

# SKLMP NEWSLETTER

VOL. 6  
FEB 2024



# Director's message



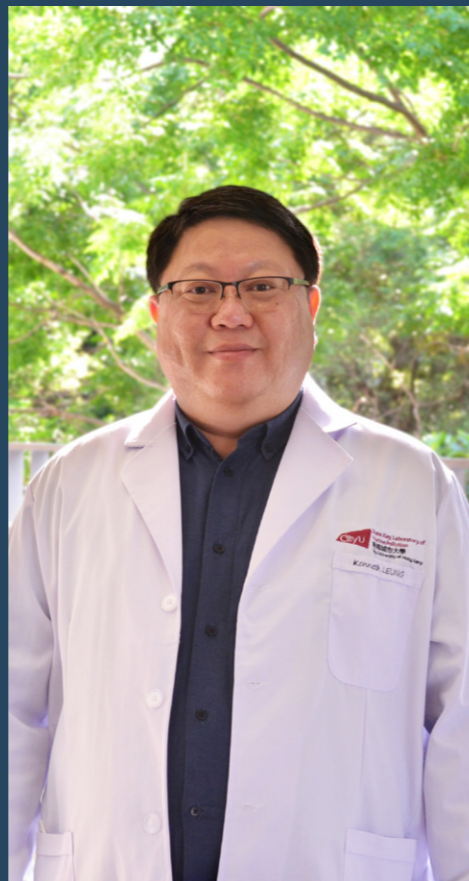
In the annual policy address, Mr. Lee Ka-Chiu, the Chief Executive of Hong Kong SAR, emphasized the significance of innovation and technology as a crucial engine for driving high-quality economic development in Hong Kong. To fully realize the vision of establishing Hong Kong as an international innovation and technology (I&T) Hub, the government has launched the “Hong Kong I&T Development Blueprint” in 2023.

香港特首李家超先生在今年施政報告中指出：「創新科技是激活香港經濟高質量發展的重要引擎。」

At City University of Hong Kong (CityU), we are committed to promoting innovation and technology through our relentless efforts in industry-academia collaboration. In 2021, CityU introduced the “HK Tech 300” innovation and entrepreneurship program, aiming to support the establishment of 300 start-up companies by our students, faculty, alumni, and/or partners within a span of three years. This initiative injects new energy into Hong Kong’s innovation and technology landscape. In less than two years, “HK Tech 300” has already facilitated the establishment of over 600 start-ups, with more than a hundred of them receiving one million Hong Kong dollars of angel funding from CityU and investment from other institutions. The “HK Tech 300” fosters the commercialization of our technological innovations and brings economic benefits to Hong Kong.

Under the thriving innovation and technology ecosystem at CityU, members of our State Key Laboratory of Marine Pollution (SKLMP) have also established a number of start-up companies, transforming our research achievements into products, services and commercial ventures. Our developed products have garnered numerous local and international awards, including eco-tiles that enhance marine biodiversity, an innovative dissolved oxygen sensor, cost-effective oil-absorbing sponges, artificial mussels for monitoring heavy metals and radionuclides in oceans, aptamer-based biosensors for monitoring emerging pollutants in seawater and technologies for underwater habitat mapping. We eagerly anticipate further innovative breakthroughs and the establishment of more successful technology-driven companies, not only to contribute to the improvement of the marine environment but also to strongly support Hong Kong in becoming a global leader in I&T.

*Kenneth Leung*  
Director of SKLMP  
February 2024



## Activities

### Successful Completion of NSFC Conference at City University of Hong Kong on 1 – 3 September, 2023

State Key Laboratory of Marine Pollution (SKLMP) held the “NSFC Forum on Ocean Science” from 1 to 3 September 2023. This forum was organized based on a cooperation agreement between the National Natural Science Foundation of China (NSFC) and the Beijing-Hong Kong Academic Exchange Centre (BHKAEC), with the participation of over 40 scholars from Hong Kong and the mainland. Due to the impact of Typhoon Saola, the forum was eventually held online.

At the opening ceremony, speeches were delivered by SKLMP Director Prof. Kenneth Leung, Prof. Chun Sing Lee, the Provost and Deputy President of CityU, and Mr. Hoi Shan Hsu, the President of the BHKAEC, who extended their wishes for the conference’s success. Afterwards, Prof. Kwan Sing Lam, the President of Hong Kong Metropolitan University, and Prof. Peiyuan Qian, the Chair Professor of the Hong Kong University of Science and Technology, gave their keynote lectures.

This forum explored various aspects related to the theme of “Marine Ecosystem Health and Sustainable Development”, covering three distinct sub-themes: Coastal Marine Ecological Safety and Health, Marine Sustainable Development, and Innovative Technologies for Marine Environmental Monitoring. Throughout the conference, both SKLMP members and attending scholars presented highly valuable scientific research reports and elaborated on the latest research findings.

Prof. Raymond Hon Fu Chan, the Dean of the College of Science at CityU, reflected on the accomplishments of the event and expressed optimism for the future development of marine environmental research in Hong Kong at the closing ceremony.



Prof. Chun Sing Lee  
Provost and Deputy  
President of CityU



Mr. Hoi Shan Hsu  
President of the  
BHKAEC



Prof. Raymond Hon Fu Chan  
Dean of the College  
of Science at CityU



### Distinguished Lecture 5 - Prof. Zhiguo Yuan AM “Mitigating Greenhouse Gas Emissions from Wastewater Systems for Net Zero Urban Water Management”

On 10 November 2023, Prof. Zhiguo Yuan, a Member of the Order of Australia (AM) delivered a distinguished lecture titled “Mitigating Greenhouse Gas Emissions from Wastewater Systems for Net Zero Urban Water Management” to an attentive groups of audiences. Prof. Yuan, renowned as the Chair Professor of Urban Water Management and Global STEM Professor at School of Energy and Environment, City University of Hong Kong, has dedicated his research to the development of innovative solutions for urban water management by integrating fundamental science and applied engineering.

