



年度報告
Annual Report

2019

The mission of the SKLMP is to protect the marine environment of Hong Kong and South China by identifying major threats such as algal toxins and contaminants of emerging environmental concern, and developing tools and technologies to address and solve these problems.

海洋污染國家重點實驗室的使命為通過明確威脅海洋環境的主要問題，如藻毒素和新興環境污染物等，並發展相關設備和技術致力於解決這些問題，以保護香港和華南地區的海洋安全。



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The State Key Laboratory of Marine Pollution (SKLMP) has had another year of success. Although 2019 appeared to be “uneventful”, SKLMP was part of a number of exciting developments in marine environmental research in Hong Kong and nearby regions. By way of example, the Centre for Ocean Research (Hong Kong and Macau) under the leadership of Professor Jianping GAN of HKUST, and the Hong Kong Branch of the Southern Marine Science and Engineering Guangdong Laboratory (Guangzhou), led by Professor Peiyuan QIAN of HKUST, started operation and offered research funds to members of the SKLMP. The SKLMP is also actively collaborating with the Southern Marine Science and Engineering Guangdong Laboratory (Zhuhai) in ocean research in southern China. The SKLMP will focus on research in the Greater Bay Area. Each of these laboratories has been promised over HK\$10 million per year. These new initiatives are vital to the future development of marine research in the region and should be welcome news to all young scientists, who deserve a promising future in their research careers. All in all, these recent developments potentially present “a golden age” for marine research in our region. The onus now is on the directors and members of the laboratories to collaborate effectively on projects that were previously infeasible, and together, take our research to a new level.

The Academic Committee (AC) of the SKLMP has been reconstituted. We are extremely grateful to the retiring AC members: Professor Arthur Chen-Tung CHEN, Professor Dunxin HU, Professor Jiazuan NI, Professor Xiaoyan TANG, Professor Shu TAO, Professor Hongxia YU, Professor Mingjiang ZHOU, and Professor Yongguan ZHU, many of whom have been with us since the establishment of the SKLMP in 2009. A number of new AC members have joined us: Professor Eddy Yongping ZENG, Professor Fengchang WU, Professor Gan ZHANG, and Professor Xiaowei ZHANG. Special gratitude goes to our AC Chairman, Professor Jilan SU, for his advice and guidance over the past 10 years, and for recommending Professor Minhan DAI as the new AC Chairman. Professor Dai has kindly agreed to assist the SKLMP.

In anticipation of the increase in annual funding from HK\$5 million to \$10 million provided by the Innovation and Technology Commission of the Hong Kong SAR Government, the SKLMP has increased the number of, and level of support for, SKLMP members to allow sustained funding for designated research themes in strategic areas. The SKLMP will continue to provide seed money to help build research clusters to apply for major projects. We will also take the opportunity to replace old or obsolete equipment with more advanced, fit-for-purpose equipment and facilities.

The next review of the SKLMP will come very soon. I will make sure that a new Director is in place as soon as practicable to take us to new heights.

Professor Paul Kwan Sing LAM
Director of the State Key Laboratory of Marine Pollution
31 December 2019

順利渡過了圓滿的一年！

儘管二零一九年是「平凡」的一年，海洋污染國家重點實驗室（SKLMP）積極參與本港及附近地區的海洋環境研究，發展令人振奮！

由香港科技大學甘劍平教授領導的港澳海洋研究中心，及香港科技大學錢培元教授帶領的南方海洋科學與工程廣東省實驗室（廣州）香港分部已開始運作，並向SKLMP成員提供研究資助。此外，SKLMP也積極與南方海洋科學與工程廣東省實驗室（珠海）展開華南海洋研究合作。我們致力大灣區研究發展，各所實驗室承諾每年投放超過一千萬港幣進行研究。

上述新措施對未來大灣區的海洋研究發展至關重要，同時也為在科研路上具發展潛力的青年科學家帶來喜訊。總而言之，這些新發展將引領大灣區海洋研究進入「黃金時代」。實驗室內上上下下應同心協力，解決過往面對的困難，使研究工作更上一層樓。

SKLMP學術委員會亦於今年完成重組。我們衷心感謝卸任的委員：陳鎮東教授、胡敦欣院士、倪嘉纘院士、唐孝炎院士、陶澍院士、于紅霞教授、周名江教授及朱永官院士。他們大部份是自二零零九年SKLMP成立以來一直與我們同行。同時，我們也歡迎一些新加入委員，包括曾永平教授、吳豐昌院士、張干教授及張效偉教授。在此，深切感謝主席蘇紀蘭院士在過去十年來的指導和帶領，及推薦戴民漢院士為新任學術委員會主席。承蒙戴院士已答應出任。

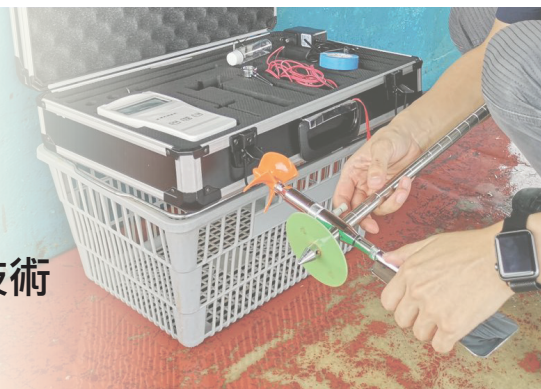
因應特區政府創新科技署將年度資助經費由五百萬港幣提升至一千萬港幣，SKLMP會提升對成員的支援，讓他們獲持續資助進行重點領域內的特定研究項目。我們也繼續提供種子資金，協助成員建立研發平台，申請重大科研項目。同時，我們會購置更先進、更切合需要的儀器和設備，以取代老化或陳舊的設備。

SKLMP快將面對下一輪國家重點實驗室評審。我確信新一任實驗室主任將盡快到任，帶領我們走向新的高峰。

林群聲教授
海洋污染國家重點實驗室主任
二零一九年十二月三十一日

Research Scopes in SKLMP 實驗室研究範疇

1. Pollution Monitoring Technology 污染檢測技術



2. Marine Ecosystem 海洋生態系統



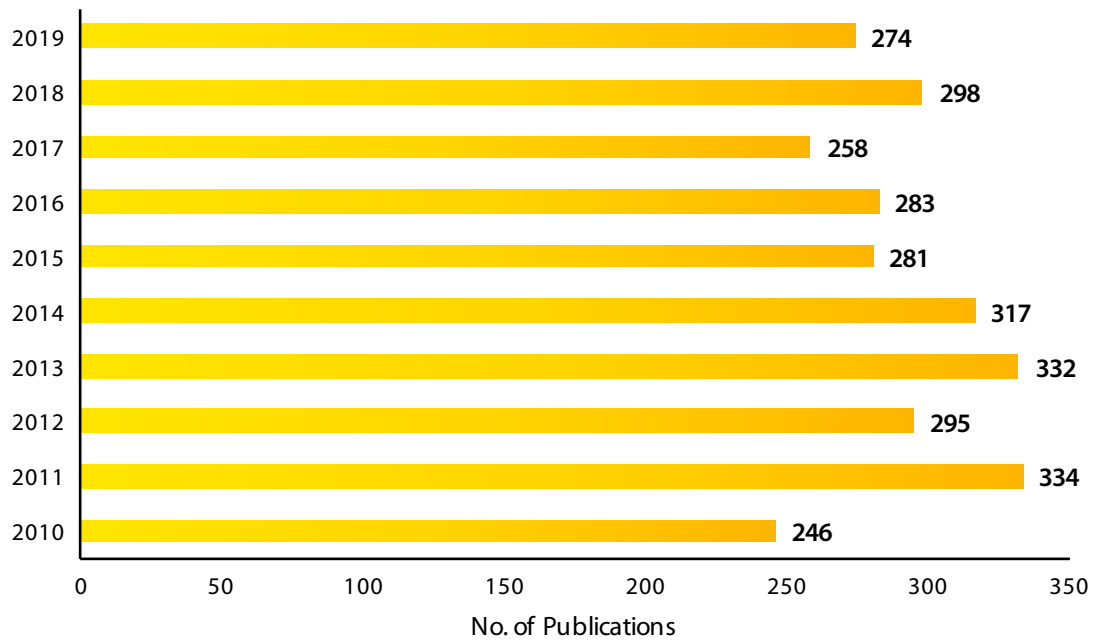
3. Risk Assessment 風險評估



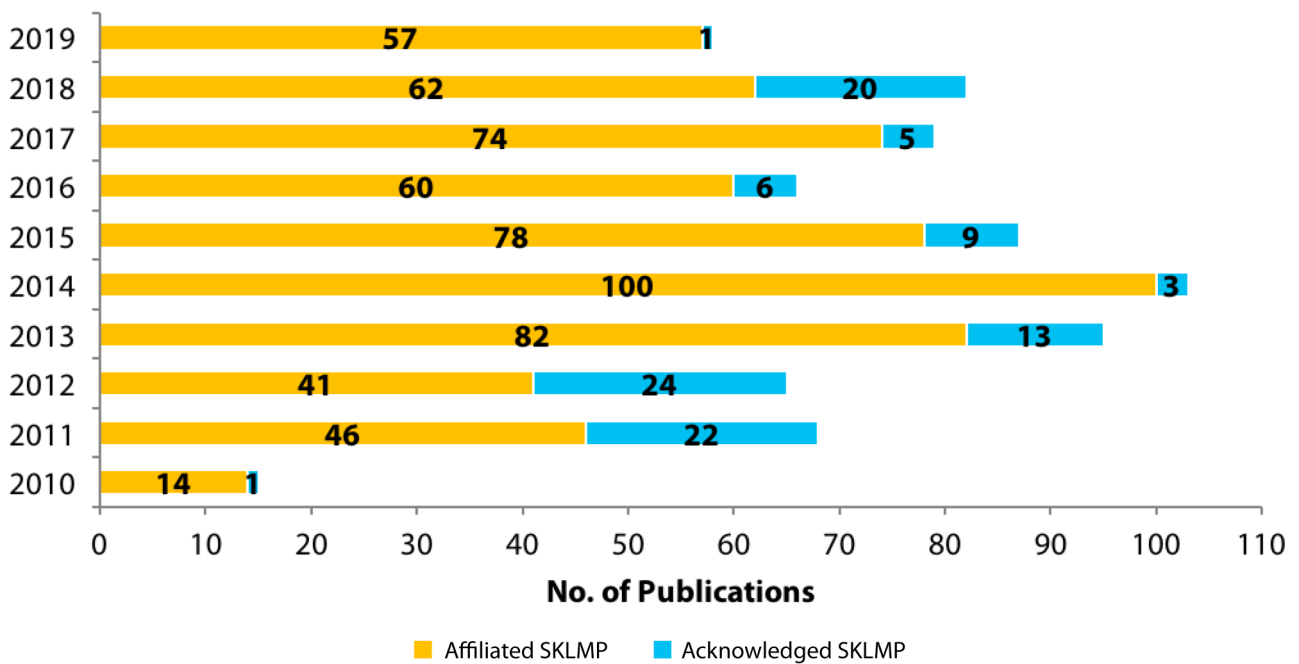
4. Pollution Control and Bioremediation 污染控制與生物修復

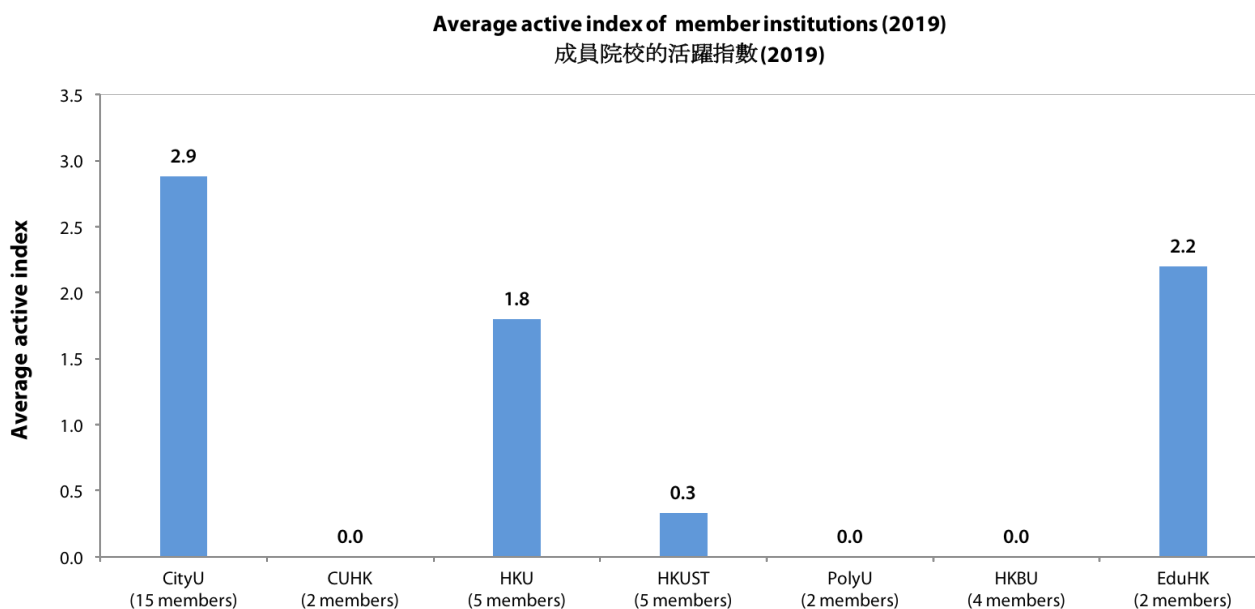
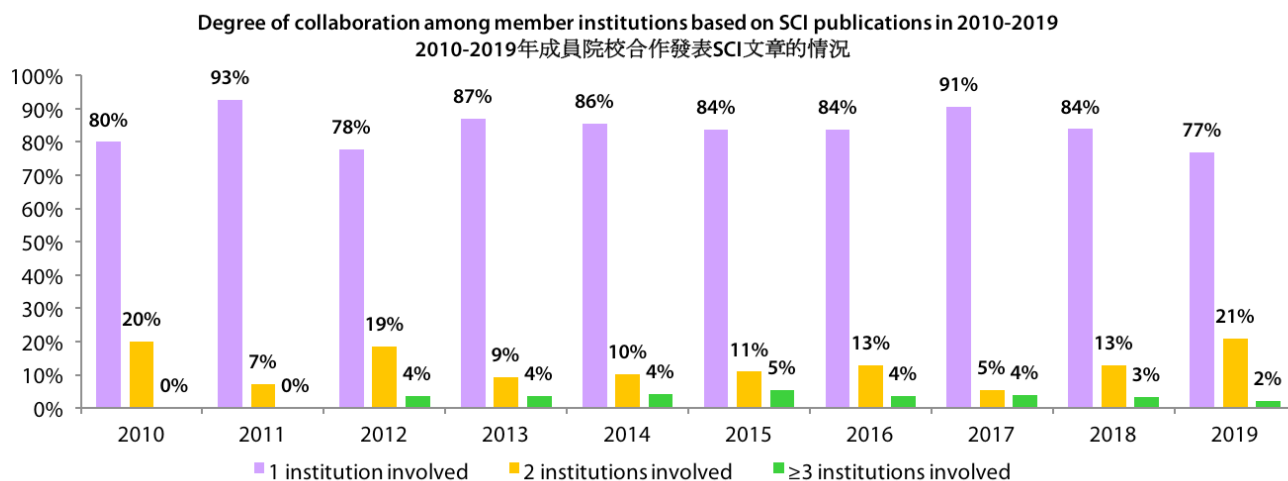


Number of SCI publications of SKLMP members (2010-2019)
2010-2019年SKLMP 成員的SCI論文數目



Number of SCI publications of SKLMP (2010-2019)
2010-2019年SKLMP的SCI論文數目





Average active index = SCI publications / members per institution

平均活躍指數 = SCI 文章數目 / 院校成員人數

Paper with the SKLMP included as the first affiliation
以SKLMP為第一作者單位的期刊論文

1. Ruan, Y., Zhang, K., Wu, C., Wu, R., & **Lam, P. K. S.** (2019).
A preliminary screening of HBCD enantiomers transported by microplastics in wastewater treatment plants.
Science of the Total Environment, 674, 171-178.
2. Song, L., **Lam, P. K. S.**, & Hecker, M. (2019).
Aquatic toxicology: History and future.
Aquatic Toxicology, 216, 105326.
3. Ruan, Y., Lalwani, D., Kwok, K. Y., Yamazaki, E., Taniyasu, S., Kumar, N. J. I., **Lam, P. K. S.**, & Yamashita, N. (2019).
Assessing exposure to legacy and emerging per-and polyfluoroalkyl substances via hair–The first nationwide survey in India.
Chemosphere, 229, 366-373.
4. Yau, M. S., Lei, E. N. Y., Ng, I. H. M., Yuen, C. K. K., **Lam, J. C. W.**, & **Lam, M. H. W.** (2019).
Changes in the neurotransmitter profile in the central nervous system of marine medaka (*Oryzias melastigma*) after exposure to brevetoxin PbTx-1–A multivariate approach to establish exposure biomarkers.
Science of the Total Environment, 673, 327-336.
5. He, T., Tsui, M. M. P., Tan, C. J., Ng, K. Y., Guo, F. W., Wang, L. H., Chen, T. H., Fan, T. Y., **Lam, P. K. S.**, & Murphy, M. B. (2019).
Comparative toxicities of four benzophenone ultraviolet filters to two life stages of two coral species.
Science of the Total Environment, 651, 2391-2399.
6. Feng, H., Ruan, Y., Zhang, K., & **Lam, P. K. S.** (2019).
Current analytical methodologies and gaps for per-and polyfluoroalkyl substances determination in the marine environment.
Trends in Analytical Chemistry, 121, 115372.
7. Wang, Q., Tsui, M. M. P., Ruan, Y., Lin, H., Zhao, Z., Ku, J. P. H., Sun, H., & **Lam, P. K. S.** (2019).
Occurrence and distribution of per-and polyfluoroalkyl substances (PFASs) in the seawater and sediment of the South China sea coastal region.
Chemosphere, 231, 468-477.
8. Feng, H., Ruan, Y., Wu, R., Zhang, H., & **Lam, P. K.S.** (2019).
Occurrence of disinfection by-products in sewage treatment plants and the marine environment in Hong Kong.
Ecotoxicology and Environmental Safety, 181, 404-411.
9. Tsui, M. M. P., Chen, L., He, T., Wang, Q., Hu, C., **Lam, J. C. W.**, & **Lam, P. K. S.** (2019).
Organic ultraviolet (UV) filters in the South China sea coastal region: Environmental occurrence, toxicological effects and risk assessment.
Ecotoxicology and Environmental Safety, 181, 26-33.

