Frost

Ms. Xinyu Dong, Shanghai Jiao Tong University

PS08-C Cavitation/Multiphase Flows

Session Chair: **Prof. Wentao Wang**, China Ship Scientific Research Center

16:00–17:30, April 16, 2026 O804

Paper Info.
Experimental Study of Granular–Liquid Two-Phase Flow Interactions With Cylindrical Obstacles Assoc. Prof. Xiaoliang Wang, Beijing Institute of Technology
Dense Granular-Liquid Flow Evolution in Inclined Channel by RIM-PTV Dr. Pengfei Lv, Beijing Institute of Technology
A SPH-FVM Coupling Algorithm Based on IRBM for FSI Problems Mr. Dihui Zhou, Sun Yat-sen University
Cavitation Inhibition and Acoustic Attenuation in Multiphase Cavitation Flow Systems Mr. Kun Ding, YangZhou University
Influence of Constant Gas Bubbling on Acoustic Cavitation Field Generated by Ultrasonic Horn Mr. Yang Xu, Yangzhou University
Research on the Simularity Criterion of Ice Breaking by High-Pressure Bubbles Mr. Zerui Yu, Harbin Engineering Univercity

PS11-A Industrial Flows

Session Chair: **Prof. Steve Melching**, Macau University of Science and Technology

11:05–12:50, April 17, 2026 O801

Paper Info.
Unsteady Flow Structure of Air-Ventilated Submerged High-Pressure Water Jets Prof. Guoyi Peng, Nihon University
Hydraulic Performance Analysis of a Wide Load Pump Turbine for Small Opening Pump Conditions Mr. Weiyi Fan, Tsinghua University
Analysis of the Flow and Pressure Pulsations Characteristics in Vaneless and Runner at Turbine Off-Design Conditions of a Wide-Load Pump-Turbine Mr. Yihang Gu, Tsinghua University
Flow Characteristics of Fresh Concrete under Different Vibration Parameters Dr. Guangsheng Zhao, Tsinghua University
Rapid Hydrate-Based CO_2 Capture via Synergistic Effects of Multi-Spray-Impingement and Nano-Copper Mr. Chenhao Yang, Wuhan University
Research on Uniform Inflow in Side Forebays of Pumping Stations Based on Frictional Gradient Offset Mr. RunZe Jiang, Yangzhou University
Does Turbulenct Pipe Flow Randomize High-Frequency Acoustic Waves? Dr. Meng Xin, The Hong Kong University of Science and Technology

PS07-B AI for Fluid Mechanics

Session Chair: **Prof. Mohamed S. Ghidaoui**, *The Hong Kong University of Science and Technology*

11:05–12:50, April 17, 2026 O802

Paper Info.
Passive Transient Source Localization in Water Distribution Networks Using Graph Neural Networks Dr. Muhammad Waqar, The Hong Kong University of Science and Technology
A Study of Statistical Metrics for Physics-Informed Neural Networks (PINN) Modelling of Water Hammer Mr. Vincent Tjuatja, The Hong Kong Polytechnic University
Physics-Informed Nerual Network Framework for Predicting Bubble Size Distribution in Cloud Cavitation Flows Ms. Yishan Xu, Shanghai Jiao Tong University
Data-Driven Approaches for Studying Cavitation Characterization and Pressure Recovery Mr. Yubo Liu, Zhejiang University
Small-Sample Prediction of Ship Calm Water Resistance Based on Physically-Informed Dynamic Regularization XGBoost Dr. Jie Liu, Ludong University
Improved U-Net++ for High-Fidelity Prediction of Propeller Wake Fields Mr. Yanjiong An, Harbin Engineering University
Predicting Fluid-Structure Interaction Dynamics From Sparse Boundary Data Based on Latent Diffusion Model Mr. Shihang Zhao, Tsinghua University

PS10-C Wave Hydrodynamics

Session Chair: **Asst. Prof. Huabin Shi**, University of Macau

11:05–12:35, April 17, 2026 O803

Paper Info.
Influence of Water Depth on the Ship Wave Resistence Prof. Quanming Miao, Jiangsu Ocean University
Numerical Simulation Study on the Control of Submersible "Falling Deep" Based on Different Control Strategies in Complex Internal Wave Environments Dr. Lu Cheng, Northwestern Polytechnical University
Parametric Study of Added Resistance of a Surface Vessel in Following Internal Solitary Waves Dr. Shangming Wang, University of Stavanger
Wave Interference among Multiple Ships Mr. Bo-Yu Liao, University of Strathclyde
Interaction of a Solitary Wave With a Submerged Circular Disk Mr. Tianqing Lu, Shanghai Jiao Tong University
Hydrodynamic Loads and Stability of a Projectile During Small-Angle Water Entry in Waves Mr. Changze Zhao, Shanghai Jiao Tong University