Drawing upon his group’s research achievements over the past 15 years and incorporating the latest findings from literature, Prof. Yuan provided a comprehensive overview of the current understanding of CH<sub>4</sub> emissions from sewer networks, N<sub>2</sub>O and CH<sub>4</sub> emissions from wastewater and sludge treatment systems, and CO<sub>2</sub> emissions originating from fossil carbon in wastewater. He also discussed the mathematical modelling of biological N<sub>2</sub>O and CH<sub>4</sub> production and the opportunities and strategies for reducing these emissions.



### SKLMP Leading Gordon Research Conference in Italy

During July 16-21, 2023, our SKLMP Director, together with Dr. Ceri Lewis from Exeter University, successfully co-chaired the Gordon Research Conference (GRC) on “One Health Approaches to Urbanization, Water, and Food Security” at the Renaissance Tuscany Il Ciocco Resort & Spa in Barga, Italy. The conference attracted a diverse audience of 80 delegates from 11 countries, including Australia, Canada, China, Czech Republic, Denmark, Germany, Korea, New Zealand, Sweden, the UK, and the USA. SKLMP demonstrated strong support for this GRC, with a total of 20 participants from our team, including 9 PhD students, 6 Postdocs, and 5 Professors. The conference featured 23 insightful keynote lectures and provided numerous discussion sessions, fostering valuable idea exchanges among attendees. This event served as a platform for us to cultivate research ideas and establish international collaborations with fellow participants. The fruitful discussions and interactions enabled us to broaden our research horizons and strengthen our global research network.



### SKLMP Scientists Presenting at the 8<sup>th</sup> Conference on Ecotoxicology

The 8th Conference on Ecotoxicology was held in Shaoxing, China from 12 to 14 October, 2023. More than one thousand scholars attended the conference, which focused on the theme of Ecotoxicology under the One Health, highlighting cutting-edge developments in related fields. The symposium on Marine Ecotoxicology was jointly organized by the State Key Laboratory of Marine Pollution (SKLMP), Xiamen University, and Minjiang University. As part of the conference, Prof. Kenneth Leung, the director of SKLMP, was invited to give a plenary lecture on “the UN-endorsed Global Estuaries Monitoring (GEM) Program for Cleaner and Safer Oceans”. Additionally, representatives from SKLMP, including Dr. Meng Yan, Dr. Chong Chen, Dr. Rongjie Zhao, Dr. Yi Yang, Mr. Shaopeng Xu, and Ms. Yifang Chen also participated in the conference and shared their latest research findings.



### SKLMP's Young Scholars Contribute Valuable Insights at the 12<sup>th</sup> National Environmental Chemistry Conference in Wuhan

On 18 November, 2023, the 12<sup>th</sup> National Environmental Chemistry Conference, jointly hosted by the Environmental Chemistry Professional Committee of the Chinese Chemical Society and China University of Geosciences (Wuhan), was grandly opened in Wuhan. The conference attracted more than 10,000 representatives gathering to explore the innovative path of environmental science and to deepen exchanges and research collaboration.

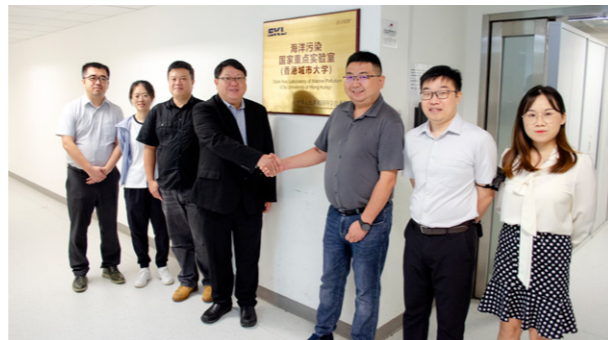
Under the theme “Healthy Environment, Habitable Earth,” the focus of the conference revolved around the “dual carbon” goals, encompassing environment, health, and various related issues such as water, soil, air, and solid waste. Ninety-four sessions were held, covering a broad range of fields including advanced analytical techniques, ecotoxicological effects and health risks, pollution remediation technologies, and environmental policies.

Many of SKLMP’s young scholars participated in this conference and gave engaging oral and/or poster presentations. Through their contributions, they effectively showcased the scientific research achievements of our laboratory.



## The delegation from the Planning and Construction Office of Shenzhen Qianhai Authority visited SKLMP

On 28 September 2023, a delegation of six representatives from the Planning and Construction Office of Shenzhen Qianhai Authority led by Deputy Director Mr. Yanwei Jin, visited the City University of Hong Kong and had a meeting with Prof. Kenneth Leung, the Director of SKLMP, and Prof. Wenxiang Wang, SKLMP member and the Associate Dean of the College of Energy and Environment. Both groups had a friendly discussion during the meeting. This visit fostered their understanding of our scientific research and innovation of marine technology, paving the way for future collaborations between Shenzhen Qianhai and SKLMP. During their visit of SKLMP, Prof. Leung introduced several interesting R&D projects conducted at the laboratory, while Dr. Wu Jiajun, the Scientific Officer, gave the guests an overview of the laboratory facilities.



## The delegation from Laoshan Laboratory visited SKLMP

On 16 October 2023, SKLMP Director Prof. Kenneth Leung warmly welcomed a delegation of four representatives from Laoshan Laboratory (LL) in Qingdao, China led by Prof. Kehou Pan, the Assistant Director of LL. Prof. Leung introduced them to the background information about SKLMP and highlighted the significant research contributions in recent years. Prof. Pan introduced the history of LL, its latest development and possibilities of collaboration. After a brief meeting, the delegation visited the facilities of SKLMP and learnt about some of our ongoing projects from our PhD students and research staff. Prof. Pan actively engaged in the discussion with our students and staff throughout the tour.