10. Ruan, Y., Wu, R., **Lam, J. C. W.**, Zhang, K., & **Lam, P. K. S.** (2019).
Seasonal occurrence and fate of chiral pharmaceuticals in different sewage treatment systems in Hong Kong: Mass balance, enantiomeric profiling, and risk assessment.
Water Research, 149, 607-616.
11. Ruan, Y., Zhang, K., **Lam, J. C. W.**, Wu, R., & **Lam, P. K. S.** (2019).
Stereoisomer-specific occurrence, distribution, and fate of chiral brominated flame retardants in different wastewater treatment systems in Hong Kong.
Journal of Hazardous Materials, 374, 211-218.
12. Zhang, K., Chen, X., Xiong, X., Ruan, Y., Zhou, H., Wu, C., & **Lam, P. K. S.** (2019).
The hydro-fluctuation belt of the Three Gorges Reservoir: Source or sink of microplastics in the water?
Environmental Pollution, 248, 279-285.
13. He, T., Tsui, M. M. P., Tan, C. J., Ma, C. Y., Yiu, S. K. F., Wang, L. H., Chen, T. H., Fan, T. Y., **Lam, P. K. S.**, & Murphy, M. B. (2019).
Toxicological effects of two organic ultraviolet filters and a related commercial sunscreen product in adult corals.
Environmental Pollution, 245, 462-471.

Paper with the SKLMP included as one of the affiliations
以SKLMP為作者單位之一的期刊論文

1. Zhou, G. J., Lai, R. W. S., Sham, R. C. T., Lam, C. S., Yeung, K. W. Y., Astudillo, J. C., Ho, K. K. Y., Yung, M. M. N., Yau, J. K. C., & **Leung, K. M. Y.** (2019).
Accidental spill of palm stearin poses relatively short-term ecological risks to a tropical coastal marine ecosystem.
Environmental Science and Technology, 53(21), 12269-12277.
2. Wang, S., Liu, G., Zhang, J., Zhou, L., & **Lam, P. K. S.** (2019).
An effective method for reconstructing the historical change in anthropogenic contribution to sedimentary organic matters in rivers.
Science of the Total Environment, 655, 968-976.
3. Lai, N. L. S., Kwok, K. Y., Wang, X.-h., Yamashita, N., Liu, G., **Leung, K. M. Y., Lam, P. K. S., & Lam, J. C. W.** (2019).
Assessment of organophosphorus flame retardants and plasticizers in aquatic environments of China (Pearl River Delta, South China Sea, Yellow River Estuary) and Japan (Tokyo Bay).
Journal of Hazardous Materials, 371, 288-294.
4. Chan C.Y., & **Wang W. X.** (2019).
Biomarker responses in oysters *Crassostrea hongkongensis* in relation to metal contamination patterns in the Pearl River Estuary, southern China.
Environmental Pollution, 251, 264-276.
5. Meng, Y., Guo, Z., Yao, H., Yeung, K. W. K., & **Thiyagarajan, V.** (2019).
Calcium carbonate unit realignment under acidification: A potential compensatory mechanism in an edible estuarine oyster.
Marine Pollution Bulletin, 139, 141-149.
6. Lee, B.Y., Kim, M. S., Choi, B.S., Nagano, A. J., **Au, D. W. T., Wu, R. S. S.,** Takehana Y., & Lee, J. S. (2019).
Construction of high-resolution RAD-Seq based linkage map, anchoring reference genome, and QTL mapping of the sex chromosome in the marine medaka *Oryzias melastigma*.
G3: Genes, Genomes, Genetics, 9(11), 3537-3545.
7. Chen, L., Tsui, M. M. P, **Lam, J. C. W.,** Wang, Q., Hu, C., Wai, O. W. H., Zhou, B., & **Lam, P. K. S.** (2019).
Contamination by perfluoroalkyl substances and microbial community structure in Pearl River Delta sediments.
Environmental Pollution, 245, 218-225.
8. Farzana, S., Zhou, H., **Cheung, S. G., & Tam, N. F. Y.** (2019).
Could mangrove plants tolerate and remove BDE-209 in contaminated sediments upon long-term exposure?
Journal of Hazardous Materials, 378, 120731.

9. Manno, F.A.M., Isla, A.G., Manno, S.H.C., Ahmed, I., **Cheng, S.H.**, Barrios, F.A., & Lau, C. (2019). **Early stage alterations in white matter and decreased functional interhemispheric hippocampal connectivity in the 3xTg mouse model of Alzheimer's disease.** *Frontiers in Aging Neuroscience*, 11, 39.
10. Chalifour, A., Chin, W. Y., Leung, P. Y., **Cheung, S. G.**, & **Tam, N. F. Y.** (2019). **Effect of light on the transformation of BDE-47 by living and autoclaved cultures of *Microcystis flos-aquae* and *Chlorella vulgaris*.** *Chemosphere*, 233, 140-148.
11. Huang, L., Li, W. C., **Tam, N. F.Y.**, & Ye, Z. H. (2019). **Effects of root morphology and anatomy on cadmium uptake and translocation in rice (*Oryza sativa* L.).** *Journal of Environmental Sciences*, 75, 296-306.
12. Wang, Z., Ho, K. K. Y., Zhou, G. J., Yeung, K. W. Y., & **Leung, K. M. Y.** (2019). **Effects of silver and zinc on tropical freshwater organisms: Implications on water quality guidelines and ecological risk assessment.** *Chemosphere*, 225, 897-905.
13. Xu, S., Liu, C., Xie, F., Tian, L., Manno, S.H., Manno, III F.A.M., Fallah, S., Pelster, B., Tse, G., & **Cheng, S.H.** (2019). **Excessive inflammation impairs heart regeneration in zebrafish *breakdance* mutant after cryoinjury.** *Fish and Shellfish Immunology*, 89, 117-126.
14. Qiang, L., & **Cheng, J. P.** (2019). **Exposure to microplastics decreases swimming competence in larval zebrafish (*Danio rerio*).** *Ecotoxicology and Environmental Safety*, 176, 226-233.
15. Kwan, B. K.Y., Hu, M., Wang, Y., **Cheung, S. G.**, & Shin, P. K. S. (2019). **Fatty acids from controlled feeding as dietary markers of juvenile Chinese horseshoe crab, *Tachypleus tridentatus*.** *Journal of the Marine Biological Association of the United Kingdom*, 99(2), 421-428.
16. Farzana, S., **Cheung, S. G.**, Zhou, H. C., & **Tam, N. F. Y.** (2019). **Growth and antioxidative response of two mangrove plants to interaction between aquaculture effluent and BDE-99.** *Science of the Total Environment*, 662, 796-804.
17. **Lai, K. P.**, Wang, S. Y., Li, J. W., Tong, Y., Chan, T. F., Jin, N., Tse, A., Zhang, J. W., Wan, M. T., Tam, N., **Au, D. W. T.**, Lee, B.-Y., Leem, J.-S., Wong, A. S. T., **Kong, R. Y. C.**, & **Wu, R. S. S.** (2019). **Hypoxia causes transgenerational impairment of ovarian development and hatching success in fish.** *Environmental Science & Technology*, 53(7), 3917-3928.
18. Liu, C., **Cheng, S. H.**, & Lin, S. (2019). **Illuminating the dark depths inside coral.** *Cellular microbiology*, 22, e13122.

19. Beni, M. S., Krstic, D., Nikezic, D., & **Yu, K. N.** (2019).
Medium-thickness-dependent proton dosimetry for radiobiological experiments.
Scientific Reports, 9, 11577.
20. Wang, S., Liu, G., Yuan, Z., & **Lam, P. K. S.** (2019).
Occurrence and trophic transfer of aliphatic hydrocarbons in fish species from Yellow River Estuary and Laizhou Bay, China.
Science of the Total Environment, 696, 134037.
21. Hu, R., Liu, G., Zhang, H., Xue, H., Wang, X., & **Lam, P. K. S.** (2019).
Odor pollution due to industrial emission of volatile organic compounds: A case study in Hefei, China.
Journal of Cleaner Production, 249, 119075.
22. Chen, L., Tsui, M. M. P., Hu, C., Wan, T., **Au, D. W. T., Lam, J. C. W., Lam, P. K. S.,** & Zhou, B. (2019).
Parental exposure to perfluorobutanesulfonate impairs offspring development through inheritance of paternal methylome.
Environmental Science & Technology, 53(20), 12018-12025.
23. Chen, L., **Lam, J. C. W.,** Hu, C., Tsui, M. M. P., **Lam, P. K. S.,** & Zhou, B. (2019).
Perfluorobutanesulfonate exposure skews sex ratio in fish and transgenerationally impairs reproduction.
Environmental Science & Technology, 53, 8389-8397.
24. Tang, X. Y., Yang, Y., **Tam, N. F. Y.,** Tao, R., & Dai, Y. N. (2019).
Pesticides in three rural rivers in Guangzhou, China: spatiotemporal distribution and ecological risk.
Environmental Science and Pollution Research, 26, 3569-3577.
25. Liu, Z. D., Liao, R., Wan, J. C., Ma, H., Leung, P. T. Y., Yan, M., **Wai, T. C.,** & Gu, J. R. (2019).
Polarization staining and high-throughput detection of marine microalgae using single cell average Mueller matrices.
Optik, 180, 84-90.
26. Xu, S., Xie, F., Tian, L., Manno, S. H. C., Manno, F. A. M., & **Cheng, S. H.** (2019).
Prolonged neutrophil retention in the wound impairs zebrafish heart regeneration after cryoinjury.
Fish and shellfish immunology, 94, 447-454.
27. **Yu, K. N.** (2019).
Radiation-induced rescue effect.
Journal of Radiation Research, 60(2), 163-170.
28. Meng, Y., Li, C., Shih, K., He, C., Yao, H., & **Thiyagarajan, V.** (2019).
Recoverable impacts of ocean acidification on the tubeworm, *Hydroides elegans*: implication for biofouling in future coastal oceans.
Biofouling, 35(8), 945-957.

29. Zhou, G. J., Li, X. Y., & Leung, K. M. Y. (2019).
Retinoids and oestrogenic endocrine disrupting chemicals in saline sewage treatment plants: Removal efficiencies and ecological risks to marine organisms.
Environment International, 127, 103-113.
30. Manno, F.A.M. III, Manno, S.H.C, Ma, V., Barrios, F.A., Cho, W.C., & Cheng, S.H., Lau, C. (2019).
Simple surgical induction of conductive hearing loss with verification using otoscope visualization and behavioral clap startle response in rat.
Journal of Visualized Experiments, 152, e57993.
31. Li, X., Xu, S., Cheng, S. H., & Sun, D. (2019).
Simultaneous Localization and Mapping-based in Vivo Navigation Control of Microparticles.
IEEE Transactions on Industrial Informatics, 16(5), 2956-2964
32. Cui, Y. H., Tian, L. J., Li, W. W., Wang, W. K., Wei, W., Lam, P. K. S., & Yu, H. Q. (2019).
Solar-energy-facilitated CdSxSe1-x quantum dot bio-assembly in *Escherichia coli* and *Tetrahymena pyriformis*.
Journal of Materials Chemistry A, 7(11), 6205-6212.
33. Manno, F. A. M., Fernandez-Ruiz, J., Manno, S. H. C., Cheng, S. H., Lau, C., & Barrios, F. A. (2019).
Sparse sampling of silence type I errors with an emphasis on primary auditory cortex.
Frontiers in Neuroscience, 13, 516.
34. Lo, H. S., Wong, C. Y., Tam, N. F. Y., & Cheung, S. G. (2019).
Spatial distribution and source identification of hydrophobic organic compounds (HOCs) on sedimentary microplastic in Hong Kong.
Chemosphere, 219, 418-426.
35. Beni, M. S., Krstic, D., Nikezic, D., & Yu, K. N. (2019).
Studies on unfolding energy spectra of neutrons using maximum-likelihood expectation-maximization method.
Nuclear Science and Techniques, 30, 134.
36. Cui, Y. H., Li, L. L., Tian, L. J., Zhou, N. Q., Liu, D. F., Lam, P. K. S., & Yu, H. Q. (2019).
Synthesis of CdS_xSe_{1-x} quantum dots in a protozoa *Tetrahymena pyriformis*.
Applied Microbiology and Biotechnology, 103(2), 973-980.
37. Lim, Z. F., Luo, Z., Lee, L. K., Hii, K. S., Teng, S. T., Chan, L. L., Chomérat, N., Krock, B., Gu, H., Lim, P. T., & Leaw, C. P. (2019).
Taxonomy and toxicity of *Prorocentrum* from Perhentian Islands (Malaysia), with a description of a non-toxicogenic species *Prorocentrum malayense* sp. nov. (Dinophyceae).
Harmful Algae, 83, 95-108.
38. Chine, V. B., Au, N. P. B., & Ma, C. H. E. (2019).
Therapeutic benefits of maintaining mitochondrial integrity and calcium homeostasis by forced expression of Hsp27 in chemotherapy-induced peripheral neuropathy.
Neurobiology of Disease, 130, 104492.

39. Tran, T. K. A., Yu, R. M. K., Islam, R., Nguyen, T. H. T., Bui, T. L. H., **Kong, R. Y. C.**, O'Connor, W. A., Leusch, F. D. L., Andrew-Priestley, M., & MacFarlane, G. R. (2019).
The utility of vitellogenin as a biomarker of estrogenic endocrine disrupting chemicals in molluscs.
Environmental Pollution, 248, 1067-1078.
40. Zhang, A. Q., Zhou, G. J., **Lam, M. H. W.**, & **Leung, K. M. Y.** (2019).
Toxicities of Irgarol 1051 derivatives, M2 and M3, to two marine diatom species.
Ecotoxicology and Environmental Safety, 182, 109455.
41. Zhang, A. Q., Zhou, G. J., **Lam, M. H. W.**, & **Leung, K. M. Y.** (2019).
Toxicities of the degraded mixture of Irgarol 1051 to marine organisms.
Chemosphere, 225, 565-573.
42. Chen, L., Tsui, M. M. P., **Lam, J. C. W.**, Hu, C., Wang, Q., Zhou, B., & **Lam, P. K. S.** (2019).
Variation in microbial community structure in surface seawater from Pearl River Delta: Discerning the influencing factors.
Science of the Total Environment, 660, 136-144.
43. Yamazaki, E., Taniyasu, S., Ruan, Y., Wang, Q., Petrick, G., Tanhua, T., Gamo, T., Wang, X., **Lam, P. K. S.**, & Yamashita, N. (2019).
Vertical distribution of perfluoroalkyl substances in water columns around the Japan sea and the Mediterranean Sea.
Chemosphere, 231, 487-494.