PS09-C Interdisciplinary Problems

Session Chair: **Prof. Jun Niu**, Macau University of Science and Technology

11:05–12:35, April 17, 2026 O804

Paper Info.
A Lightweight Multi-Scale Network for Underwater Object Detection With Integrated Spatial–Contextual Perception Dr. Zijun Chen, Northwestern Polytechnical University
Statistics on the Cross-Slope Propagation of Mesoscale Eddies in the Northern South China Sea Assoc. Prof. Huan Mei, Jiangsu University of Science and Technology
Reduced-Order Solution of the Poisson Equation Based on Modal Decomposition and Reconstruction Mr. Liyuan Dou, Dalian University of Technology
The Generalized Interpolation-Supplemented Cascaded Lattice Boltzmann Method With Turbulent Simulations for External Flows Mr. Jian Song, Northwestern Polytechnical University
Hydrodynamic Modeling and Characterization of Cavitation Effects on Two Generic Underwater Vehicle Geometries Mr. Sezer Kefeli, Istanbul Technical University
Heat Transfer and Flow Structures in a Partially Porous Three-Dimensional Cavity With Temperature-Dependent Viscosity and a Heat Source of Ununiform Heat Release Ms. Astanina Marina, Tomsk State University

Poster Session

10:10-11:05, April 16, 2026
15:45-16:00, April 16, 2026

N101, MUST Campus

Board No.	Paper Info.
01	**Experimental Evaluation on a Scaled Model of a Prototype Rotary Sail Design in an Automotive Aero-Acoustic Wind Tunnel** Mr. Chenyu Shi, Tongji University
02	**Multi-Source Validation and Characterization of a Theoretical Model for Slamming Loads on Ship Bows during Water Entry** Dr. Ling Liu, China Ship Scientific Research Center
03	**Numerical Simulation and Information Entropy Analysis on Thermal Control Performance of a Phase Change Material Thermal Management Sytem for Data Centers** Mr. Junyuan Liao, Beihang University
04	**Experimental Study on the Spreading Dynamics of Droplet Impaction on a Concave Cylindrical Surface** Ms. Xiaoyi Wu, Beihang University
05	**Numerical Study of Multi-Body Floating Pv Hydrodynamics Under Different Connection Stiffness** Dr. Hou Yadong, Zhejiang University
06	**Nanoscale Competitive Cavitation Nucleation Pathway: Bulk or Surface** Dr. Yuhan Li, Shanghai Jiao Tong University
07	**Improved Gravity-Theory Model for Sediment Concentration in Vegetated Flows Considering Vertical Variation of Frontal Blockage Area** Prof. Jiao Zhang, Xi'an University of Technology
08	**Ecological Management of Reservoirs in the Upper Reaches of the Yellow River Considering Fish Spawning Needs** Lecturer Shanshan Li, Xi'an University of Technology
09	**Heat Transfer and Flow Structures in a Partially Porous Three-Dimensional Cavity With Temperature-Dependent Viscosity and a Heat Source of Ununiform Heat Release** Ms. Astanina Marina, Tomsk State University
10	**Calibration of an Instream Leaky Barrier Model Using Longterm Field Measurement Data** Ms. Wuyi Zhuang, University of Cambridge
11	**Numerical Modeling of Granular Landslide Generated Impulse Waves and Its Application** Assoc. Prof. Haixiao Jing, Xi'an University of Technology

Technical/Culture Visit

➤ Route 1 *(start at 14:00, Friday, April 17)*

- National Observation and Research Station of Coastal Ecological Environments in Macao
- Key Laboratory of River Basin Digital Twinning of Ministry of Water Resources
- Hac Sa Beach Nourishment and Conservation

Discover China's first national field station outside the mainland, established in 2022 to monitor subtropical coastal ecosystems. Learn about cutting-edge equipment. Then, visit Hac Sa Beach, Macao's largest natural beach on Coloane Island, renowned for its unique dark volcanic sand, scenic views, and role as a key study site for microplastics, water quality, and biodiversity.

➤ Route 2 *(Start at 14:00, Friday, April 17)*

- Coloane Flood Protection Works
- Inner Harbour Flooding
- The Historic Centre of Macao

Begin in peaceful Coloane, with its quaint village, historic chapel, and visit flood protection works for storm surge protection. Explore the UNESCO-listed Historic Centre of Macao, featuring iconic sites like the Ruins of St. Paul's and Senado Square blending East-West heritage. Experience the importance of flood protection in Inner Harbour, ending with a tasty lunch of local specialties.

Memo

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