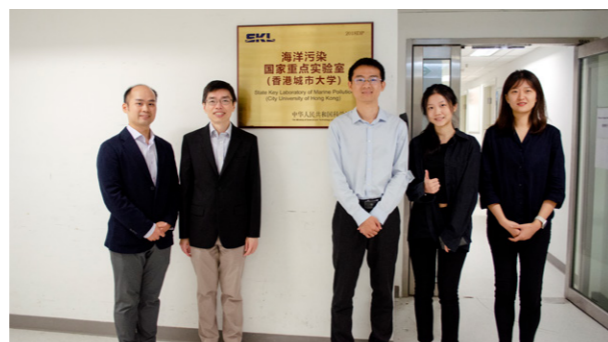
## The delegation of State Key Laboratory of Marine Environmental Science visited SKLMP

On 18 October 2023, Prof. Yangfan Li from the State Key Laboratory of Marine Environmental Science (MEL) at Xiamen University, led a team of five young researchers to visit SKLMP, where they were greeted with great enthusiasm by our Director, Prof. Kenneth Leung. MEL is a long-term collaborative partner of SKLMP, and members of the two institutions have been working together on many collaborative projects in the field of marine environmental research. During the meeting, Prof. Leung narrated the historical journey of SKLMP, providing young researchers with valuable insights into its development and remarkable research achievements. Prof. Li introduced his recent research endeavors and highlight the possible areas for collaboration between the two labs. In the subsequent laboratory tour, our PhD students shared their research findings and provided in-depth explanations to the guests.



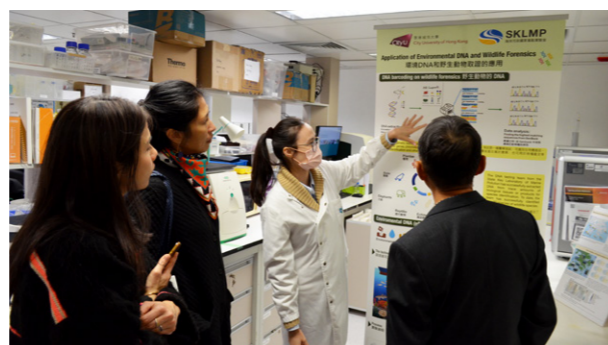
## Visit of The China Prosperity Capital

On 26 October 2023, SKLMP's new Associate Director of Research, Prof. Patrick Lee, hosted a visit for Mr. Shaolong Xiong and his team from The China Prosperity Capital. Prof. Lee shared the background and origins of the laboratory's establishment history, its current mission and vision, as well as the Three Strategic Research Themes of SKLMP with examples. He also highlighted the awards and honours received by SKLMP members in the past two years, along with the key research accomplishments. After the meeting, Prof. Lee took the visiting guests on a tour of the laboratory, showcasing the advanced scientific instruments, well-equipped research facilities, and ongoing experimental samples. The guests also listened to project presentations delivered by the SKLMP research students and staff.



## Visit of John Swire & Sons (H.K.) Limited

On 19 December 2023, a delegation of six representatives from the John Swire & Sons (H.K.) Limited and the TUYF Charitable Trust visited the City University of Hong Kong. Our Director, Prof. Kenneth Leung provided a detailed account of the history and research achievements of SKLMP. Prof. Patrick Lee, SKLMP's new Associate Director of Research, along with SKLMP members Prof. Siu Gin Cheung, Prof. Vincent Ko, and Dr. Meng Yan, shared their updates on their on-going research and innovation projects. Following that, Prof. Leung invited the delegation to visit the SKLMP laboratory, where the research staff and students showcased and explained various ongoing research projects. Among these presentations, Dr. Qin Xian, representing SKLMP Associate Director Prof. Leo Chan's research team, highlighted their projects on digital twin ocean and underwater habitat mapping, and demonstrated scientific equipment used to capture real-time data on water quality, and coral health.



## New members



**Prof. Meng FANG**  
Assistant Professor  
School of Law, CityU  
**Expertise:**  
Environmental law and policy, energy law, international trade law, climate change



**Prof. Li WANG**  
Assistant Professor  
Department of Biomedical Sciences, CityU  
**Expertise:**  
Cardiovascular, metabolism, pollution, drug



**Prof. Yu HUANG**  
Jeanie Hu Professor of Biomedical Sciences  
Chair Professor  
Department of Biomedical Sciences, CityU  
**Expertise:**  
Health impact of environmental pollutants on cardiovascular, metabolic system



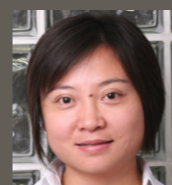
**Prof. Huiyong YIN**  
Professor  
Department of Biomedical Sciences, CityU  
**Expertise:**  
Mass spectrometry, lipidomics/metabolomics, risk assessment, disease models, toxicology



**Prof. Alex Kwan Yue JEN**  
Lee Shau Kee Chair Professor of Materials Science  
Chair Professor  
Department of Materials Science and Engineering, School of Energy and Environment, Department of Chemistry, CityU  
**Expertise:**  
Photonics, energy, opto-electronics, nanomedicine, nanotechnology



**Prof. Angus Hin Lap YIP**  
Professor  
School of Energy and Environment, Department of Materials Science and Engineering, CityU  
**Expertise:**  
Floating photovoltaics, sustainable energy solutions, self-sustainable marine research infrastructure, eco-shoreline development, lightweight and flexible PV



**Prof. Wanxin LI**  
Associate Professor  
Department of Public and International Affairs, School of Energy and Environment, CityU  
**Expertise:**  
Governance, Monitoring, Reporting and Verification (MRV), impacts



**Prof. Zhiguo YUAN AM**  
Chair Professor  
School of Energy and Environment, CityU  
**Expertise:**  
Integrated urban water management, net-zero urban water management, smart urban water systems, sustainable carbon bioeconomy, wastewater treatment and resource recovery, urban water infrastructure protection



**Prof. Arul Lenus Roy VELLAISAMY**  
Chair Professor  
School of Science and Technology, HKMU  
**Expertise:**  
Environmental monitoring and remediation, water quality



**Prof. Liang ZHANG**  
Associate Professor  
Department of Biomedical Sciences, CityU  
**Expertise:**  
Proteomics, cell signaling, multi-omics



**Prof. Xue WANG**  
Assistant Professor  
School of Energy and Environment CityU  
**Expertise:**  
Renewable energy storage and conversion, CO<sub>2</sub> utilization and conversion, chemicals/fuels electrosynthesis, electrocatalysis, nanomaterials

## Meet our team

**Ms. Naiyu XIE**  
Research assistant



My research interest is mainly about the intestinal microbiota of fish and marine pollutants. Currently, my focus is on investigating the toxic mechanism of emerging chemicals to marine organisms, utilizing various 'omics' techniques. SKLMP stands out for its expertise in marine pollution and marine biology which attracts a lot of outstanding researchers. There is no doubt that I will select it as the top choice to start my scientific career.