Grants from Hong Kong 香港科研資助

Government / Non-governmental Organization 政府部門 / 非政府組織

Project Title * 項目名稱	Funding Agency 資助機構	Investigators # 項目負責人 (PI or PC/Co-PI or Co-I)	Amount 金額 (HKD)
2019			
1 Provision of Services to conduct coral monitoring in Marine Parks (AFCD/SQ/176/18/C) 提供海岸公園的珊瑚監測的服務 (AFCD/SQ/176/18/C)	Agriculture, Fisheries and Conservation Department, Hong Kong SAR 香港特別行政區政府漁農自然護理署	<u>Chan, L.L.</u>	1,370,000
2 Provision of Services for Organising a Ghostnet Clean-up and Safety Workshop 組織鬼網清理和安全研討會	Agriculture, Fisheries and Conservation Department, Hong Kong SAR 香港特別行政區政府漁農自然護理署	<u>Chan, L.L.</u>	49,800
3 Provision of Service on Coral Habitat Mapping at Sharp Island North 提供橋咀北珊瑚棲息地的測繪服務	Agriculture, Fisheries and Conservation Department, Hong Kong SAR 香港特別行政區政府漁農自然護理署	<u>Chan, L.L.</u>	49,950
4 Provision of Services for Juvenile Horseshoe Crab Monitoring Using Field Surveys and Environment DNA Technique in Hong Kong 利用野外調查和環境DNA技術監測香港的幼年馬蹄蟹	Agriculture, Fisheries and Conservation Department, Hong Kong SAR 香港特別行政區政府漁農自然護理署	<u>Cheung, S.G.</u>	465,000
5 Juvenile Horseshoe Crab Rearing Programme 馬蹄蟹保母計劃	Ocean Park Conservation Foundation Hong Kong 香港海洋公園保育基金	<u>Cheung, S.G.</u>	261,600
6 Unravelling the Food Web Dynamics Sustaining Hong Kong's Shallow Marine Soft-bottom Ecosystems 探索支持香港淺海軟底質生態系統的食物網動態	Environment and Conservation Fund 環境及自然保育基金	<u>Cheung, S.G.</u>	2,126,478
7 Impact of Microplastics on the Chinese Horseshoe Crab <i>Tachypleus Tridentatus</i> in Hong Kong Western Waters (Phase II) 微米塑膠對香港西部水域的中國蠶 (<i>Tachypleus Tridentatus</i>)之影響(第二階段)	Marine Ecology Enhancement Fund, Airport Authority, Hong Kong 香港機場管理局改善海洋生態基金	<u>Fang, J.K.H.</u> <u>Cheung, S.G.</u>	349,000
8 Microplastics in the Coastal Waters of Hong Kong 香港沿海水域微塑料調查	World Wide Fund for Nature Hong Kong 世界自然基金會香港分會	<u>Fang, J.K.H.</u>	140,800
9 Impact of Microplastics on Life-history Stages of Hard Corals 微米塑膠對石珊瑚不同生長階段之影響	Environment and Conservation Fund 環境及自然保育基金	<u>Fang, J.K.H.</u> Ang, P.O. <u>Chui, A.P.Y.</u> Yuen, M.	1,697,000

Project Title * 項目名稱	Funding Agency 資助機構	Investigators # 項目負責人 (PI or PC/Co-PI or Co-I)	Amount 金額 (HKD)
10 Three-Dimensional Forensic Scene Investigation of Marine Vessel Interaction in Indo-Pacific Humpbacked Dolphins and Indo-Pacific Finless Porpoises in the Hong Kong Waters - Phase 1 法證重組：船隻撞擊對香港水域的中華白海豚及江豚造成的威脅 (第一階段)	Marine Ecology Enhancement Fund 改善海洋生態基金	<u>Kot, B.C.W.</u> Dennison, S. Martelli, P. Thali, M.	1,224,237
11 Consultancy Agreement in relation to the Consultancy Services to Develop Options for a Fisheries Monitoring Programme in Hong Kong (AFCD/FIS/01/19) 建立及評估香港漁業資源調查的可行性方案 (AFCD/FIS/01/19)	Agriculture, Fisheries and Conservation Department, Hong Kong SAR 香港特別行政區政府漁農自然護理署	<u>Lam, P.K.S.</u> <u>Leung, K.M.Y.</u> Wai, T.C. Leung, P.T.Y. Yan, M. Tao, L.S. Lai, V.C.S. Ng, J.S.S. Chow, R. Liu, M. Kang, B. Kennelly, S.J.	4,883,680
12 Provision of Services for Baseline Survey on Condition of Microplastic Pollution in Hong Kong's Marine Waters 香港海域微塑料污染情況的基線調查	Environmental Protection Department 環境保護署	<u>Lam, P.K.S.</u> Zhang, K.	870,000
13 Provision of Service for Species Identification by DNA Test (AFCD/SQ/171/18/C) 提供通過DNA檢測鑑定物種的服務 (AFCD/SQ/171/18/C)	Agriculture, Fisheries and Conservation Department, Hong Kong SAR 香港特別行政區政府漁農自然護理署	<u>Lam, P.K.S.</u> Leung, P.T.Y. Yan, M. <u>Wai, T.C.</u>	1,050,000
14 Pilot Site Trials of Sustainable Measures at Seawalls within Victoria Harbour - Tsuen Wan Promenade 維多利亞港內荃灣海堤的可持續措施試驗計劃	Development Bureau 發展局	<u>Leung, K.M.Y.</u>	1,084,417
15 Apelin Receptor Agonist – A Novel Oral Therapeutic Agent to Treat Alzheimer's Disease Apelin受體激動劑：一種治療阿爾茨海默氏病的新口服治療劑	Human and Medical Research Fund 醫療衛生研究基金	<u>Ng, R.C.L.</u> <u>Leung, K.M.Y.</u>	1,245,348
16 Assessment of Water Quality of Tai Shui Hang River near WENT Landfill 新界西堆填區附近的大水坑河水水質評估研究	Environmental Protection Department 環境保護署	<u>Leung, K.M.Y.</u>	596,000
Subtotal			HKD 17,463,310

University Grants Committee
大學教育資助委員會

Project Title * 項目名稱	Funding Agency 資助機構	Investigators # 項目負責人 (PI or PC/Co-PI or Co-I)	Amount 金額 (HKD)
2019			
1 The Role of the Perception and the Conceptual Understanding about Shark on the Behavioural Intention for Shark Conservation in Primary Students in Chinese Communities 華裔小學生對於鯊魚的認知和概念性理解如何影響保育鯊魚行為意向的研究	General Research Fund 優配研究金	<u>Cheang, C.C.</u> Chen, Y.H. Cheung, T.O. Tsoi, K.H.	362,500
2 Modulation of Androgen Receptor Signaling by miRNAs: a Molecular Basis for Hypoxia-induced Male-biased Sex Ratios in Fish 對雄激素受體信號的調節：缺氧誘導魚類雄性偏向性別比率的分子學基礎	General Research Fund 優配研究金	<u>Kong, R.Y.C.</u> <u>Lai, B.K.P.</u> Yu, R.	983,137
3 SIRMS 2.0: Establishing Asia's Premier Stable Isotope Ratio Mass Spectrometry Laboratory in Hong Kong SIRMS 2.0: 在香港建立亞洲首屈一指的穩定同位素比例質譜實驗室	Collaborative Research Fund 協作研究金	<u>Leung, K.M.Y.</u> Baker, D.M. <u>Cheung, S.G.</u> <u>Lee, J.C.Y.</u> <u>Lee, J.S.Y.</u> <u>Li, X.D.</u> Not, C.A. <u>Qiu, J.W.</u> Ran, L. Tan, V.P.Y. Thibodeau, B. <u>Wai, T.C.</u> Yasuhara, M.	3,804,007
4 Study of Super-fast Large-area Economical Marine Reclamations for Housing and Infrastructural Developments in the Guangdong-Hong Kong-Macau Greater Bay Area 粵港澳大灣區超快大面積經濟填海造地發展房屋和基礎設施之研究	Research Impact Fund 研究影響基金	<u>Yin, J.H.</u> <u>Li, X.D.</u>	9,876,160
5 Differential Chemical Mixtures and Toxicities of Urban PM2.5 in Diverse City Clusters in China 中國不同城市群空氣PM2.5化學混合污染物與毒性的差異	General Research Fund 優配研究金	<u>Li, X.D.</u>	832,421
6 Effects of In Utero Exposure to Perfluorinated Compounds on Placental Functions and Early Development of Pancreatic Islets 在子宮內暴露於全氟化合物對胎盤功能及早期胰島發育的影響	General Research Fund 優配研究金	<u>Wong, C.K.C.</u>	720,000

Project Title * 項目名稱	Funding Agency 資助機構	Investigators # 項目負責人 (PI or PC/Co-PI or Co-I)	Amount 金額 (HKD)
7 Development of an Integrated Microfluidics System for Multi-level High Content Screening of Anti-tumor Drugs 開發微流控集成系統用於多層次高內涵抗腫瘤藥物篩選	Research Impact Fund 研究影響基金	<u>Yang, M.M.S.</u> Chin, R.Y.M. Zhang, L. Guan, X.Y. Wu, J.J. Wu, J.	9,000,000
8 Linking Microbial Community Dynamics and Interactions to Partial-nitritation Anammox Process Treating Saline Reject Water of WWTP by Using Multi-omics 利用多組學方法研究厭氧氨氧化過程中微生物群落相互作用	General Research Fund 優配研究金	<u>Zhang, T.</u>	544,500
Subtotal			HKD 26,122,725

Others 其他

Project Title * 項目名稱	Funding Agency 資助機構	Investigators # 項目負責人 (PI or PC/Co-PI or Co-I)	Amount 金額 (HKD)
2019			
1 Ancestral Exposure to Environmental Benzo[a]pyrene Causes Transgenerational Bone Impairment in Fish: Underlying Mechanisms at the Genetic and Epigenetic Level 環境苯並[a]芘祖代暴露誘導魚類跨代骨頭損傷：於其表觀遺傳及遺傳機制水平	Open Collaborative Research Fund, Hong Kong Branch of Southern Marine Science and Engineering Guangdong Laboratory (Guangzhou) 南方海洋科學與工程廣東省實驗室(廣州) 香港分部，開放協作研究金	<u>Au, D.W.T.</u> Seemann, F. Xu, J.L. Zhang, G. <u>Kong, R.Y.C.</u>	1,500,000
2 Development of the Environmental DNA Metabarcoding Technique for the Early Warning of Algal Bloom and Diagnosis of Fish Mortality Events 用於赤潮預警和魚類死亡診斷的技術發展	Open Collaborative Research Fund, Hong Kong Branch of Southern Marine Science and Engineering Guangdong Laboratory (Guangzhou) 南方海洋科學與工程廣東省實驗室(廣州) 香港分部，開放協作研究金	<u>Cheng, J.P.</u> <u>Liu, H.B.</u> <u>Qian, P.Y.</u>	750,000
3 3D Printing User-interactive Training Models for Enhancing Learning Experience in Regenerative Medicine 增強再生醫學學習經驗的3D打印用戶交互培訓模型	CityU Teaching Development Grant 城市大學教學發展補助金	<u>Yao, X.</u> <u>Cheng, S.H.</u> Lee, Y.J.	200,000

	Project Title * 項目名稱	Funding Agency 資助機構	Investigators # 項目負責人 (PI or PC/Co-PI or Co-I)	Amount 金額 (HKD)
4	Centre for Ocean Research in Hong Kong and Macau 港澳海洋研究中心	Qingdao National Laboratory for Marine Science and Technology 青島海洋科學與技術試點國家實驗室	<u>Gan, J.P.</u>	10,000,000
5	Virtopsy for 3D Documentation of Blunt and Sharp Force Injury Induced by Marine Vessel Interaction on Stranded Cetaceans in the Hong Kong Waters 影像解剖: 立體紀錄香港水域擱淺的鯨豚因船隻撞擊而造成的創傷	CityU Strategic Research Grant	<u>Kot, B.C.W.</u>	100,000
6	Applicability of Unmanned Aerial Vehicle Technology for Collecting Biological Health Data of Local Cetaceans in Hong Kong Waters 利用無人機收集香港水域鯨豚的生物健康數據	Ovarian Cancer Research Foundation	<u>Kot, B.C.W.</u> Li, J. Leung, T.Y. Yan, M.	360,000
7	Non-target Screening and Ecological Risk Assessment of Emerging Chemicals of Concern in Marine Cetaceans from the South China Sea 環境新興污染物在南海鯨豚類中的非靶標篩選鑑定和生態風險評估	Open Collaborative Research Fund, Hong Kong Branch of Southern Marine Science and Engineering Guangdong Laboratory (Guangzhou) 南方海洋科學與工程廣東省實驗室 (廣州) 香港分部, 開放協作研究金	<u>Lam, P.K.S.</u> <u>Ruan, Y.F.</u> Zhang, K. Yan, M.	1,200,000
8	Development of A Suite of Novel in Vitro Assays for Screening of Epigenetic Modifiers 一套新體外測定用以篩選影響表觀遺傳的化合物的開發	Open Collaborative Research Fund, Hong Kong Branch of Southern Marine Science and Engineering Guangdong Laboratory (Guangzhou) 南方海洋科學與工程廣東省實驗室 (廣州) 香港分部, 開放協作研究金	<u>Wu, R.S.S.</u> <u>Kong, R.Y.C.</u> <u>Chiu, J.M.Y.</u> Wong, A.	1,200,000
Subtotal				HKD 15,310,000

Grants from Mainland China 內地科研資助

Research Grant 科研項目			
Project Title * 項目名稱	Funding Agency 資助機構	Investigators # 項目負責人 (PI or PC/Co-PI or Co-I)	Amount 金額 (CNY)
2019			
1 Design of Plasmonic Poor Metal Based Photocatalyst with High Light Utilization and Quantum Efficiency for Nitric Oxide Abatement 設計具有高光利用和量子效率的等離子貧金屬光催化劑用於氮氧化物降解	Hong Kong Scholars Program 香江學者計劃	<u>Ho, W.K.K.</u>	300,000
2 Ecologically engineered shorelines for enhancing biodiversity and ecosystem functions 以人工生態海堤提高生物多樣性和生態功能	Hong Kong Scholars Program 香江學者計劃	<u>Leung, K.M.Y.</u> Underline name	300,000
3 Guangdong-Hong Kong-Macau Joint Laboratory of Environmental Pollution Processes and Control 粵港澳大灣區環境污染過程與控制聯合實驗室	Guangdong-Hong Kong-Macau Joint Laboratory Scheme 粵港澳聯合實驗室	<u>Peng, P.A.</u> <u>Li, X.D.</u> Li, F.B.	5,000,000
4 Exposure to enantiomers of metoprolol and venlafaxine in marine medaka (Oryzias melastigma): Bioaccumulation and full life-cycle toxicological investigations 美托洛爾和文拉法辛對映體在海水青鱒內的富集及全生命週期毒性研究	The National Natural Science Foundation of China, Young Scientists Fund 國家自然科學基金，青年科學基金項目	<u>Ruan, Y.F.</u> <u>Lam, P.K.S.</u> Zhang, K. Yan, M.	300,000
5 Application and Industrialization of Large Seaweed-sea Grape in Sewage Treatment 大型海藻-海葡萄在污水處理中的應用及產業化	The People's Government of Shenzhen Municipality 深圳市人民政府	<u>Wang, W.X.</u>	644,167
6 Research on Male Infertility Caused by the Process of Abnormal Spermatoocyte Division 基於精母細胞分裂異常的男性不育疾病研究	Shenzhen Science and Technology Program 深圳科技計劃	<u>Wong, C.K.C.</u>	2,000,000
Subtotal			CNY 8,544,167

Research Grants

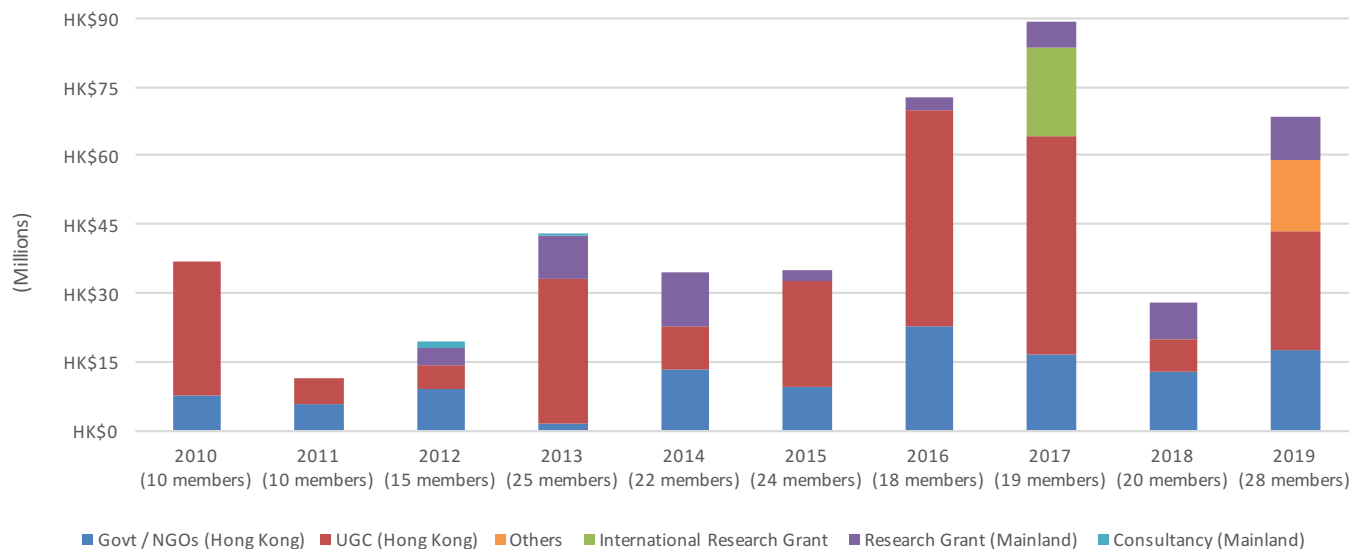
研究資助 *

Competitive External Research Grants

外部的研究資助

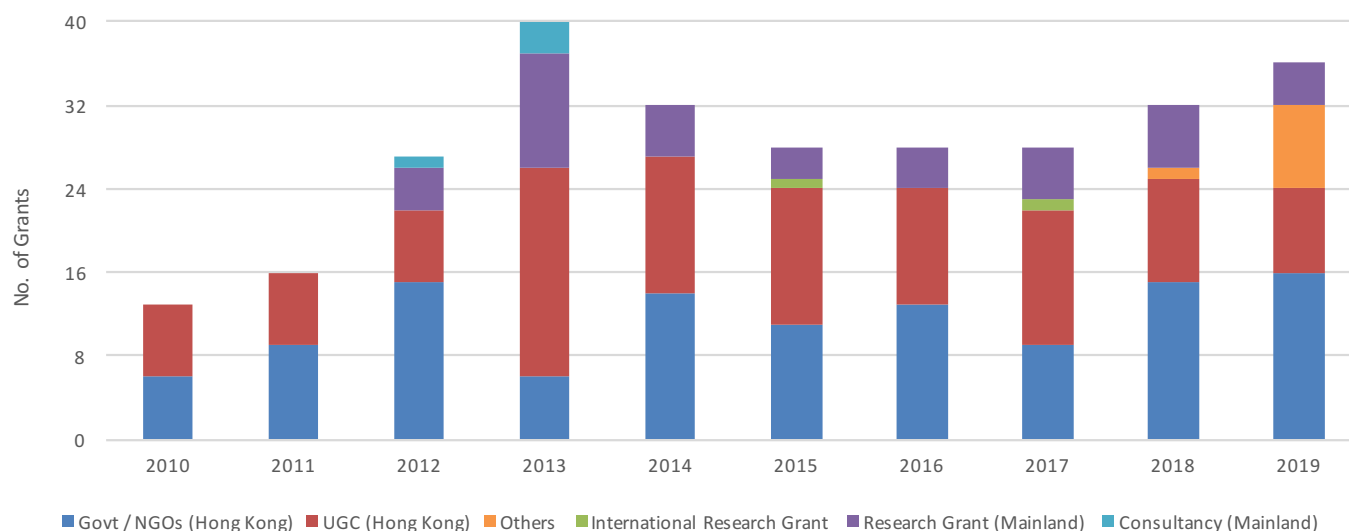
Amount of Competitive External Research Grants (2010-2019)

2010-2019外部的研究資助總額 #



Number of Competitive External Research Grants (2010-2019)

2010-2019外部的研究資助項目統計



* Research Outputs information provided by members.