**Ms. Ning XU**  
Research assistant



My research focuses on fish stock assessment through morphology and environmental DNA (eDNA) metabarcoding methods. My recent work involves the investigation of fishery resources in marine and freshwater ecosystems. In particular, I will pay more attention to look for endangered marine organisms through eDNA in the future. I believe that SKLMP will bring me unique research experience and opportunities.

**Dr. Yang LIU**  
Visiting fellow



I am a Visiting Fellow from the South China Sea Institute of Oceanology, Chinese Academy of Sciences in Guangzhou. My research revolves primarily around the biodiversity of toxic and harmful algal species, as well as the biological tracing and environmental migration processes of phycotoxins in the marine environment. I was driven to join the SKLMP by the lab's impressive team capabilities and advanced research platform. At present, I am working in collaboration with Prof. Leo Chan on the risk assessment of marine phycotoxins in Hong Kong waters.

**Dr. Dumas DECONINCK**  
Postdoc



I am a scientist by nature and a biologist at heart. As a kid, I would ask questions regarding the world, and how things work, but I would always be most interested in living organisms. I finished my Bachelor's at Ghent University, and after a year of a functional biology Master's, I discovered I would rather do Marine Biology, so I studied at EMBC+ (currently known as IMBRSea) an international Master's in Europe for which I spent time abroad in Ireland and Spain, and met many fellow students from all over the world. During my thesis, I discovered a love for working with DNA, which continued throughout my Doctoral thesis, where I focused on identifying seafood with genetic methods. I currently work on using eDNA to monitor biodiversity in Hong Kong waters under the supervision of Prof. Leo Chan and Prof. Jianwen Qiu. I am grateful for the opportunity I've been given. Not only does it allow me to expand my horizons by travelling to a different continent, but it also enables me to work on a topic I'm truly passionate about.

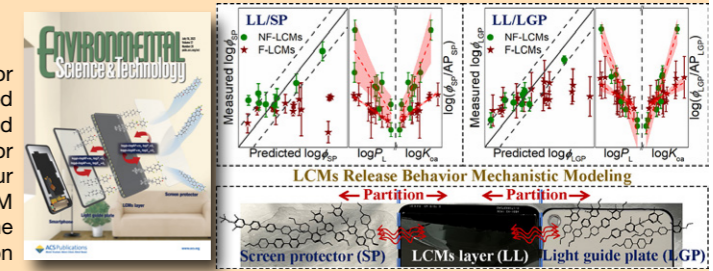


**Prof. Henry HE**  
Assistant Professor,  
School of Energy and Environment, CityU

### Release behavior of liquid crystal monomers from waste smartphone screens: occurrence, distribution, and mechanistic modeling

*Environmental Science & Technology*, 57, 28, 10319–10330 (2023). (Impact Factor: 11.357)

Liquid crystal display (LCD) screens can release organic pollutants into indoor environments, including liquid crystal monomers (LCMs), which have been proposed as a novel class of emerging pollutants. Understanding the release pathways and mechanisms of LCMs from different components of LCD screens is crucial for accurate assessment and comprehension of their environmental transport behaviour and fate in the ambient environment. In this study, LCMs were detected in the LCM layer (LL), light guide plate (LGP), and screen protector (SP) of waste smartphone screens. The LL was identified as the source of LCMs in the LGP and SP. Emission factors of LCMs from the waste screen, SP, LGP were estimated and a mechanism model was developed. The study suggests that LCMs in LGP could reach diffusion-partition equilibrium more quickly than those in SP, indicating that LCM release could be mainly governed through SP diffusions.



[Read Online](https://doi.org/10.1021/acs.est.2c09602) → <https://doi.org/10.1021/acs.est.2c09602>

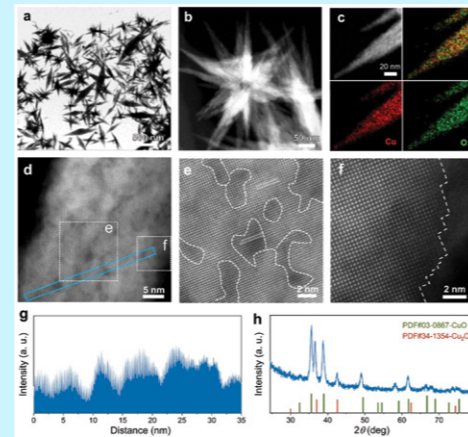
## Research highlights

**Prof. Ruquan YE**  
Associate Professor,  
Department of Chemistry, CityU

### Accelerating multielectron reduction at Cu<sub>x</sub>O nanograins interfaces with controlled local electric field

*Nature Communications*, 14, 7383 (2023). (Impact Factor: 16.6)

In this study, Cu<sub>x</sub>O bipyramids with controlled tip angles and abundant nanograins were synthesized using laser-assisted manufacturing. The relationship between electron transport/ion concentrations and electrocatalytic performance was investigated through various tests and simulations. The results demonstrated the contributions of a strong electric field at the sharp tip and provided insights into the dynamic evolution of critical \*CO/\*OCCO intermediates and product profiles. By modulating electron transport and ion concentrations, high Faradaic efficiency was achieved for C<sub>2</sub>+ products via CO<sub>2</sub>RR and nitrate reduction reaction (NITRR), showcasing the potential for carbon-nitrogen cycling.



[Read Online](https://doi.org/10.1038/s41467-023-43303-1) → <https://doi.org/10.1038/s41467-023-43303-1>

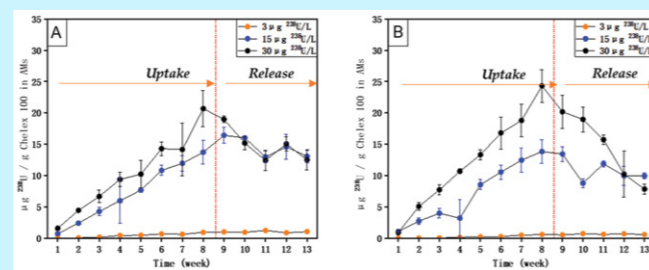
**Prof. Rudolf WU**  
Advisor (Environmental Science),  
Department of Science and Environmental Studies, EdUHK

### Polarization fingerprint for mic artificial mussels: a new tool for monitoring radionuclides in aquatic environments

*Journal of Marine Science and Engineering*, 11(7), 1309 (2023). (Impact Factor: 2.744)

This study aimed to explore the feasibility of using the 'Artificial Mussel' (AM) as a new tool for monitoring radionuclides in marine environments. It was found that the uptake and accumulation of <sup>238</sup>U, <sup>88</sup>Sr, and <sup>133</sup>Cs by AMs were directly related to their concentrations in water and equilibrium could be reached within 7 to 8 weeks, with high concentration factors. The results suggest that AMs can be an effective and practical tool for monitoring of radionuclides in aquatic environments, overcoming the challenges faced by existing methods. By offering a low-cost and efficient alternative, AMs have the potential to revolutionize long-term and large-scale radionuclide monitoring, providing valuable insights into the presence and levels of radioactive substances in marine ecosystems.

**Prof. Vincent KO**  
Professor,  
Department of Chemistry, CityU



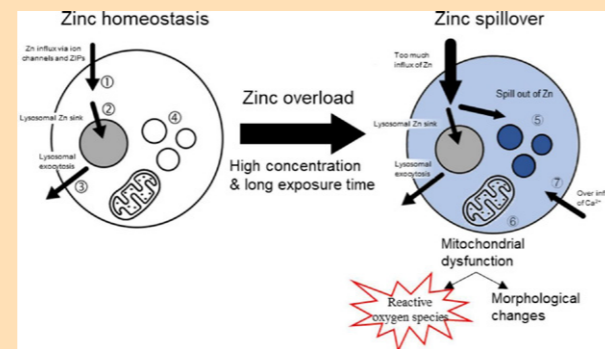
[Read Online](https://doi.org/10.3390/jmse11071309) → <https://doi.org/10.3390/jmse11071309>

**Prof. Wenxiong WANG**  
Chair Professor,  
School of Energy and Environment, CityU

### How fish cells responded to zinc challenges: Insights from bioimaging

*Science of The Total Environment*, 875, 162538 (2023). (Impact Factor: 10.754)

This study investigated the subcellular trafficking of zinc ions (Zn) in rabbitfish fin cells. The results showed that the toxicity and bioaccumulation of Zn were both dose- and time-dependent. Cellular homeostasis was maintained at lower Zn concentrations, but disruptions occurred at higher concentrations (>200 μM) and longer exposure time. Lysosomes played a crucial role in Zn regulation during the initial exposure period, storing Zn and exhibiting increased activity. However, beyond a certain threshold, Zn spillover occurred, affecting other cellular organelles, particularly mitochondria. This Zn-induced damage to mitochondria led to morphological changes, increased production of reactive oxygen species, and decreased cell viability. The study also found that the amount of Zn in mitochondria served as a reliable predictor of Zn toxicity in fish cells.



[Read Online](https://doi.org/10.1016/j.scitotenv.2023.162538) → <https://doi.org/10.1016/j.scitotenv.2023.162538>

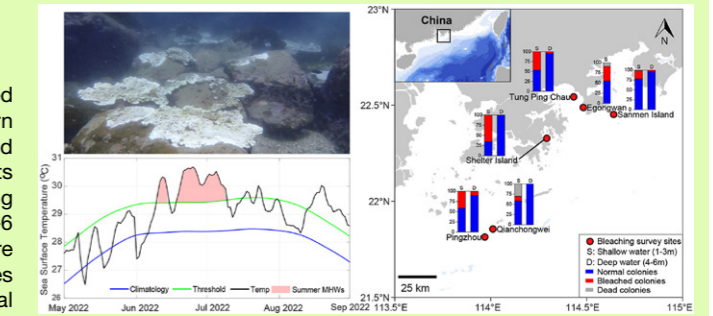
**Prof. Jianwen QIU**  
Professor,  
School of Biology, HKBU

**Prof. Leo CHAN**  
Associate Director,  
SKLMP, CityU

### The 2022 summer marine heatwaves and coral bleaching in China's Greater Bay Area

*Marine Environmental Research*, 189, 106044 (2023). (Impact Factor: 3.737)

Coral communities in China's Greater Bay Area (GBA) experienced an unprecedented coral bleaching event in the scleractinian coral communities located in the northern South China Sea (nSCS) from July to August 2022. This research conducted field surveys at 6 sites in the three main coral distribution areas of the GBA. The results indicate that coral bleaching was observed at all sites, with the bleaching being more severe in the shallow waters (1-3 meters) compared to the deeper waters (4-6 meters). By analysing oceanographic data, marine heatwaves (MHWs) were detected during the summer in 3 of the surveyed areas, with mean intensities between 1.62 and 1.97°C and durations between 5 and 22 days. Histological oceanographic data further suggested a significant increase in the frequency, intensity, and total days of MHWs in 2022 compared to previous years. This impacted the structure of subtropical coral communities in the nSCS and weakened their potential as thermal refugia.