Number of members in 2010-2012: CityU (13), CUHK (3), HKU (5), HKUST (6), PolyU (1), HKBU (2), XMU (1)

Number of members in 2013: CityU (18), CUHK (2), HKU (5), HKUST (5), PolyU (1), HKBU (7), XMU (1)

Number of members in 2014: CityU (18), CUHK (2), HKU (5), HKUST (5), PolyU (1), HKBU (5), XMU (1)

Number of members in 2015: CityU (17), CUHK (1), HKU (6), HKUST (5), PolyU (1), HKBU (4), XMU (1)

Number of members in 2016: CityU (16), CUHK (1), HKU (5), HKUST (5), PolyU (1), HKBU (4), EdUHK (2), XMU (1)

Number of members in 2017: CityU (14), CUHK (3), HKU (5), HKUST (5), PolyU (2), HKBU (4), EdUHK (2), XMU (1)

Number of members in 2018: CityU (14), CUHK (3), HKU (4), HKUST (6), PolyU (2), HKBU (3), EdUHK (4), XMU (1)

Number of members in 2019: CityU (17), CUHK (3), HKU (5), HKUST (6), PolyU (3), HKBU (3), EdUHK (5), XMU (1)

1CNY=1.2HKD (2019)

Awards, Recognitions and Patents

獎項、讚譽和專利

Awards 獎項			
Member	Award Description	Award Date	Awardee(s)
Dr. Doris W.T. AU	“市級科技項目申報先進個人” 深圳市科技創新委員會對先進個人表彰	Apr 2019	Doris W.T. AU
Dr. S.G. CHEUNG	廣東省科技進步獎二等獎 珠江河口濱海濕地生態修復關鍵技術	Mar 2019	S.G. CHEUNG
Dr. Apple P.Y. CHUI	2019 PEW Marine Fellow	20 Feb 2019	Apple P.Y. CHUI
	Faculty Exemplary Teaching Award 2018, Faculty of Science, CUHK	24 Mar 2019	Apple P.Y. CHUI
	GGEF Women Eco Game Changer Awards - Eco star of China in 2019	24 Mar 2019	Apple P.Y. CHUI
Prof. Paul K.S. LAM Dr. James C.W. Lam	新興有機污染物在環境基質中的賦存、 富集與生物毒性。高等學校科學研究優 秀成果獎（科學技術），國家教育部， 自然科學獎，二等獎	2019	Paul K.S. LAM, James C.W. LAM, B.S. ZHOU, I.H. LOI, L.G. CHEN
Prof. Kenneth M.Y. LEUNG	Certificate for Top Downloaded Article in Environmental Toxicology and Chemistry [2017-2018] by Wiley	Jun 2019	Kenneth M.Y. LEUNG
	Presidential Citation for Exemplary Service by Society of Environmental Toxicology and Chemistry, SETAC World Council	Nov 2019	Kenneth M.Y. LEUNG
Prof. X.D. LI	Environmental Science and Technology Letters Best Paper Award Seasonal Disparities in Airborne Bacteria and Associated Antibiotic Resistance Genes in PM2.5 between Urban and Rural Sites	9 Apr 2019	X.D. LI
Prof. X.Y. LI	Second-class Award in Environmental Science and Technology (Chinese Society for Environmental Sciences): Membrane technology for water purification and wastewater reuse	Dec 2019	X.Y. LI, J.J. ZHANG, F.Y. SUN, X.M.WANG, F. XIAO, K. SHIH, S.F. YANG, R.H. LI, L.C. CHEN
Prof. T. ZHANG	2019 Clarivate Highly Cited Researcher (Category: Environment and Ecology)	2019	T. ZHANG

Organization and Implementation of Individual Research Areas

自主研究課題情況與效果

Funding support from CityU 城大內部撥款資助項目

SKLMP Postgraduate Scholarship (PGS)

SKLMP研究生獎學金

In order to nurture young scientists and develop strategic and in-depth research in the field of marine pollution, the SKLMP has decided to provide financial support to our members to recruit excellent postgraduates

Project Title *	Investigators #	Amount
項目名稱	項目負責人 (PI or PC/Co-PI or Co-I)	金額 (HKD)
Nov 2017 – Oct 2019		
1 Generation of transgenic marine medaka lines to enable high-resolution reconstruction of the beating heart 構建轉基因海水青鱒用於重建高解析度跳動心臟	<u>Cheng, S.H. (CityU)</u> <u>Wong, C.K.C. (HKBU)</u> Yao, X. (CityU) Li, T. (TianjinU)	100,000

Director Discretionary Fund (DDF)

主任資助基金

The fund is allocated by the SKLMP Director to support exploratory projects for encouraging innovation and new initiatives

Project Title *	Investigators #	Amount
項目名稱	項目負責人 (PI or PC/Co-PI or Co-I)	金額 (HKD)
May 2019 – Apr 2022		
1 Development of in-field nutrient analyzer and its application in coral area 珊瑚區營養鹽現場快速監測儀的研製及應用	<u>Yuan, D.X. (XMU)</u> <u>Chan, L.L. (CityU)</u>	300,000
Nov 2017 – Oct 2018		
2 Biomarker diagnostics of metal pollution in Hong Kong's waters 香港水域金屬污染的生物標誌物診斷	<u>Wang, W.X. (HKUST)</u>	200,000
Jun 2016 – Jun 2018		
3 Identification and assessment of emerging halogenated organic pollutants in marine ecosystem 海洋生態系統中新興鹵系有機污染物的識別與評估	<u>Lam, J.C.W. (EdUHK)</u>	400,000
Jun 2016 – Dec 2017		
4 Functional responses of marine ecosystem to hypoxia 海洋生態系統對缺氧的功能性響應	<u>Wu, R.S.S. (EdUHK)</u> <u>Tam, N.F.Y. (CityU)</u> <u>Shin, P.K.S. (CityU)</u> <u>Cheung, S.G. (CityU)</u> <u>Au, D.W.T. (CityU)</u> <u>Ang, P.O. (CUHK)</u> <u>Chiu, J.M.Y. (HKBU)</u>	400,000

Funding support from the Innovation and Technology Commission

創新科技署國家重點實驗室專項基金資助項目

SKLMP Seed Collaborative Research Fund (SCRF)

SKLMP種子協作研究基金

The fund aims to promote excellent, collaborative and interdisciplinary research programs among members from the six collaborating universities

Project Title * 項目名稱	Investigators # 項目負責人 (PI or PC/Co-PI or Co-I)	Amount 金額 (HKD)
Oct 2019 - Sep 2021		
1 Removal of salt and organic pollutants by solar steam using graphene materials 基於石墨烯太陽能水蒸氣技術的海水淡化及有機污染物去除研究	<u>WAI T.C. (CityU)</u> <u>LAM J.C.W. (EdUHK)</u> YE R.Q. (CityU)	300,000
2 Toxicological assessment of Organic Ultraviolet Filters (OUVFs) to early life stage of marine medaka (<i>Oryzias melastigma</i>) 抗紫外線有機化合物對青鱗早期發育毒性的研究	<u>HE Y.H. (CityU)</u> <u>LAM J.C.W. (EdUHK)</u>	300,000
3 Real-time antibiotic resistance genes and pathogen surveillance using Nanopore metagenomic sequencing 使用納米孔宏基因組測序進行即時抗生素抗性基因和病原體監測	<u>ZHANG T (HKU)</u> <u>LEUNG K.M.Y. (HKU)</u> <u>LAM P.K.S. (CityU)</u>	300,000
4 Microplastics in edible oysters and their significance in the Greater Bay Area 大灣區牡蠣的微塑膠含量及其意義	<u>FANG J.K.H. (PolyU)</u> <u>CHEUNG S.G. (CityU)</u>	300,000
5 Organophosphate triesters and diester in coral communities 珊瑚群落裡海洋野生動物中新興的有機阻燃劑	<u>LAM J.C.W. (EdUHK)</u> <u>CHUI A.P.Y. (CUHK)</u> <u>ANG P.O. (CUHK)</u> <u>HO W.K. (EdUHK)</u> <u>CHEANG C.C. (EdUHK)</u>	300,000
6 Removal mechanisms of selected Endocrine Disrupting Chemicals (EDCs) in Bioreactors with biochars 生物炭強化生物反應器對內分泌干擾物的去除及其機理研究	<u>TSANG Y.F. (EdUHK)</u> <u>LI X.Y. (HKU)</u> RINKLEBE J. (UoW)	300,000
7 Assessing the coral health status under different anthropogenic pressures using in-situ and ex-situ innovative methods 使用原位和非原位的創新方法評估不同人為壓力下的珊瑚健康狀況	<u>CHAN L.L. (CityU)</u> <u>QIU J.W. (HKBU)</u>	300,000

Project Title *	Investigators #	Amount
項目名稱	項目負責人 (PI or PC/Co-PI or Co-I)	金額 (HKD)
Nov 2017 - Oct 2020		
8 Ocean acidification threatens Chinese oysters: Can some species adapt within this century? 海洋酸化威脅到中國的生蠔：本世紀內會有物種能夠適應嗎？	<u>Thiyagarajan, V. (HKU)</u> <u>Qiu, J.W. (HKBU)</u> <u>Qian, P.Y. (HKUST)</u> <u>Cheung, S.G. (CityU)</u> <u>Dai, M.H. (XMU)</u>	240,000
9 How phosphate concentration affect the nitrogen uptake of phytoplankton? 磷酸鹽濃度影響浮游植物的氮吸收的機理研究	<u>Liu, H.B. (HKUST)</u> <u>Chan, L.L. (CityU)</u>	240,000
10 Neurotoxicity studies of selected marine biotoxins via neurometabolomic profiling and neurobehavioral assessment on marine medaka (Oryzias melastigma) and zebrafish (Danio rerio) 利用青鱗魚及斑馬魚作為腦神經代謝分析和神經行為評估平台進行對幾種海洋生物毒素的神經毒性的研究	<u>Lam, M.H.W. (CityU)</u> <u>Lam, J.C.W. (EdUHK)</u>	240,000
11 Targeting Astrocytes-neuronal L-lactate Signaling Pathway for Rescuing decision-making deficit in Chronic Ciguatera Poisoning 靶向星形膠質-神經元L-型乳酸信號通路治療慢性雪卡中毒相關的決策行為障礙	<u>Li, Y. (CityU)</u> <u>Chan, L.L. (CityU)</u>	240,000
Jan 2018 - Dec 2020		
12 Microplastics augment the transfer of Bisphenol A and Bisphenol A analogues to marine fish 微塑料增加雙酚A和雙酚A類似物的轉移到海洋魚類	<u>Cheung, S.G. (CityU)</u> <u>Lai, B.K.P. (CityU)</u> <u>Wong, C.K.C. (HKBU)</u>	240,000

SKLMP 2019 Internal Research Fund (IRF)**SKLMP 2019 內部研究經費**

IRF is a seed grant allocated to SKLMP CityU members of SKLMP for attracting large outside grants and bringing members together within CityU

Project Title * 項目名稱	Investigators # 項目負責人 (PI or PC/Co-PI or Co-I)	Amount 金額 (HKD)
Mar 2018 – Feb 2021		
1 Development of an immune-stimulating antimicrobial peptide feeding regime for the hybrid grouper 開發一套針對雜交石斑魚具有免疫促進的抗菌多肽餵養體系	<u>Au D.W.T. (CityU)</u> Seemann F. (CityU) <u>Chan L.L. (CityU)</u> Lam Y.W. (CITYU) <u>Wu R.S.S. (EdUHK)</u> Wang K.J. (XMU)	300,000
2 High-resolution reconstruction of the beating marine medaka heart 高分辨率重建構造海洋青鱒魚心臟	<u>Cheng S.H. (CITYU)</u> <u>Wong C.K.C. (HKBU)</u>	300,000
3 Towards understanding population stress response in aquatic organisms: studies on rescue effect induced by ionizing radiation 水生生物群體應激反應：電離輻射誘導之拯救效應	<u>Yu P.K.N. (CITYU)</u> <u>Wang W.X. (HKUST)</u>	300,000
Apr 2018 – Mar 2021		
4 Interactive effects of hypoxia- and flutamide-induced endocrine disruption in marine medaka: an ecotoxicogenomic approach for environmental risk assessment 對缺氧和氟他胺誘導的海洋青鱒魚內分泌紊亂的交互作用的研究：一種環境風險評估的生態毒理學方法	<u>Kong R.Y.C. (CITYU)</u> <u>Wu R.S.S. (EdUHK)</u>	300,000

Summary of the Director Discretionary Fund (DDF) Projects DDF項目概要

Nov 2019 – Oct 2021 (On going)

Development of in-field nutrient analyzer and its application in coral area

珊瑚區營養鹽現場快速監測儀的研製及應用

D.X. YUAN, Leo L. CHAN

Funding Amount: HK\$300,000

Being able to analyze nutrient concentrations in-situ will provide critical data for better understanding and management of coral ecosystems and assess the impacts of eutrophication, hypoxia and harmful algal blooms. It is found that about one-third of nutrient concentrations in the related areas of Hong Kong are close to or below the quantitative limits of current monitoring methods from the routine monitoring data released by the Environmental Protection Department. The aims of this research project are to develop a compact, rapid, automatic in-field nutrient analysis system and monitor two important trace nutrients, phosphate and ammonium, in the natural coral communities of Hong Kong.

The research project mainly focused on the development of the phosphate and ammonium analysis system and its application in the natural coral communities. After a year of study, the project is currently in the transition from the first phase to the second phase. Based on the preliminary investigation on the range of nutrients' concentration in the coral areas of Hong Kong, two analyzer prototypes for the determination of phosphate and ammonium were designed and produced.

The work includes the design and manufacture of the manifold, flow cell and electronic control devices, compilation of the control software and assembly of the analyzers. However, some problems were encountered in this process, for example, the produced compound phosphomolybdenum blue (PMB) was easily deposited on inner wall of the flow cell of the first instrument design. Therefore, a further study to improve the manifold and optimize the reagent composition was carried out to solve this problem. Moreover, a series of chemical experiments were performed with the analyzer prototype, including the optimization of the concentration of the various reagents, flow rate, reaction temperature, verification of the detection limit, repeatability, stability and so on. As a result, the main parameters of this novel monitoring system are as follows: Detection limits are both lower than 50 nmol/L for phosphate and ammonium; Relative standard deviation (RSD) is lower than 4%; Only 2 mL/sample is consumed for each measurement; Analytical speed is 30 data/h for orthophosphate and 24 data/h for ammonium. The advantages of the analyzers include avoiding introducing contaminants during the processes of sample collection and transportation to reflect the real status of the target compounds and reducing the quantitative limits of the nutrients to trace level compared to conventional instruments.

A field monitoring test was conducted on 10 May, 2019 to evaluate the performance of the analyzer prototypes with 2 h continuous monitoring in-situ at 0.5 m underwater and analyzing the water samples collected by divers near coral communities in Sai Kung waters. The results showed that the concentrations of these two main nutrients (especially ammonium) in the coral areas of Sai Kung were slightly higher owing to frequent human activities. Concentrations of phosphate and ammonium were in ranges of 100-200 nmol/L and 2000-3000 nmol/L, respectively. And this system was sensitive enough for trace nutrient measurement in Hong Kong waters. The field test in Hong Kong waters showed that the nutrient analyzers can meet the operational requirements of coral area monitoring.

Now these two analyzer prototypes, together with a underwater sampling device, have been delivered to SKLMP for researchers to validate the sampling and operation methods. Further improvements on the control software to calculate and transform data more efficiently will be completed soon. The progress of this research project went well as planned. More field tests will be conducted in Hong Kong waters to keep the project on track. The improved and optimized in-field nutrient analysis system will be applied to the coral reserves throughout Hong Kong waters to establish a water quality database for better protection and management of coral ecosystem in Hong Kong.