[Read Online](https://doi.org/10.1016/j.marenvres.2023.106044) → <https://doi.org/10.1016/j.marenvres.2023.106044>

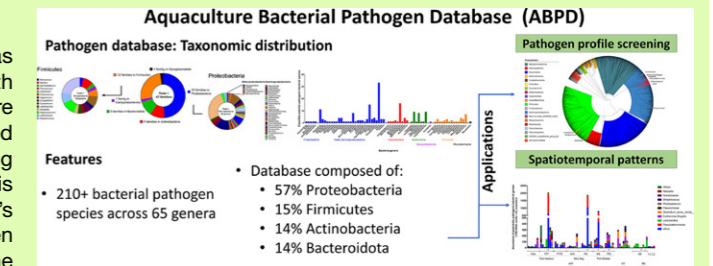
**Dr. Jinping CHENG**  
Assistant Professor,  
Department of Science and Environmental Studies, EdUHK

**Prof. Hongbin LIU**  
Chair Professor,  
Department of Ocean Science, HKUST

### Aquaculture bacterial pathogen database: Pathogen monitoring and screening in coastal waters using environmental DNA

*Water Research X*, 20, 100194 (2023). (Impact Factor: 9.365)

The increasing occurrence of diverse pathogens in coastal and mariculture areas demands improved monitoring platforms to prevent economic and public health implications. Accessible databases with up-to-date knowledge and taxonomy are critical for detecting and screening environmental pathogens. This study developed an aquaculture bacterial pathogen database from over 3000 relevant reports, curating over 210 bacterial pathogenic species impacting aquaculture. Applying this database to environmental DNA metabarcoding monitoring data in Hong Kong's coastal and mariculture waters could effectively characterise regional pathogen profiles over a year, improving identification of new potential pathogen targets. The results highlighted increased potential pathogen abundance related to aquaculture activity and associated inorganic nitrogen load, primarily due to *Vibrio* enrichment during atypical dry winter season. This database empowers environmental DNA-based approaches in coastal marine pathogen surveillance, benefiting global water resource management and aquaculture development.



[Read Online](https://doi.org/10.1016/j.wroa.2023.100194) → <https://doi.org/10.1016/j.wroa.2023.100194>

## News updates

### SKLMP Receives Gold Award at FITMI 2023 for Innovative Project Enhancing Hong Kong's Marine Biodiversity

SKLMP's invention on "Eco-tiles for enhancing marine biodiversity" has won the Gold Medal of the Asia International Innovative Award at the 2023 Asia International Innovative Invention Exhibition held in June 2023 which was organised by the Hong Kong Federation of Innovative Technologies and Manufacturing Industries (FITMI). This award is a recognition of the SKLMP Eco-shoreline research team's dedication to developing innovative and sustainable solutions for protecting the marine ecosystem.

The team has established a start-up called "afterNATURE" through CityU's Hong Kong Tech 300 program. With their expertise, they have developed a range of eco-engineered products that have been adopted by the Hong Kong SAR Government for numerous local seawalls, including those in Causeway Bay, Tsuen Wan, and Lamma Island.



## SKLMP's Team Wins Top Prize at Hong Kong Green Innovations Award for Transforming Manmade Seawalls into Living Shorelines

SKLMP Director Prof. Kenneth Leung's research team, comprising of Dr. Chi Chiu Lo, Thea Bradford, and Rainbow Leung from SKLMP, as well as Dr. Juan Carlos Astudillo, Assistant Professor of Department of Applied Sciences at Hong Kong Metropolitan University and Prof. Chi Sun Poon, Chair Professor and Head of Department of Civil and Environmental Engineering at the Hong Kong Polytechnic University, was awarded the prestigious Gold Award of the Hong Kong Green Innovations Award (HKGIA) as part of the 2022 Hong Kong Awards for Environmental Excellence (HKAAEE).

Their impactful innovation, titled "Enhancing Intertidal Marine Biodiversity on Artificial Seawalls by Novel Eco-tiles," clinched the top prize among 80 entries in this year, highlighting the remarkable achievement of the SKLMP team in green innovation.



**Figure legend:** Our SKLMP Team happily won the top prize (Gold Award) of the Hong Kong Green Innovation Awards 2022 for the invention of eco-tiles for enhancing marine biodiversity on manmade seawalls (Top right); the Director of SKLMP received the award from Mr. Chin-wan Tse, the Secretary for Environment and Ecology on 15 December 2023 at the Hong Kong Convention and Exhibition Centre (Lower right).



## SKLMP Research Team Reveals Health risks of Emerging Pollutants on Dolphins and Porpoises in Hong Kong Waters (reported by Mingpao)

SKLMP Director Prof. Kenneth Leung, along with SKLMP members, Prof. Paul Kwan-sing Lam, Prof. Brian Chin Wing Kot, and Prof. Yuefei Ruan, collaborated on research regarding the concentrations and long-term variations of emerging persistent organic pollutants (POPs) in local marine mammal bodies. Two papers were published in May and June of 2023 in the journal *Environmental Science & Technology*.

The team's latest findings reveal that compared to the regulated and significantly reduced polybrominated diphenyl ethers (PBDEs), emerging POPs such as per- and polyfluoroalkyl substances (PFAS) and halogenated flame retardants (HFRs) are present in higher concentrations in the liver and skin tissue samples of stranded Chinese white dolphins and finless porpoises in Hong Kong. These pollutants can potentially lead to reproductive injury in the marine mammals, posing potential health risks. The concentrations of these pollutants also multiplied along the marine food chain.

In another study conducted by the team, tissue samples from 25 Chinese white dolphins and 72 finless porpoises were collected for chemical analysis. The results revealed that both species contained emerging PFAS, including PFECBS and HFPO-DA, and their tissue concentrations increased by 2.8 times and 5.6 times, respectively between 2012 and 2018.

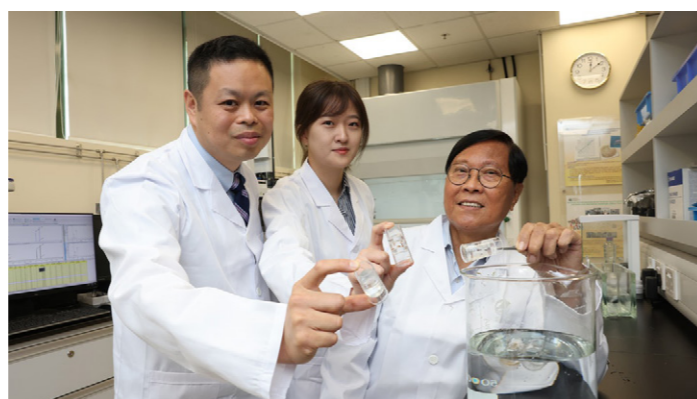


## 'Artificial Mussels' Provide Efficient Detection of Radioactive Contaminants in Seawater (reported by various local newspapers and TV media)

The Japanese government's plan to discharge nuclear-contaminated water into the ocean has raised unforeseen safety concerns for marine ecosystems, prompting a new demand to efficiently detect radioactive substances in contaminated seawater samples.

Prof. Rudolf Wu and Prof. Vincent Ko have successfully developed an innovative device known as the "Artificial Mussels" to address this issue. These transparent cylindrical devices are capable of adsorbing metals and monitoring the levels of radioactive substances in seawater. In 2022, the research team conducted relevant tests by exposing the "Artificial Mussels" to seawater with varying concentrations of common radioactive substances such as uranium, strontium, and cesium to evaluate their absorption and release capabilities. After a period of 7-8 weeks, the "Artificial Mussels" reached saturation, and they were subsequently transferred to clean seawater, enabling the team to detect the released radioactive substances.

The "Artificial Mussel" device offers a cost-effective solution, priced at approximately HK\$8 per unit, and surpasses traditional detection methods in its suitability for long-term and large-scale monitoring of wastewater.



## From Childhood Adventures to Scientific Breakthroughs: Prof. Kenneth Leung's Eco-Tile Innovations (featured by Ta Kung Pao)

Prof. Kenneth Leung was previously interviewed for the "Our Innovation Story" series by Ta Kung Pao, where he shared his journey in scientific research and his current research on eco-engineering of seawalls.

Due to his father's occupation, Prof. Leung had the opportunity to venture out to sea during his childhood, allowing him to experience the mystery of the ocean. During his study of Diploma in Environmental Studies (Pollution) at Chai Wan Technical Institute, he had taken a summer internship at the Shatin Sewage Treatment Plant where he discovered the fascinating aspects of research, gradually leading him to a career in environmental research.

Currently, Prof. Leung leads a research team that focuses on the development of eco-tiles. Compared to conventional seawall components, the utilization of eco-tiles as artificial eco-modules not only decreased temperatures by at least 2°C but also created complex and diverse habitats, effectively enhancing marine biodiversity. The team plans to collaborate with more regions worldwide to promote the use of eco-tiles and protect the marine environment.



Image by Ta Kung Pao: <http://www.takungpao.com.hk/news/232109/2023/0515/850109.html>

## SKLMP Members Contribute to 'Hong Kong Nature Stories' Documentary Series, Illuminating Biodiversity and Conservation Efforts

The 2023 public cultural welfare project "Hong Kong Nature Stories", was jointly launched by Phoenix Media Group and WWF Hong Kong, and produced in collaboration between Phoenix Media Group and China Resources Group, with the generous support of the local government. Officially premiered on 28 October 2023, this documentary series comprises 12 episodes, each lasting 26 minutes, aiming to illuminate Hong Kong's natural environment, biodiversity, conservation practices, and sustainable development to the world by using six natural wonders (i.e., rocks, mountains, shores, ocean, fields, and wetlands). "Hong Kong Nature Stories: Ocean" and "Hong Kong Nature Stories: Shoreline" were filmed with the active involvement and support of our SKLMP members and their research teams.



Dr. Apple Chui, the founder of the Coral Academy, has dedicated several years to collaborating with the Agriculture, Fisheries, and Conservation Department on the Secondary School Coral Nursery Programme. With a primary focus on coral cultivation, her objective extends beyond the protection and restoration of Hong Kong's degraded coral communities. Dr. Chui also aims to foster awareness and concern for marine ecology and coral conservation in Hong Kong by incorporating marine environmental education into her initiatives.



Prof. Leo Chan, the Associate Director of SKLMP, and his Research Assistant Jeffrey Chung leads their team to conduct a research project focused on creating panoramic maps of Hong Kong's underwater habitats. By blending photographs taken by divers at precise moments and locations with cutting-edge computer technology, these maps offer an all-encompassing depiction of marine data, facilitating a better understanding of Hong Kong's underwater ecosystem.

During the documentary, Prof. Jianwen Qiu mentioned the global trend towards mainstreaming biodiversity and emphasized the necessity to raise public awareness of the importance of biodiversity, as well as the challenging but essential task of balancing socio-economic development and biodiversity conservation in Hong Kong.



SKLMP Director, Prof. Kenneth Leung presented three research projects, including "Oysters Saves Our Seas (Oyster SOS)", "Eco-Shorelines," and "Global Estuaries Monitoring (GEM)". The Oyster SOS project focuses on utilizing discarded oyster shells to restore manmade shorelines, by providing livable habitats for marine organisms, while also incorporating a series of experiential educational activities for the public. In collaboration with the Civil Engineering and Development Department, the "Eco-Shorelines" project has piloted an eco-engineered seawall in Siu Ho Wan, New Territories. Both projects make significant contributions to the enhancement of coastal biodiversity. Furthermore, the UN-endorsed GEM project has successfully engaged over 100 international scientists in monitoring pollutants of emerging concern in more than 130 estuaries worldwide.

## Successful ICMPE-10 Conference Held at City University of Hong Kong from 3 to 6 of January, 2024

This event witnessed a remarkable turnout, with about 300 participants from over 20 different countries and received a total of 270 abstracts. Throughout the four-day conference, participants enjoyed a rich program consisting of 80 regular oral presentations plus 3 plenary and 23 keynote lectures, encompassing a diverse array of comprehensive marine science topics. All speakers delivered stimulating presentations and actively participated in discussions on the latest research findings and new ideas in the field.

Participants are currently invited to submit their manuscripts to the Virtual Special Issue (VSI) of the ICMPE-10 Conference via the online submission system, which has been opened on 1 February 2024, and will be closed on 31 May 2024.

The next edition of the ICMPE Conference will be held in Jeju Island, Korea, in August 2026.



## Meet Prof. Patrick Lee, New Associate Director of SKLMP

Patrick Lee is a Professor in the School of Energy and Environment at City University of Hong Kong. He obtained his Bachelor of Science degree in chemical engineering from Queen's University in Canada in 2001 and subsequently earned his Master of Science and PhD degrees in environmental engineering from the University of California, Berkeley in 2002 and 2007, respectively. From 2008 to 2010, he conducted postdoctoral research at the same university.