Nov 2017 – Oct 2020 (On going)**Ocean acidification threatens Chinese oysters: Can some species adapt within this century?**

海洋酸化威脅到中國的生蠔：本世紀內會有物種能夠適應嗎？

V. THIYAGARAJAN, J.W. QIU, P.Y. QIAN, S.G. CHEUNG, M.H. DAI

Funding Amount: HK\$240,000

It is well known that human CO₂-induced reduction of carbonate ion concentration and pH in coastal areas are severely affecting calcification process of several marine organisms including commercially important edible oyster species through a process known as “ocean acidification” (OA). Aquaculture industries around the world are concerned about this ongoing and projected impacts of OA on oyster production. China is particularly concerned about this OA impacts because over 80% of world’s oysters are produced in Chinese coastal areas. This project aims are, therefore, centered around this issue of OA effects on edible oysters. Recent long-term (months) OA studies looking at transgenerational (within- and across-generations) epigenetic inheritance, including this project data, showed the existence of positive carryover effects and “non-genetic” adaptive mechanism in oysters, i.e., transgenerational plasticity (TGP) mediated through DNA methylation. However, we do not understand the dynamics of such TGP changes, including their “persistence and inheritance” over multiple generations (e.g., F₀, F₁, and F₂). Furthermore, the ultimate “fate” of the OA-adapted F₂ individuals acquiring TGP is still unknown in natural environments that experience multiple stressors. Thus, it is not surprising that the mechanisms underlying such TGP are currently a hot topic in marine climate change research. We have successfully started filling up these knowledge gaps through this project.

In the first phase of this project, we have observed that the oyster larvae of the F₁ generation whose parents were exposed to OA had increased growth and metamorphosis under OA compared to those whose parents were not exposed to OA. Now we are continuing this project to investigate whether this expressed positive carryover effect and TGP are further carried forward to the next F₂ generation, as well as identify the underlying transgenerational inheritance mechanisms. In this year, we are aiming to test the hypothesis that parental exposure to OA can generate favorable persistent and inheritable traits through differentially methylated genes, such as the carryover of several commercially and physiologically important traits (i.e., meat quality and quantity), in oysters over multiple generations.

Our specific objectives for the remaining part of this project are to identify epigenetically modifiable and inheritable molecular and phenotypic traits that are critical for survival over multiple generations of this commercial species in the field. All these data will be useful for aquaculture industries with their molecular breeding programs and also will help to accurately project the capacity of the commercially important oyster species to cope with OA.

Research Output

1. Meng, Y., Guo, Z., Fitzer, S. C., Upadhyay, A., Chan, V. B. S., Li, C., Cusack M., Yao, H., Yeung, K. W. K., **Thiyagarajan, V.** (2018) **Ocean acidification reduces hardness and stiffness of the Portuguese oyster shell with impaired microstructure: a hierarchical analysis.** *Biogeosciences*, 15(22), 6833-6846.
2. Meng, Y., Guo, Z., Yao, H., Yeung, K.W.K., **Thiyagarajan, V.** (2019) **Calcium carbonate unit realignment under acidification: A potential compensatory mechanism in an edible estuarine oyster** *Marine Pollution Bulletin*, 139, 141-149.
3. Meng, Y., Li C., Li, H.K., Shih, L., He, C., Yao, H., **Thiyagarajan, V.** (2019) **Recoverable impacts of ocean acidification on the tubeworm, *Hydroides elegans*: implication for biofouling in future coastal oceans.** *Biofouling*, 35(8), 945-957.
4. Campanati, C., Dupont, S., Williams, G.A., **Thiyagarajan, V.** (2018) **Differential sensitivity of larvae to ocean acidification in two interacting mollusc species.** *Marine Environmental Research*, 141, 66-74.
5. Meng, Y., Fitzer, S.C., Chung, P., Li, C., **Thiyagarajan, V.**, Cusack M. (2018) **Crystallographic Interdigitation in Oyster Shell Folia Enhances Material Strength.** *Crystal Growth & Design*, 18, 3753-3761.

Nov 2017 – Oct 2020 (On going)

How phosphate concentration affect the nitrogen uptake of phytoplankton?

磷酸鹽濃度影響浮游植物的氮吸收的機理研究

H.B. LIU, Leo L. CHAN

Funding Amount: HK\$240,000

In the past year, I have recruited a student, Miss Jenny Cheung, and started to conduct laboratory experiments. We have selected two diatoms and two dinoflagellates to conduct the following experiments:

Purpose: To investigate whether P limitation intensify the ammonia inhibition on nitrate uptake.

Cultures used: two diatoms (*Thalassiosira pseudonana* and *Thalassiosira weissflogi*) and two dinoflagellates (*Prorocentrum minimum* and *Amphidinium carterae*)

1. P unlimited – 1 μM P, 10 μMNO_3 , then 3 gradient of NH_4 : 10, 3, and 0.5 μM , under high and low temperature
2. P. limited – 0.1 μM of P, the others are the same.

All the other nutrients (Si, metal and vitamin) are added according to the ratio of f/2 medium. The temperatures used in this experiment are 22°C and 28°C.

For each treatment, the uptake rate experiment is carried out during the exponential phase of the culture. Photosynthetic rates of the cultures are studied via measuring the uptake rate of sodium bicarbonate. The uptake rate of nitrate, ammonium and bicarbonate are measured by adding stable isotope tracers at a centration of 10% ambient values of a particular nutrient. There are 4 set of triplicates for each treatment. 2 sets for control and 2 sets for incubation (125mL bottles, 100mL each). The tracers of nitrate and ammonium were added independently into different sets of triplicates. Uptake rate samples and particular phosphorus samples were collected, using glass fiber membranes, 4 hours after incubation. Pre-combusted GFD or GFC was used according to the cell size. The sample were stored in freezer for later analysis by IRMS. Initial Lugol's, Chl *a*, flow cytometry and nutrient samples were also collected at the beginning of the experiment for future normalization of the uptake rate calculations.

The experiment has been completed and isotopic samples are being analyzed. We should have our results reported soon.

Deviation from the original plan: We added temperature as a factor to regulate the preference and inhibition in nitrogen uptake. Global warming is one of the major challenges for the next century, so it is very important to understand how rising temperature could modulate phytoplankton nutrient uptake.

Research Output

1. Liu, K., Chen, B., Zhang, S., Sato M., Shi, Z., **Liu, H.** (2019)
Marine phytoplankton in subtropical coastal waters showing lower thermal sensitivity than microzooplankton.
Limnology and Oceanography, 64(3), 1103-1119.
2. Zou, D., Li, Y., Kao, S.-J., **Liu, H.**, Li, M. (2019)
Genomic adaptation to eutrophication of ammonia-oxidizing archaea in the Pearl River estuary.
Environmental Microbiology, 21(7), 2320-2332.
3. Shi, Z., Liu, K., Zhang, S., Xu, H., **Liu, H.** (2019)
Spatial distributions of mesozooplankton biomass, community composition and grazing impact in association with hypoxia in the Pearl River Estuary.
Estuarine, Coastal and Shelf Science, 225, 106237.

Dec 2017 – Nov 2020 (On going)

Neurotoxicity studies of selected marine biotoxins via neurometabolomic profiling and neurobehavioral assessment on marine medaka (*Oryzias melastigma*) and zebrafish (*Danio rerio*)

利用青鱗魚及斑馬魚作為腦神經代謝分析和神經行為評估平台進行對幾種海洋生物毒素的神經毒性的研究

Michael H.W. LAM, James C.W. LAM

Funding Amount: HK\$240,000

In this reporting period, we refine our data obtained from our neurometabolomic study on the perturbation of neurotransmitter profile in 3-month-old marine medaka (*Oryzias melastigma*) by brevetoxin PbTx-1 for publication in *Science of the Total Environment* as a full article. We have also refined our technique in neurobehavioural locomotion tracking of fish exposure to neurotoxicants and neuroactive drugs. We used zebrafish (*Danio rerio*) as the model organism and a simple novel tank for locomotion tracking. A specialize software for animal behavioural/locomotion tracking and analysis – Ethovision® XT 13.0 – has been installed and utilized for the study. We exposed zebrafish to the SSRI drug Fluoxetine and studied their neurobehavioural changes compared to control fish. Data on various neurobehavioural endpoints have already been obtained showing strong dose-response correlation (Fig. 1).

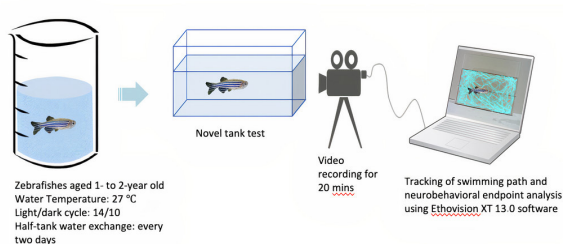
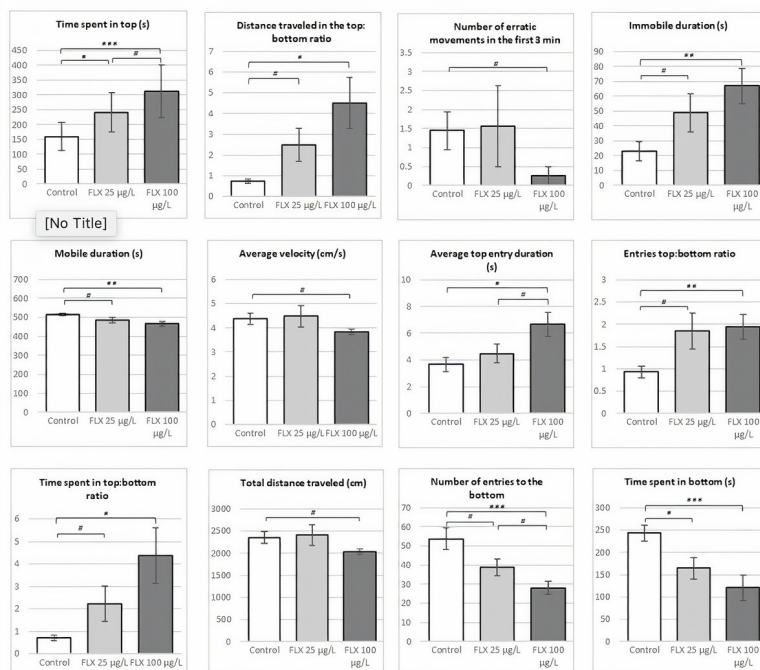


Fig. 1 Preliminary data obtained from neurobehavioural locomotional tracking studies on zebrafish (*Danio rerio*) after waterborne exposure to different dosages (25 & 100 $\mu\text{g L}^{-1}$) of Fluoxetine.



We will also determine the changes in neurotransmitter profile of the exposed fish in the next stage of our study in 2020. The goal is to correlate all the phenotypical neurobehavioural changes caused by the neuroactive drug to its neurometabolic perturbations on the fish model.

Research Output

1. Yau, M.S., Lei, E. N.Y., Ng, I. H.M., Yuen, C. K.K., Lam, J. C.W., Lam, M. H.W. (2019) **Changes in the Neurotransmitter Profile in the Central Nervous System of Marine Medaka (*Oryzias melastigma*) after Exposure to Brevetoxin PbTx-1 – A Multivariate Approach to Establish Exposure Biomarkers.** *Science of the Total Environment*, 673, 327-336.

Nov 2017 – Oct 2020 (On going)

Targeting astrocytes-neuronal L-lactate signaling pathway for rescuing decision-making deficit in chronic ciguatera poisoning

靶向星形膠質-神經元L-型乳酸信號通路治療慢性雪卡中毒相關的決策行為障礙

Y. LI, Leo L. CHAN

Funding Amount: HK\$240,000

Ciguatera poisoning is the most frequently reported seafood-toxin illness that manifests in complex and long-lived neurological symptoms which are more severe in repeated exposure. However, very few studies have been conducted in animal models to investigate the nature of central nervous system damage and the underlying mechanisms for behavioral deficits after exposure to ciguatoxin. Previously, we showed a single dose of Pacific ciguatoxin-1 (P-CTX-1) induced severe visceral pain, and anterior cingulate cortex (ACC) synaptic plasticity. Reactive astrogliosis was identified supporting the concept that neuron and astroglia signals may play roles in ciguatera poisoning. However, the induction of LTP was occluded in acute P-CTX-1 rats suggesting emotional and cognitive dysfunctions in ciguatera poisoning. By examining a rat model with chronic repeated exposure to sub-clinic dosage of P-CTX-1, we observed development of anxiety and decision making deficits in rats after one-month exposure to the toxins. Nonetheless, the underlying molecular mechanisms are poorly understood.

The brain requires continuous supply of oxygen and energy-yielding substrates involving glucose. A growing body of evidence suggests that L-lactate, byproduct of astrocytic glycolysis, plays a critical role in cognition processing. Astrocytes respond to all forms of CNS damage and disease by undergoing cellular, molecular and functional changes. Our preliminary data showed markedly reactive astrogliosis occurs in ACC in chronic P-CTX-1 rats. We hypothesized that impaired L-lactate release casually involved in cognitive deficit in chronic ciguatera poisoning. We find failure of L-lactate release in an activity-dependent manner in chronic ciguatera poisoning. Theta burst stimulation (TBS) which used to elicit LTP can reliably induce increase in lactate concentration in control rats, but not in P-CTX-1 rats. Further, P-CTX-1 rats exhibited significant lower lactate level immediately after the cognitive behavioral task (rat gambling task RGT). Next, exogenous L-lactate infusion into ACC repairs the impairments of LTP and decision-making performance in P-CTX-1 rats.

Using multi-electrodes recording in both BLA and ACC of freely behaving rats, spike-field coherence (SFC) analysis revealed chronic ciguatera poisoning led to disruption of ACC spike timing to BLA local theta oscillation. Cross-correlation analysis revealed that ciguatera poisoning was associated with suppressed synchronization between the BLA and ACC, indicating reduced neuronal communications between these two regions under chronic ciguatera poisoning.

Disruption of the flow of L-lactate from astrocytes to neurons severely impairs the local and broad spatial scales of interaction of ACC neuronal network, disturbs functionally coherent assemblies and damages the decision making ability in chronic ciguatera poisoning.

Nov 2017 – Oct 2020 (On going)

Microplastics augment the transfer of Bisphenol A and Bisphenol A analogues to marine fish

微塑料增加雙酚A和雙酚A類似物的轉移到海洋魚類

S.G. CHEUNG, Ball K.P. LAI, Chris K.C. WONG

Funding Amount: HK\$240,000

Research on plastics fragmentation is important for the estimation of amount of microplastics in the aquatic systems. Although this process depends very much on the interaction between the physicochemical environment and the properties of the plastic debris, the biological causes for fragmentation, including biting action of macro-fauna, have not been well acknowledged. This study aims to characterize an unexplored type of micro-fragment that has a unique triangular shape and to understand the possible causes of these fragments.

In the surveys from 11 beaches, 3563 pieces out of the 6350 pieces (56.1%) of microplastics analysed were fragments. Among these fragments, 661 pieces (18.6%) had trimmed side(s), and 362 pieces (10.2%) were trimmed triangular fragments TTFs. The ratio of TTFs varied highly from 1% to 24% among the beaches, just as how microplastics have been known to distribute in a highly variable pattern on coasts. The three beaches with the highest TTFs abundance were Luk Keng, Tai O, and Tsing Lung Wan with their average abundance of TTFs (SD) being 75.3 (18.6), 39.8 (13.9), and 34.5 (10.8) pieces per gram microplastics, respectively. These sites were all in western Hong Kong with the beach facing south-east, and this could be linked to the higher abundance in microplastics in the west due to closeness to the Pearl River Delta.

The area of the flat side of a total of 315 TTFs ranged from 0.22 – 12.97 mm², with mean (SD) = 4.17 (2.90) mm², median (IQR) = 3.39 (1.83 – 5.84) mm². The degree of isosceles was high (35.7% and 60.0% TTFs had two sides with <5% and <10%, respectively, difference in ratio). The description of micro-fragments with specific morphological features reflecting that themselves could have been formed by a particular mechanism of degradation is not common. However, due to curiosity and to the fact that the amount of TTFs was quite high at some locality (75 pieces per gram of microplastics in Luk Keng), the cause of formation of TTFs is investigated in this study. The investigations below were then led by the remaining possibility – biodegradation. While it is rather implausible to suppose that microbes or small invertebrates have somehow degraded or grazed on just the edges of fragments which had incidentally been cut out as triangular shapes, another way, active macrofaunal bite, could have been the cause. Looking closely to TTFs, the trimmed edge resembled how a flat fragment would look like when being pressed against by teeth that manage to thin it until the fragment was detached completely. Tear marks would have been caused by additional twisting force when the cut was not sharp enough. Although edges could have been rounded by weathering, the formation of the particularly neat impression along the straight sides of the triangles should have involved processes which were less stochastic than abrasion caused by wave action. Moreover, the fact that the TTFs were relatively large among the micro-fragments (> 90.9% have sides > 2mm) might hint that a constrain existed on the size of TTFs, which could be the minimum size of jaw of the macrofaunal which attacked them.

The enumeration of TTFs had been rather conservative as only fragments that met all criteria were counted. Obviously, the TTFs focused here did not represent all micro-fragments caused by biting because the shapes of macrofaunal jaw and/or teeth bitemark can vary a lot more. The shape of any bitten piece could also be altered by other possibilities such as different biting angles, secondary fragmentation after the bite, and so on. These might explain how the trimmed non-triangular fragments, and some rounded-edge triangular foam, were formed.

Investigation on the spatial and temporal distribution of the TTFs will be useful to provide information on how abundant they are in the field, and potentially it would help in finding out which species were involved in the formation. It is likely that a number of species were involved because of the variety of the size and shape of triangles. All of these could be extended to trimmed micro-fragments so that the wider picture of daughter microplastics from animal attack could be understood.

Oct 2019 – Sep 2021 (On going)

Removal of salt and organic pollutants by solar steam using graphene materials

基於石墨烯太陽能水蒸氣技術的海水淡化及有機污染物去除研究

T.C. WAI, James C.W. LAM, R.Q. YE

Funding Amount: HK\$300,000

Water scarcity is one of the major global challenges. In Hong Kong, around 80% of water relies on import due to water shortages. In recent years, nanotechnology enabled water treatment has become a frontier that employs the cutting-edge nanomaterials and utilizes renewable energy for the provision of potable water. Here, we aim to develop a graphene-based technology for water purification via solar steam generation. We use graphene with controllable hydrophobicity because of its broadband absorption and antifouling properties. The desalination process uses solar energy as energy source and does not require specific infrastructures, which will avoid significant influence on the local ecosystem. This project will enable the low-cost provision of drinkable water from renewable materials and energy, which could mitigate the local water scarcity problem.

Oct 2019 - Sep 2021 (On going)

Toxicological assessment of organic ultraviolet filters (OUVFs) to early life stage of marine medaka (*Oryzias melastigma*)

抗紫外線有機化合物對青鱗早期發育毒性的研究

Henry Y.H. HE, James C.W. LAM

Funding Amount: HK\$300,000

There are increasing concerns on the large amounts of organic ultraviolet filters (OUVFs) released to the coastal environment. However, the toxicities of OUVFs and their metabolites to marine fish, especially under the condition of UV radiation, are not well characterized. Here we propose an *in ovo* study to evaluate the toxicities and bioaccumulation of three OUVFs benzophenone-3 (BP-3), and octocrylene (OC), and ethylhexyl methoxycinnamate (EHMC) to the early life stage of marine medaka (*Oryzias melastigma*). Newly fertilized marine medaka embryos will be exposed to single and combined-chemical mixture solutions for 96 hours 16/8 hour light/dark cycle coupled with UV radiation to mimic natural sunlight exposure. The parent compounds and their metabolites in the exposure water and embryo/larvae will be measured by high-performance liquid chromatography/electrospray ionization tandem mass spectrometry (HPLC-ESI-MS/MS). Lethality and deformity of exposed embryo, including coagulation, lack of somite development, lack of detachment of the tail-bud, lack of heartbeat, spinal malformation will be recorded. Sublethal biomarkers, such as enzymatic activity and gene expression responsible for biotransformation, endocrine disruption and oxidative stress response, will also be examined using quantitative real-time polymerase chain reaction (Q-RT-PCR). This study will provide novel information on the metabolism and toxicity of tested OUVFs in marine fish, and potential hazards to marine ecosystem.

Oct 2019 - Sep 2021 (On going)**Real-time antibiotic resistance genes and pathogen surveillance using Nanopore metagenomic sequencing**

使用納米孔宏基因組測序進行即時抗生素抗性基因和病原體監測

T. ZHANG, Kenneth M.Y. LEUNG, Paul K.S. LAM

Funding Amount: HK\$300,000

Antimicrobial resistance (AMR) threatens the effective treatment of an ever-increasing range of infections due to the continued evolution and widespread dissemination of antibiotic-resistant pathogens (ARPs). Although the transfer of ARGs is a particular clinical concern as they potentiate the emergence of multidrug-resistant pathogens, the complex epidemiology of resistance transfers and risk assessment requires extensive and deeper profiling of ARGs in different environments where HGT is greatly enhanced due to the selection pressure imposed by residual antibiotics or coselection agents (e.g. heavy metals), such as in sewage treatment plants and the receiving water. Importantly, little is known about the impact of effluent of WWTPs on the development of ARGs in the receiving water. The identification of ARGs profiles and their related genetic context will substantially expand our current knowledge of resistome, especially for revealing the impact of effluent of WWTPs on the development of ARGs in the receiving water and help establish a comprehensive analysis framework to study mobile resistome in the environment. Meanwhile, understanding the mechanisms of ARGs HGT could help to guide engineering practice for risk assessments and monitoring.

Oct 2019 - Sep 2021 (On going)**Microplastics in edible oysters and their significance in the Greater Bay Area**

大灣區牡蠣的微塑膠含量及其意義

James K.H. FANG, S.G. CHEUNG

Funding Amount: HK\$300,000

World production of plastics has been increasing to meet the growing demand. Many of these plastics end up as waste in aquatic environments and are eventually degraded into microplastics. The more prevalence of microplastics has raised a lot of concern due to the potential bioaccumulation of these harmful materials by aquatic organisms, and by us through consumption of contaminated seafood. Oysters represent a favourite seafood item, yet a high-risk group to bioaccumulate microplastics due to their filter-feeding nature. In this regard, this project aims to determine the amounts of microplastics in edible oysters (*Crassostrea* spp.) in the Greater Bay Area of south China, a rapidly urbanised coastal environment in which oyster aquaculture is prosperous. We will investigate the spatial bioaccumulation patterns of microplastics in oysters in terms of size, shape and plastic type, as well as the effects of seasonal change and oysters' growth conditions on these spatial patterns. Obtained data will be used to estimate human ingestion rates of microplastics through consumption of oysters produced in the Area. The proposed work will provide important baseline data of microplastics for evaluating associated human health risks and for the Area-wide management of plastic pollution and aquaculture practice.

Oct 2019 - Sep 2021 (On going)

Organophosphate triesters and diester in coral communities

珊瑚群落裡海洋野生動物中新興的有機阻燃劑

James C.W. LAM, Apple P.Y. CHUI, P.O. ANG, W.K. HO, C.C. CHEANG

Funding Amount: HK\$300,000

Coral ecosystems globally are threatened by a variety of anthropogenic perturbations. Of different environmental stressors, pollution has been identified as key stressor that led to coral decline. Well-known paradigms of pollution that affect coral habitats include nutrients, metals, and conventional trace organic pollutants, all of which have been proven to impact coral communities. Recently, emerging contaminants namely organic UV filters (OUVFs) which have been reported to cause bleaching of hard coral, have been detected in the coral-fringed coastal environment of Hong Kong. The evidence shows that over time this group of emerging contaminants can accumulate in corals. Even though current levels may not be causing coral bleaching, this has aroused our curiosity and interest in studying “other” new pollutants namely organophosphate triesters and diester (OPs), which may even be more persistent in the environment and have more potent toxic effects on aquatic organisms than OUVFs. Moreover, there is overwhelming evidence that, due to rapid development of the coastal region of the Pearl River Estuary (PRE) of South China, the area has been severely contaminated by various environmental contaminants including OPs.

Previous studies have demonstrated a trend towards significant increases in emerging toxic substances in the wildlife inhabiting the PRE. These higher levels may pose risks to aquatic organisms, including corals. However, the spatial scale over which OPs may impact coral communities in the region is unknown. Data on the bioavailability of OPs to coral is very limited. There is also a lack of information concerning whether coral health is likely to deteriorate due to exposure to bioavailable OPs. For those reasons, we propose a comprehensive approach to identify and quantify target OPs occurring most frequently in coral habitats, as well as any wide-ranging potential effects that would make their chemical constituents priorities for further investigation for potential impact on coral communities. Overall, the present study can unravel the OP distributions and their fate in important coral ecosystems and such outcomes will inform our understanding of how coral communities may be impacted due to exposure to OPs.

Oct 2019 - Sep 2021 (On going)

Removal mechanisms of selected endocrine disrupting chemicals (EDCs) in bioreactors with biochars

生物炭強化生物反應器對內分泌干擾物的去除及其機理研究

Chris Y.F. TSANG, X.Y. LI, J. RINKLEBE, Y. YANG

Funding Amount: HK\$300,000

Endocrine disrupting chemicals (EDCs) are extensively used in industrial and consumer applications. They have been widely recognised as typical contaminants of emerging concern because of their persistence, bioaccumulative properties, and ubiquity in aquatic environments. Recent studies show that EDCs have already been detected in drinking water, treated effluent, marine, sediment, and tissues of different aquatic species. Much effort has been focused on investigating their occurrence, fate, and elimination efficiencies in water pollution control processes. The details of EDC removal mechanisms are still inefficient and unsatisfactory. Biochar is attracting worldwide attention as an excellent candidate for a tool to resolve the limitations of commonly used water treatment processes due to its wide spectrum of advantages. While biochar has been shown as promising and beneficial in use in EDC removal, there is room for modification to engineer and tailor the biochar properties to enhance its functionalities and added values in biological processes in water and sewage treatment plants. In this project, engineered biochars will be designed, modified, prepared and characterised for EDC removal in drinking water and sewage. The kinetic study and removal mechanisms of EDCs in bioreactors with engineered biochars will be evaluated. The added values and synergistic effects of engineered biochars in bioreactors for EDC removal will be validated using dose-response experiments and under dynamic redox conditions. Multiple lines of evidence will be collected in terms of physicochemical properties, adsorption capacity, biodegradation, key EDC-degrading bacteria, microbial community shift, inhibitory and/or synergistic effects, and long-term stability. Finally, the study will propose and optimise suspended-growth and attached-growth bioreactors using the engineered biochars for improved efficiency, controllability, and stability for EDC removal, thus realising stable and efficient biological processes for real application in water purification and sewage treatment facilities.

Oct 2019 - Sep 2021 (On going)

Assessing the coral health status under different anthropogenic pressures using in-situ and ex-situ innovative methods

使用原位和非原位的創新方法評估不同人為壓力下的珊瑚健康狀況

Leo L. CHAN, J.W. QIU

Funding Amount: HK\$300,000

The marginal coral habitat of Hong Kong is described as turbulent with several fluctuations in terms of seasonality and anthropogenically-derived nutrient input. Heavy rains and a warmer period during the wet season (April - October) increase the seawater temperature and lower the salinity, while colder currents lower the temperature and increase the salinity during the dry season (November – April). Although a resilience pattern has been investigated, climate change has recently affected the survival and recruitment of new corals, making them more susceptible to infections and bioerosion. The rising seawater temperature is causing thermal stresses to the corals, which would result in reduced photosynthetic efficiency of the coral symbiont, cause a shift in the tolerant clades, and they would finally be expelled and result in bleaching of the coral tissue. On the other hand, the decrease of salinity affects negatively the availability of carbonate species needed for calcification and coral growth. In addition, turbid events and nutrient inputs are also affecting the coral communities living in urban areas such as Hong Kong. These changes will affect the metabolic pattern of corals and the microbial community associated, but how they will respond to single and multiple stresses *in-situ* and *ex-situ* has not yet been investigated. The metabolism of benthic ecosystems has been studied using environmental changes in oxygen and pH variation as a proxy of biological processes. Recently, the use of microsensors and benthic chambers has become popular for coral surface studies and allows the study of in-situ physiological response possible. These studies have focused on the health status of coral reef using standard protocols, but the *in-situ* monitoring of single colonies has not yet been investigated. Here, we propose using a combination of non-destructive metabolic measurements of the coral surface to investigate the coral *in-situ* physiology in three different areas of Hong Kong waters and *ex-situ* manipulation to better understand the limiting factors affecting survival and bleaching rate. This study will provide a new insight on the health status of the coral holobiont and propose relevant techniques for a new perspective on coral restoration. The ultimate goal will be the development of a new Coral *in-situ* Health Index to provide fast and reliable information concerning coral physiology.

Summary of the Internal Research Fund (IRF) Projects IRF項目概要

Feb 2018 – Jan 2021 (On going)

Development of an immune-stimulating antimicrobial peptide feeding regime for the hybrid grouper

開發一套針對雜交石斑魚具有免疫促進的抗菌多肽餵養體系

Doris W.T. AU, F. SEEMANN, Leo L. CHAN, Y.W. LAM; Rudolf S.S. WU, K.J. WANG

Funding Amount: HK\$300,000

The hybrid grouper (*Epinephelus* sp. x sp.) is a commercial important aquaculture species in Hong Kong and South China. The project aimed at the reduction of antibiotic use in grouper aquaculture and enhancement of juvenile survival. Three major grouper antimicrobial peptides (AMPs): β -defensin, piscidin (ecPis-3) and hepcidin (EC-hepcidin1) were suggested to be tested for their immune-stimulatory potency under a prophylactic feeding regime and under different pathogen challenge scenarios, including bacteria *Edwardsiella tarda* (edwardsellosis), red grouper necrosis virus (RGNNV) and the parasite *Cryptocaryon irritans* (white spot disease) (Objective 1).

EC-hepcidin has been established and developed by Prof Wang K.J. Milestones to be completed in the first year comprised the recombinant protein production of two other selected AMPs (β -defensin, piscidine-3) and AMP feeding trials with subsequent challenge with the pathogenic *Edwardsiella tarda* bacteria.

Recombinant AMP protein production:

Synthetic peptide production is commercially available, but remains at a high cost. To reduce the budget of AMPs feeding experiments, it is necessary to generate recombinant AMPs using the BL21 cells (*Escherichia coli*). Three plasmids (pET Biotin His6mCherry LIC; pET28:GFP, pETmRuby2 LIC) were used for each AMP: beta-defensin and piscidin3 protein expression in BL21 cells. Genes were inserted into plasmids through restriction enzyme cutting for pET:GFP (HindIII) or ligation independent cloning for pET Ruby2 and pETmCherry (LIC; <https://www.addgene.org/protocols/lic/>). In the end, a set of 3 plasmids was done for each gene. Transformation of plasmids into BL21 competent cells followed the protocol (<https://www.addgene.org/protocols/bacterial-transformation/>). AMP insert was combined to vector with fluorescent tag (mCherry, mRuby and GFP) to stabilize the short AMP protein (ca. 200 base pairs only) and to aid in visualization of protein expression. Bacteria growth and protein harvest as well as Western blot for protein quantification followed the procedures in Pan et al. (2012).

Problem encountered: While the bacterial production of ecPis-3 is close to completion. Recombinant production of β -defensin was not successful due to improper protein folding after production through the bacteria, which would affect its functionality as an AMP and render it not desirable for mass production and feeding application.

Host Resistance Assay and AMP feeding trials:

Host resistance assays were conducted on juvenile hybrid grouper using the *E. tarda* (3 replicate run, LC60 = 1.8×10^8 cfu/ml). *In vitro* test for ecPisc3 was also completed using the MIC assay. The effectiveness of ecPisc 3 administration for bacterial infection is being tested. The proteomics profiles will be measured for skin mucus and plasma in experimental fish. The levels of AMPs and other major immune proteins will be quantified and correlated with post-pathogen challenge fish survival. The parasite *Cryptocaryon irritans* is not available for experiment due to problem in getting approval and transportation of parasite from Mainland.

Essential information regarding the optimal AMPs feeding regime as immune-stimulating feed additive in the hybrid grouper will be gained. The findings will also provide new insights into the immunomodulatory and antimicrobial capacities of fish AMPs. This novel study will potentially contribute to a significant reduction of antibiotics administration in aquaculture.

Mar 2018 - Feb 2021 (on going)
Internal Research Fund (IRF) Project
High-resolution reconstruction of the beating marine medaka heart
 高分辨率重建構造海洋青鱗魚心臟

S.H. CHENG, Chris K.C. WONG
 Funding Amount: HK\$300,000

Nov 2017 - Oct 2019 (Completed)
Postgraduate Scholarship (PGS) Project
Generation of transgenic marine medaka lines to enable high-resolution reconstruction of the beating heart
 構建轉基因海洋青鱗魚用於重建高解析度跳動心臟

S.H. CHENG, Chris K.C. WONG, X. YAO
 Funding Amount: HK\$100,000

The research team has developed an experimental design as depicted in figure (1) below. The comparative study on the roles of macrophages in zebrafish and medaka is an on-going subject.

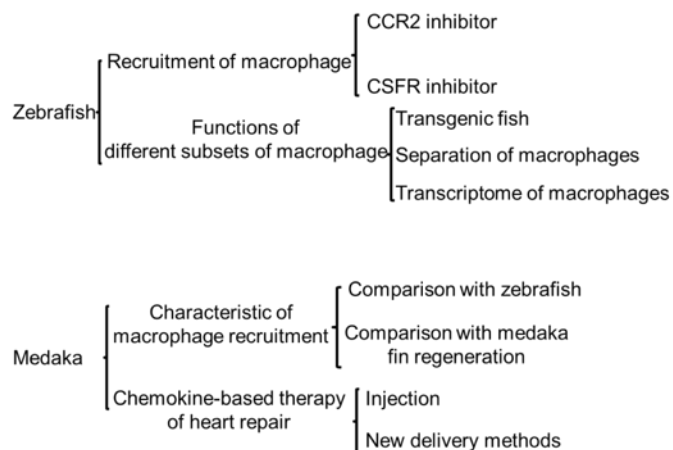


Figure 1: research design on the comparative study of the roles of macrophages in the regenerating adult heart in zebrafish and medaka

1) Comparison heart repair process of madaka and zebrafish after cryoinjury

As shown in Figure 2, the scar volumes of medaka and zebrafish were measured by Picro Sirius Red staining. The collagen deposition was dark red compared to the healthy tissue. At 1 dpc, there was no significant difference between these two species, the percentage of the scar volume of medaka and zebrafish was 29.35% and 26.58, respectively. After 7 days, the scar volume of zebrafish was declined to 19.65%, which showed that it is under repair and regeneration. However, the scar volume of zebrafish was increased compared to that of 1 dpc. The excessive fibrotic response of medaka was also reported by Ito et al. (Ito et al., 2014). At 30 dpc, the scar volume of both medaka and zebrafish became smaller, but, as shown in Figure 1d, a permanent scar was shaped in medaka heart. These results indicated that the response of medaka after heart cryoinjury was significantly different. The excessive fibrotic deposition might prevent the heart regeneration.