Prof. Lee's research focuses on utilizing experimental and computational techniques to investigate environmental microbiology and the environmental microbiome. The overarching objective of his research is to contribute to the development of a healthier, greener, and more sustainable future for all. In recognition of his contributions, Prof. Lee has received various awards, including the World Cultural Council Special Recognition Award. He also serves as an Associate Editor for the journal *Water Research X*.



# SeaMap Tech, a New Startup from SKLMP, Secures Seed Fund for Revolutionary Underwater Mapping

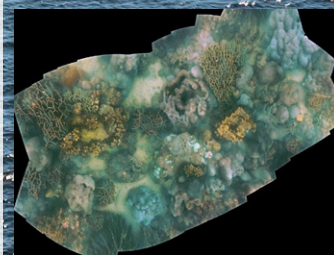
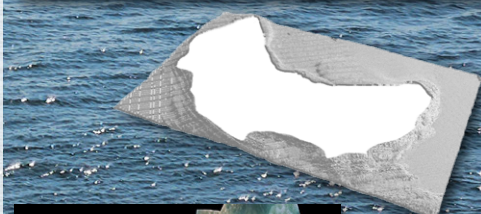
SeaMap Tech, formed by a dynamic team of innovative researchers from City University of Hong Kong (CityU), is thrilled to announce that they have been awarded a seed fund from CityU's HK Tech 300 to establish their new start-up. Led by Prof. Leo Chan, our Associate Director, the team of SeaMap Tech has achieved remarkable success in the field of underwater habitat mapping and underwater scientific investigation.

Over the past few years, SeaMap Tech has spearheaded several pioneering projects focusing on marine ecosystems. Notably, they have conducted three comprehensive underwater mapping initiatives, including the investigation of underwater habitats in Tung Ping Chau Marine Park, the survey of coral communities in five no-anchoring areas in Port Shelter, and an extensive study of underwater habitats in Victoria Harbour.

Leveraging their extensive experience and expertise, SeaMap Tech is currently developing a state-of-the-art unmanned water drone. This innovative technology will revolutionize underwater exploration and provide invaluable insights into the marine ecosystem and biodiversity conservation.

Additionally, SeaMap Tech is establishing an underwater mapping technique to provide large-scale underwater visual maps. This pioneering approach has the potential to transform our understanding of marine ecosystems, enhance conservation efforts, and support sustainable development.

Team members of SeaMap Tech envision to push the boundaries of underwater mapping technology and develop a comprehensive solution that will eventually benefit scientific research, environmental conservation, and various industries relying on accurate underwater data. SeaMap Tech is committed to advancing underwater exploration and revolutionizing the way we perceive and protect marine environments.



## Upcoming events

### SETAC Asia-Pacific 14th Biennial Meeting

21 - 25 September 2024 • Add to calendar  
Tianjin, China

The SETAC Asia-Pacific 14<sup>th</sup> Biennial Conference will be held from 21 to 25 September 2024 in Tianjin, China, organized by Nankai University and Society of Environmental Toxicology and Chemistry (SETAC). The Director of SKLMP, Prof. Kenneth Leung, will co-chair for the "Marine Pollution and Ecotoxicology" session with Prof. Bryan Brooks, Prof. Huahong Shi, and Prof. Xinhong Wang. SKLMP member Dr. Yuefei Ruan will serve as the Session Secretary. This session will invite scientists and policymakers to discuss regional and global marine pollution problems and jointly explore their solutions through sharing their knowledge and latest advancements in the field of marine pollution and ecotoxicology, which will support the UN Sustainable Development Goal 14.1 aiming to prevent and significantly reduce marine pollution of all kinds by 2050.



The 2<sup>nd</sup> UN Ocean Decade Regional Conference & 11<sup>th</sup> WESTPAC International Marine Science Conference will take place from 22 to 25 April 2024, in Bangkok, Thailand. Our Director, Prof. Kenneth Leung and his postdoc, Dr. Chong Chen will serve as co-conveners for sub-theme C1, Marine chemical Contaminants of Emerging Concern (CEC). The objective of this session is to share research progress and innovative solutions for combating marine pollution problems, with the goal of achieving a clean ocean by 2030. Dr. Jiajun Wu will also serve as a co-convenor for sub-theme C6, Marine Toxins and Seafood Safety. The session aims to provide updates on seafood poisonings in the region, exchange scientific information about marine toxin research and analytical methods, and share experiences in reducing poisonings in the area.

Link: <https://www.ioctestp2024.com/>



The East Asian Seas (EAS) Congress is a triennial event that brings together stakeholders to share knowledge, build partnerships, monitor progress, and plan for the implementation of the Sustainable Development Strategy for the Seas of East Asia with the vision of promoting a 'Healthy Ocean, People and Economies'. The EAS Congress 2024, under the theme "Blue Synergy for a Shared Future: One Sustainable and Resilient Ocean", will be held in Xiamen, China from 6-8 November 2024, in collaboration with Xiamen World Ocean Week (XWOW). Hosted by PEMSEA and the Ministry of Natural Resources of China, the Congress will include training and knowledge exchange activities organized by SKLMP, the Regional Centre of Excellence (RCOE) in Marine Pollution. Registration opens on 28 February 2024.

Link: <https://pemsea.org/eas-congress/eas-2024>

## New promotion

### Congratulations to Dr. Philip Wing Lok Ho

Dr. Ho started a new appointment as an Assistant Professor at Department of Rehabilitation Sciences in the Hong Kong Polytechnic University, since September 2023.



## Call for contributions



To better capture the news, updates and great work of the SKLMP members and community, we are now calling for contributions for the next issue of our newsletter. Please email us your contributions (up to 100 words) to [sklmp.info@cityu.edu.hk](mailto:sklmp.info@cityu.edu.hk) by 31 May 2024. Ideas of contributions include your new publications or projects, received awards, and conferences or meetings that are of particular interest to the SKLMP members. We look forward to your contributions!