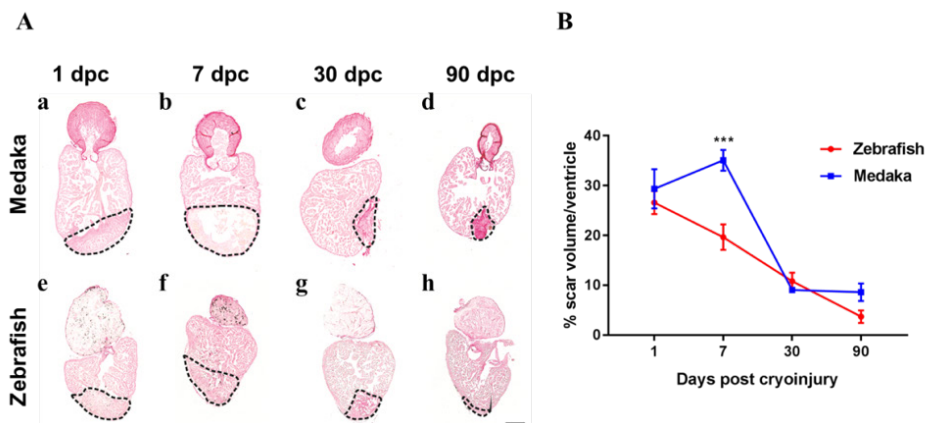


Figure 2. Comparison of heart repair in zebrafish and medaka after cryoinjury. (A) Representative images of heart section stained by Picro sirius red over time. (B) Percentage of scar volume in ventricle over time (n = 3-5 hearts; two-way ANOVA with multiple comparisons, ***P = 0.0006). Scale bar: 200 μ m. Data are mean \pm s.e.m.

2) Macrophage recruitment in medaka heart post cryoinjury was reduced compared to zebrafish

Macrophage plays an important role in both inflammatory and anti-inflammatory phases during heart regeneration. After depletion of macrophage, the heart regeneration was blocked in neonatal mice, salamander and zebrafish (Aurora et al., 2014; Godwin et al., 2017; Lai et al., 2017). Although amount of researches have investigated the cardiac macrophage population and function, promoting heart regeneration by modulation of the macrophage and relative stromal environment is still cannot be realized. Therefore, the relative researches are still needed. As shown in Figure 1, zebrafish and medaka have extremely different heart repair ability. Didier et al. found that macrophage recruitment was reduced in medaka compared to zebrafish, which might be the reason for the deficiency of medaka heart regeneration. Our data also showed that the expression of *mpeg*, which is a marker gene of macrophage, was significantly lower at 2 dpc compared with zebrafish (Figure 3). However, the expression or neutrophil marker gene, *mpx*, was no different in these two species, which indicated that reduced macrophage recruitment might cause the deficiency of medaka heart regeneration.

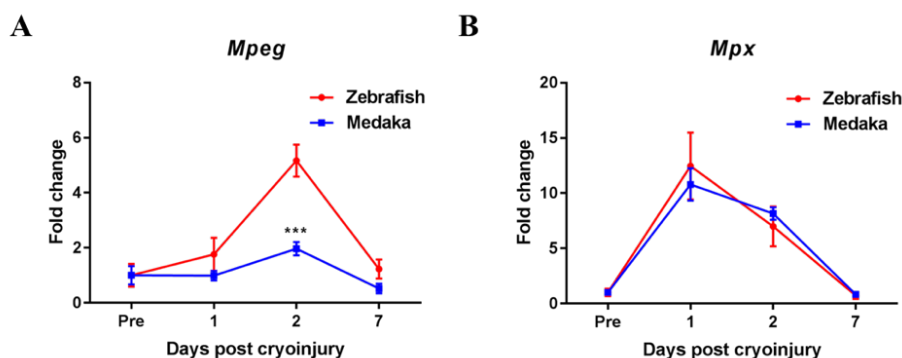


Figure 3. The qRT-PCR analysis of *mpeg* (A) and *mpx* (B) expressions in the hearts of Zebrafish and Medaka at untouch (pre), 1 dpc, 2 dpc and 7 dpc (n = 3 - 4 per time point; two-way ANOVA with multiple comparisons, ***P = 0.0001). Data are mean \pm s.e.m.

3) Expression of chemokine CCL2

The chemokine is specific in recruiting macrophages. To enable us to conduct recruitment, migration and dispersal experiments, recombinant CCL2 was successfully expressed (Figure 4). In the future experiment, we will cut the GST tag and check the bioactivities of it.

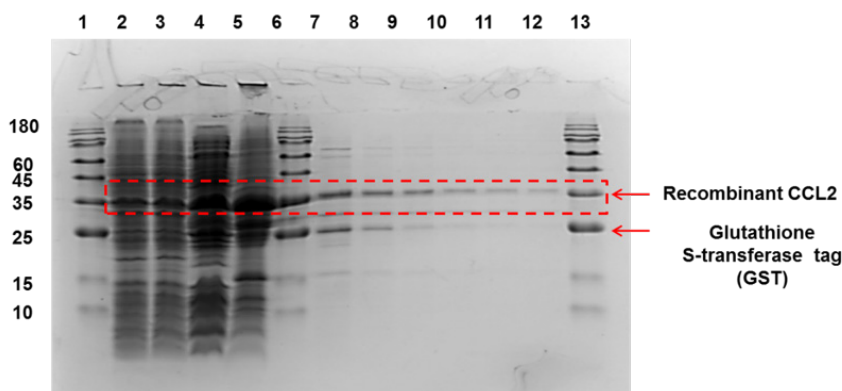


Figure 4. Recombinant CCL2 were expressed in *E.coli* after Isopropyl β -D-Thiogalactoside (IPTG) induction and then affinity purified by Glutathione Sepharose 4B. 1, 6, 13: ladder; 2, 3: protein expression in uninduced *E.coli*; 4, 5: recombinant CCL2 expression induced by IPTG; 7-12: recombinant CCL2 purified by Glutathione Sepharose 4B

Research Output

- Manno, F.A.M. III, Manno, S.H.C, Ma, V., Barrios, F.A., Cho, W.C., **Cheng, S.H.**, Lau, C. (2019)
Simple Surgical Induction of Conductive Hearing Loss with Verification Using Otoloscope Visualization and Behavioral Clap Startle Response in Rat.
Journal of Visualized Experiments, 152.
- Xu, S., Xie, F., Tian, L., Manno, S.H., Manno, F.A.M. III, **Cheng, S.H.** (2019)
Prolonged neutrophil retention in the wound impairs zebrafish heart regeneration after cryoinjury.
Fish and Shellfish Immunology, 94, 447-454.
- Manno, F.A.M., Isla, A.G., Manno, S.H.C., Ahmed, I., **Cheng, S.H.**, Barrios, F.A., Lau, C. (2019)
Early stage alterations in white matter and decreased functional interhemispheric hippocampal connectivity in the 3xTg mouse model of Alzheimer's disease.
Frontiers in Aging Neuroscience, 11, 39.
- Xu, S., Liu, C., Xie, F., Tian, L., Manno, S.H., Manno, III F.A., Fallah, S., Pelster, B., Tse, G., **Cheng, S.H.** (2019)
Excessive inflammation impairs heart regeneration in zebrafish *breakdance* mutant after cryoinjury.
Fish and Shellfish Immunology, 89, 117-126.
- Manno, S.H.C., Manno, F.A.M., Ahmed, I., Ahmed, R., Shu, L., Li L., Xu, S., Xie, F., Li, V.W., Ho, J., **Cheng, S.H.**, Lau, C. (2018)
Spectroscopic examination of enamel staining by coffee indicates dentin erosion by sequestration of elements.
Talanta, 189, 550-559
- Tse, G., Du, Y., Hao, G., Li, K.H.C., Chan, F.Y.W, Liu, T., Li, G., Bazoukis, G., Letsas, K.P, Wu, W.K.K., **Cheng, S.H.**, Wong, W.T. (2018)
Quantification of beat-to-beat variability of action potential durations in Langendorff-perfused mouse hearts.
Frontiers in Physiology, 9, 1578.
- Xu, S., Webb, S., Lau, T.K.C. **Cheng, S.H.** (2018)
Matrix metalloproteinases (MMPs) mediate leukocyte recruitment during the inflammatory phase of zebrafish heart regeneration.
Scientific Reports, 8, 7199.

Mar 2018 – Feb 2021 (On going)

Towards understanding population stress response in aquatic organisms: studies on rescue effect induced by ionizing radiation

水生生物群體應激反應：電離輻射誘導之拯救效應

Peter K.N. YU, W.X. WANG

Funding Amount: HK\$300,000

The present project studies the radiation-induced rescue effect (RIRE) caused by ionizing radiation (such as X-ray photons and alpha particles). RIRE refers to the phenomenon that irradiated cells/organisms derive benefits from feedback signals released from bystander unirradiated cells/organisms. The project aims to (1) study the dose responses of RIRE in zebrafish embryos and embryonic zebrafish fibroblast (ZF4) cells induced by alpha particles and X-ray photons; and (2) study the involvement of underlying mechanisms (including but not limited to the NF- κ B pathway) in the rescue effect induced by different doses of alpha particles and X-ray photons.

We have started studies on RIRE in a number of cell lines, including HCT116p53, MCF7, CNE2 and HeLa cells, together with the ZF4 cells. Experiments are being carried out using X-ray photons with different doses, and using different ratios of number of bystander cells to number of irradiated cells. After a series of preliminary experiments, we found that PARP1 (poly (ADP-ribose) polymerase1) was likely to play a significant role in RIRE. Data are being collected and analyzed, and a manuscript is being prepared for publication.

Research Output

1. **Yu, K.N.** (2019)

Radiation-induced rescue effect.

Journal of Radiation Research, 60(2), 163-170.

Mar 2018 – Feb 2021 (Ongoing)

Interactive effects of hypoxia- and flutamide-induced endocrine disruption in marine medaka: an ecotoxicogenomic approach for environmental risk assessment

對缺氧和氟他胺誘導的海洋青鱗魚內分泌紊亂的交互作用的研究：一種環境風險評估的生態毒理學方法

Richard Y.C. KONG, Rudolf S.S. WU

Funding Amount: HK\$300,000

Previously, we reported the anti-androgenic effects of flutamide (a nonsteroidal antiandrogen) on the reproductive functions of 3- and 4-month old male marine medaka (*Oryzias melastigma*) by treating the fish with 3.2 mg/L flutamide for 2 weeks. Here, we report a repeat of the study on 3- (juvenile) and 6-month (sexually mature) old male medaka fish. Significant retardation in response to food or net catching were observed in all flutamide-treated fish after approximately 6 days of exposure. Six-month old flutamide exposed medaka were found to show a decrease in lobule width in the testes, which may correlate with a presumed reduction in testosterone levels reflected by the reduced expression of 17 β -HSD. Histological examination of the testes revealed significant reduction in testes lobule width and the number of cysts in 6-month old male fish treated with flutamide, indicating impaired spermatogenesis. Further examination revealed the number of spermatocytes and spermatids were significantly reduced in the cysts of the testes of both flutamide-treated 3- and 6-month old male fish. Intriguingly, the number of spermatogonia was comparatively higher in the testes of 6-month old fish, which suggested a greater impairment in spermatogonia differentiation into spermatocytes. Expression of the obesity-related genes, FABP4, FATP4 and PPAR γ in 6-month old flutamide exposed medaka was also significantly downregulated, which may associate with the downregulation in FSHR gene expression. Three-month old flutamide-exposed medaka, on the other hand, showed no significant changes in lobule width in the testes, or changes in expression of steroidogenic genes. The little to no change in steroidogenic gene expression in 3-month old fish could be due to lower expression levels of androgen receptors in juvenile fish compared to adult fish, and hence weaker androgen signaling. Lobule width of 3-month old fish appeared to be less affected by antiandrogenic effect of flutamide. Overall, both the 3-month old and 6-month old medaka fish demonstrated noticeable differences in lobule width and selected gene expression profiles when the control and flutamide-exposed fish were compared.

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Professor of the Department of Physics
物理學系教授

The Chinese University of Hong Kong 香港中文大學

Dr. Apple Pui Yi CHUI
崔佩怡 博士

Lecturer of the School of Life Sciences
生命科學學院講師

Prof. Joe Shing Yip LEE
李成業 教授

Professor of the School of Life Sciences and Earth System Science
生命科學學院及地球系統科學教授

The Education University of Hong Kong 香港教育大學

Dr. Chi Chiu CHEANG
蔣志超 博士

Associate Professor of the Department of Science and Environmental Studies
科學與環境學系副教授

Dr. Keith Wing Kei HO 何詠基 博士	Associate Professor of the Department of Science and Environmental Studies 科學與環境學系副教授
Dr. James Chung Wah LAM 林忠華 博士	Assistant Professor of the Department of Science and Environmental Studies 科學與環境學系助理教授
Dr. Chris Yiu Fai TSANG 曾耀輝 博士	Associate Professor of the Department of Science and Environmental Studies 科學與環境學系副教授
Prof. Rudolf Shiu Sun WU 胡紹燊 教授	Research Chair Professor (Biological Sciences) of the Department of Science and Environmental Studies 科學與環境學系研究講座教授(生物科學)

Hong Kong Baptist University 香港浸會大學

Dr. Jill Man Ying CHIU 招文嫻 博士	Associate Professor of the Department of Biology 生物系副教授
Prof. Jianwen QIU 邱建文 教授	Professor of the Department of Biology 生物系教授
Prof. Chris Kong Chu WONG 黃港住 教授	Professor of the Department of Biology 生物系教授

The Hong Kong Polytechnic University 香港理工大學

Dr. James Kar Hei FANG 方家熙 博士	Assistant Professor of the Department of Applied Biology and Chemical Technology 應用生物及化學科技學系助理教授
Dr. Ling JIN 金靈 博士	Research Assistant Professor of the Department of Civil and Environmental Engineering 土木及環境工程學系研究助理教授
Prof. Xiangdong LI 李向東 教授	Chair Professor of the Department of Civil and Environmental Engineering 土木及環境工程學系講座教授

The Hong Kong University of Science and Technology 香港科技大學

Dr. Jinping CHENG 程金平 博士	Research Assistant Professor of the Department of Ocean Science 海洋科學系研究助理教授
Prof. Jianping GAN 甘劍平 教授	Chair Professor of the Department of Ocean Science 海洋科學系講座教授
Dr. Stanley Chun Kwan LAU 劉振鈞 博士	Associate Professor of the Department of Ocean Science 海洋科學系副教授
Prof. Hongbin LIU 劉紅斌 教授	Professor of the Department of Ocean Science 海洋科學系教授
Prof. Peiyuan QIAN 錢培元 教授	Chair Professor of the Department of Ocean Science 海洋科學系講座教授
Prof. Wenxiong WANG 王文雄 教授	Chair Professor of the Department of Ocean Science 海洋科學系講座教授

The University of Hong Kong 香港大學

Dr. Jidong GU 顧繼東 博士	Associate Professor of the School of Biological Sciences 生物科學學院副教授
Prof. Kenneth Mei Yee LEUNG 梁美儀 教授	Professor of the School of Biological Sciences 生物科學學院教授
Prof. Xiaoyan LI 李曉岩 教授	Professor of the Department of Civil Engineering 土木工程系教授
Dr. Vengatesen THIYAGARAJAN 華俊 博士	Associate Professor of the School of Biological Sciences 生物科學學院副教授
Prof. Tong ZHANG 張彤 教授	Professor of the Department of Civil Engineering 土木工程系教授

Co-opted Members in 2019 2019年新增成員

Dr. Ling JIN 金靈博士

Dr. Jin studied for his Bachelor and Master's degrees from City University of Hong Kong between 2005 and 2009. After two years of work at the State Key Laboratory of Marine Pollution, Dr. Jin won the Prime Minister's Australia Asia Endeavour Award in 2011 to undertake his doctorate study in environmental toxicology at The University of Queensland. He took up the Hong Kong Polytechnic University Postdoctoral Fellowship in 2015, and joined the faculty as a Research Assistant Professor in 2019 after postdoctoral training at the Department of Civil and Environmental Engineering. Dr. Jin is broadly interested in environmental chemistry and environmental health, with a focus on the pollution-health nexus in the marine and atmospheric environments. He has published 30 peer-reviewed articles in leading journals such as *Nature*, *National Science Review*, *Environmental Health Perspectives*, *Environmental Science and Technology*, and *Water Research*, and five scholarly book chapters. He currently serves as an Editorial Board Member for *Environmental Toxicology and Chemistry*.

金靈博士現任香港理工大學土木與環境工程系研究助理教授，本科與碩士就讀於香港城市大學，2011年榮獲澳大利亞總理亞洲奮進獎學金，負笈昆士蘭大學，攻讀環境毒理學博士學位，2015年獲得香港理工大學博士後基金。其研究領域包括環境化學與環境健康，重點聚焦海洋和大氣污染與人群健康。已發表國際主流期刊論文三十篇（例如*Nature*、*National Science Review*、*Environmental Health Perspectives*、*Environmental Science and Technology*、*Water Research*）及書中章節五篇，目前擔任*Environmental Toxicology and Chemistry*編委。

Dr. Brian Chin Wing KOT 葛展榮博士

Dr. Brian KOT is a registered diagnostic radiographer and veterinary imaging clinician, obtained his Bachelor of Science degree in Radiography, and subsequently his Doctor of Philosophy degree in Diagnostic Ultrasound from the Hong Kong Polytechnic University in 2005 and 2010 respectively. He furthered his study on postmortem radiology with Prof. Michael Thali and his team at Institute of Forensic Medicine, University of Zurich in 2016, where he completed his certificate course in virtopsy. He is currently affiliated with City University of Hong Kong, holding a joint-appointment by the State Key Laboratory of Marine Pollution and the Jockey Club College of Veterinary Medicine and Life Sciences, with particular interest on public health and marine & environmental science/conservation biology in aquatic animals. His team applies virtopsy routinely to stranded cetaceans in the HK waters, aiming to supplement conventional necropsy procedures for death and biological profile investigation. His team has demonstrated a consistent track record of peer-reviewed publication and research funding since 2013, including more than HK\$7 million in competitive research grants as Principal Investigator and Co-investigator. He has been engaged in local governmental scientific advisory boards to provide comments and advice for local and China central government boards and the Hong Kong Airport Authority on marine conservation, under the capacity of membership in 3 scientific/professional working groups since 2015.

葛展榮博士是一個註冊放射診斷師及動物影像研究員。在2005年於香港理工大學完成他的放射學榮譽理學士後，隨後便在2010年於香港理工大學取得哲學博士學位；2016年時在蘇黎世大學進修法醫放射學，取得影像解剖的專業證書。他現時在香港城市大學擔任訪問助理教授及研究員。他對公共衛生與水生動物的環境科學、生物學及保育尤其有興趣。他的團隊把影像解剖恆常地應用在香港水域擱淺的鯨豚身上，利用此技術補充傳統解剖，從而調查牠們的死因及生活史。自2013年起，他及其團隊致力刊登學術文章與取得研究資助，一共取得超過七百萬港元的研究資助。此外，他亦有參與香港政府的諮詢委員會，自2015年起在三個不同的科學/專業工作擔任會員，為香港、中國政府及香港機場管理局提供海洋保育的意見。

Dr. Chris Yiu Fai TSANG 曾耀輝博士

Dr. Chris TSANG is an Associate Professor in the Department of Science and Environmental Studies at The Education University of Hong Kong (EdUHK). He received his BEng and PhD in Environmental Engineering from The Hong Kong Polytechnic University (PolyU). Prior to joining EdUHK, he was a Visiting Scholar in the Department of Agricultural and Biological Engineering at the University of Illinois at Urbana-Champaign (UIUC) and a Research Fellow in the Department of Civil and Environmental Engineering at PolyU. Currently, he is the Editor-in-Chief of Energy & Environment (SAGE), Associate Editor of Chemical Engineering Journal (Elsevier), and Subject Editor of Process Safety and Environmental Protection (Elsevier). His research interests include wastewater treatment, bioremediation, and resource recovery from organic waste.

曾耀輝博士於香港理工大學取得環境工程學士和博士學位。在加入香港教育大學(教大)前，曾博士曾任美國伊利諾大學厄巴納-香檳分校農業及生物工程學系訪問學者和理大土木及環境工程學系研究員。現為教大科學與環境學系副教授，研究方向包括廢水處理、生物修復和有機廢物資源化等。目前擔任《Energy & Environment》主編、《Chemical Engineering Journal》副主編和《Process Safety and Environmental Protection》主題編輯。

Prof. Michael Kwok Hi LEUNG 梁國熙教授

Prof. Michael LEUNG is a Professor in the School of Energy and Environment (SEE) at the City University of Hong Kong (CityU). He is also the Director of Ability R&D Energy Research Centre at CityU. His current research interests include solar photocatalysis, marine antifouling, fuel cell and advanced refrigeration/air-conditioning. He has published 140+ journal papers, 15 books/book chapters and 7 patents. He is listed in Highly Cited Researchers 2018 by Clarivate Analytics that recognizes world-class researchers selected for their exceptional research performance. He is also listed in The Most Cited Researchers in Energy Science and Engineering, Developed for ShanghaiRanking's Global Ranking of Academic Subjects by Elsevier. Prof. Leung has received total research funding above HK\$40M. He is an Editorial Board Member for Applied Energy and HKIE Transactions.

梁國熙教授現職香港城市大學能源及環境學院教授，能量研發能源研究中心主任。主要研究領域包括太陽能光催化、海洋防污、微流液相燃料電池、先進製冷/空調等。已發表一百四十多篇學術期刊論文，十五項學術專著或章節和七項專利。他獲Clarivate Analytics認可其卓越研究成果，並列入《2018年高引用研究人員》世界級研究人員名單。他還獲列入Elsevier為上海排名而開發的全球學術科目排名《能源科學與工程領域高引用研究人員》名單。梁教授的研究經費總額超過港幣四千萬元。他亦是《Applied Energy》和《HKIE Transactions》的編委。

Dr. Henry Yuhe HE 何宇鶴博士

Dr. Henry HE's research focuses on understanding the mechanisms that lead to toxicity in aquatic organisms exposed to various natural and anthropogenic chemical stressors at the molecular, cellular and organism level. He has keen interests in studying the emerging organic contaminants (eg. petroleum-associated organics, persistent organic pollutants, endocrine disrupting chemicals, etc.) using a variety of molecular and biochemical biomarkers on invertebrate and fish models. The areas of his expertise in aquatic ecotoxicology include endocrine disruption, oxidative stress, developmental toxicology, and reproductive behavior, particularly in small fish models.

His previous work focused on toxicological assessment on crude oil related wastewater, nanomaterial and nanopesticide, brominated flame retardants, and other emerging contaminants in aquatic ecosystems. Up to now he has published 24 SCI papers, and delivered 38 presentations in national and international conferences. He has supervised 2 master students and 3 PhD students during his postdoc training, and has been working on several research projects funded by National Sciences and Engineering Research Council (NSERC) in Canada.

何博士的研究致力於理解各種自然及人工污染源在分子、細胞及生物個體層面上的毒理機制。他的研究領域集中於有機污染物（例如石油類相關有機物，持久性有機污染物，內分泌幹擾物等等），並使用一系列分子及生化標的用於無脊椎動物及小型魚類模型。

他之前的研究工作包括石油類廢水，納米材料和納米農藥，溴化物防火劑，以及其他新興污染物在水生態系統中的毒理評估，到目前為止，共有相關SCI論文二十四篇，在國內外各論壇會議上發表三十八次。在博後工作期間曾經指導過兩名碩士研究生及三名博士研究生，並負責過加拿大自然科學及工程研究基金的數項課題。

Prof. Tong ZHANG 張彤教授

Professor Tong ZHANG earned his BSc and MPhil degree from Nanjing University in 1990 and 1993, respectively, and his PhD degree from The University of Hong Kong in 2001. Since September 2001, he has been working in the Department of Civil Engineering at The University of Hong Kong, where he is a Professor now. He is also a Distinguished Visiting Professor of Southern University of Science and Technology, China, and an Honorary Professor at School of Public Health of HKU. Professor Zhang's research fields include environmental bioinformatics, omics technologies, anaerobic digestion and bioenergy from waste/wastewater, biological wastewater treatment, biodegradation of emerging pollutants, antibiotic and antibiotic resistance genes, etc. He published over 230 peer-reviewed journal papers, with more than 15,000 citations. He has a H index of 69 and is top 1% researcher (Essential Science Indicators) for the past 10 years from 2009 to 2018. He is associate editors of Microbiome, and Applied Microbiology and Biotechnology. He was Yi Xing Chair Professor of Nanjing University from 2013 to 2016. He won First-Class Award in Natural Science of China Ministry of Education in 2015, and Second-Class State Natural Science Award of China State Council in 2016, and Outstanding Research Student Supervisor Award of HKU in 2017. He is listed as one of Highly Cited Researchers by Clarivate in 2018.

張彤教授現任香港大學土木工程系教授和香港大學公共衛生學院榮譽教授。他2017年4月起任南方科技大學環境科學與工程學院長期訪問傑出教授。主要研究方向為環境生物資訊學、微生物組學、厭氧生物處理、污水生物處理、新興污染物生物降解、污水中抗生素抗性基因及致病菌檢測等。發表學術論文二百三十篇，其中ESI高被引論文十六篇，H指數69 (Google Scholar)，總引用一萬五千次(Google Scholar)。2018科睿唯安“全球高被引學者”。2011至2014年受聘兼任“華大基因”環境微生物和環境生物技術的特邀顧問，2013至2016年受聘兼任南京大學講座教授。

Position Held in International Academic Institutions and Journals

國際學術機構和國際學術期刊的任職情況

Positions of Members in International Academic Organizations and Government Advisory Committees

SKLMP成員在國際學術組織及政府諮詢委員會的任職情況

Member	Position	Organization	Duration
1. Dr. Leo L. CHAN	Adjunct Professor	Xiamen University, Xiamen, China	Since 2006
	Chief Technical Advisor	State Key Laboratory of Marine Environmental Science (Xiamen University), Xiamen, China	Since 2008
	Expert Member of Policy Expert Advisory Committee	Shenzhen Municipal Government	2019 - 2024
	Scientific Diving Consultant of Marine Science Committee	Hong Kong Underwater Association	Since 2018
	Scientific Advisor	Coral Reef Branch of the Pacific Society of China	2018 - 2023
	Expert member	The 6 th National Marine Technology Forecast Working group under Ministry of Science and Technology of China	Since 2019
2. Dr. S.G. CHEUNG	學術委員會委員	廣西北部灣海洋生物多樣性養護重點實驗室	2017 - 2020
3. Dr. James K.H. FANG	Marine Parks Committee Member	The International Scientific Advisory Committee (2018-2023) of the Chinese Research Academy of Environmental Sciences, China	2019 - 2021
	Expert Advisor	ECF Big Issue of Microplastics, World Wide Fund for Nature Hong Kong	2019 - 2021
	Adjunct Fellow	Global Change Institute, The University of Queensland, Australia	2018 - 2020
	Scientific Committee Member	Ocean Park Conservation Foundation Hong Kong	2019 - 2021
	Chartered Biologist	Royal Society of Biology, United Kingdom	2014 - Present
4. Dr. Keith W.K. HO	Adjunct Professor	Institute of Earth Environment, Chinese Academy of Sciences, China	2014 - Present
	Adjunct Professor	Xi'an Jiaotong University, China	2018 - Present

	Member	Position	Organization	Duration
5.	Dr. Brian C.W. KOT	Member of the Expert Committee	The National Aquatic Wildlife Conservation Association, Ministry of Agriculture and Rural Affairs, the People's Republics of China	Since 2017
6.	Prof. Kenneth M.Y. LEUNG	Visiting Professor	Universiti Malaysia Terengganu, Malaysia	2019 - 2020
7.	Prof. T. ZHANG	Honorary Professor	School of Public Health	2018 - 2020

Positions of Members in International Academic Journals

SKLMP成員在國際學術期刊的任職情況

Member	Position	Name of Academic Journal	Duration
1. Dr. J.P. CHENG	Editor	Bulletin of Environmental Contamination and Toxicology	2013 - Present
2. Dr. Keith W.K. HO	Senior Editorial Board Members	General Chemistry	2017 - Present
	Associate Editor	Journal of Research in Science Mathematics and Technology Education	2016 - Present
	Editorial Board	International Journal of Photoenergy	2013 - Present
3. Dr. James C.W. LAM	Guest-Editor	Marine Pollution Bulletin	2019
	Editorial Board Member	Science of the Total Environment	2016 - Present
	Editorial Board Member	Heliyon	2019 - Present
4. Prof. Paul K.S. LAM	Subject Editor	Ecosystem Health and Sustainability	2014-present
	Associate Editor	Journal of Environmental Sciences	2015-present
	Member	Editorial Advisory Board, Environmental Science & Technology	since 2010
5. Prof. Kenneth M.Y. LEUNG	Editorial Board Member	Springer Journal, Toxicology and Environmental Health Sciences	2009 - Present
	Editor-in-Chief	Elsevier Journal, Regional Study in Marine Science	2014 - Present
	Editorial Board Member	Elsevier Journal, Marine Pollution Bulletin	2008 - Present
	Editorial Board Member	Springer Journal, Ocean Science Journal	2012 - Present
	Associate Editor	Canadian Journal of Zoology	2011 - Present
6. Prof. X.D. LI	Associate Editor	Environmental Science and Technology	2012 - Present
	Associate Editor	Applied Geochemistry	2010 - Present
	Editorial Board Member	National Science Review	2018 - Present

Nurturing of Talents 人才培養

Research Students 研究生				
	Member	Student	Degree	Status
1.	Dr. Leo Lai CHAN	Walter DELLISANTI Wai Hin LEE Haiying MA LiKun WEI Ki Chun YIP Shiwen ZHOU	PhD PhD PhD PhD PhD PhD	Ongoing Ongoing Ongoing Ongoing Ongoing Ongoing
2.	Dr. C.C. CHEANG	Diana Yuen Sum WONG	PhD	Ongoing
3.	Dr. J.P. CHENG	Shing Him LO Jun YI	MSc PhD	Graduate in 2019 Graduate in 2019
4.	Prof. S.H. CHENG	Yu Suen CHAN Sinai MANNO	PhD PhD	Ongoing Ongoing
5.	Dr. S.G. CHEUNG	Chong MAK Yanhao MIAO Han SUN	MSc MSc MSc	Ongoing Ongoing Ongoing
6.	Dr James K.H. FANG	Ryan Kar Long LEUNG	MPhil	Ongoing
7.	Prof. J.P. GAN	Yao TANG Wai Pang TSANG Chi Wing HUI Junlu LI	MPhil MPhil PhD PhD	Graduate in 2019 Graduate in 2019 Ongoing Graduate in 2019
8.	Dr. Brian C.W. KOT	Ladan JAHANGIRI	PhD	Ongoing
9.	Dr. James C.W. LAM	Ching Yan KWOK	PhD	Ongoing

	Member	Student	Degree	Status
10.	Prof. Paul K.S. LAM	Yaru CAO	PhD	Ongoing
		Jiarui GU	PhD	Ongoing
		Jiayong LAO	PhD	Ongoing
		Jing LI	PhD	Ongoing
		Huiju LIN	PhD	Ongoing
		Rongben WU	PhD	Ongoing
		Qi WANG	PhD	Ongoing
		Xin LI	PhD	Graduate in 2019
		Zhen WU	PhD	Graduate in 2019
		Shuo CUI	Joint PhD Student*	Ongoing
		Wenyuan FAN	Joint PhD Student*	Ongoing
		Meng GE	Joint PhD Student*	Ongoing
		Bei JIANG	Joint PhD Student*	Ongoing
		Jie LI	Joint PhD Student*	Ongoing
		Xue LI	Joint PhD Student*	Ongoing
		Jing JIN	Joint PhD Student*	Ongoing
		Linlin MA	Joint PhD Student*	Ongoing
		Yue QIU	Joint PhD Student*	Ongoing
		Mengchen SHEN	Joint PhD Student*	Ongoing
		Li WANG	Joint PhD Student*	Ongoing
Shanshan WANG	Joint PhD Student*	Ongoing		
Li ZHOU	Joint PhD Student*	Ongoing		
Yinhua CUI	Joint PhD Student*	Graduate in 2019		
Ruoyu HU	Joint PhD Student*	Graduate in 2019		
Xinrong PAN	Joint PhD Student*	Graduate in 2019		
11.	Prof. Kenneth M.Y. LEUNG	Racliffe LAI	PhD	Ongoing
		Chi Chiu LO	PhD	Ongoing
		Qi HUANG	PhD	Ongoing
		Wa Tat YAN	PhD	Ongoing
		Jason YAU	PhD	Ongoing
		Katie YEUNG	PhD	Ongoing
		Ronia SHAM	PhD	Graduate in 2019
12.	Prof. X.D. LI	Yihua WANG	PhD	Ongoing
		Xiaohua ZHANG	PhD	Ongoing
		Siyuan LIANG	PhD	Graduate in 2019

	Member	Student	Degree	Status
13.	Prof. X.Y. LI	Wenkui MI Boyang MENG	PhD PhD	Ongoing Graduate in 2019
14.	Prof. W.X. WANG	Yunlong LI Zishuang SHAO Anqi SUN Neng YAN Liuliang YUAN Yanping ZHANG	PhD PhD PhD PhD PhD PhD	Ongoing Ongoing Ongoing Ongoing Ongoing Ongoing
15.	Prof. Michael M.S. YANG	Ying NI Tongxu SI Zihan YANG Tianzhong LI	PhD PhD PhD PhD	Ongoing Ongoing Ongoing Graduate in 2019
16.	Prof. T. ZHANG	Xiaoqing XU Xiawan ZHENG	PhD PhD	Ongoing Ongoing

SKLMP member reveals ecological impacts of the accidental palm stearin spill to the coastal ecosystem of Hong Kong
 SKLMP成員的研究揭示了意外溢漏的棕櫚硬脂污染對香港海岸生態系統的影響

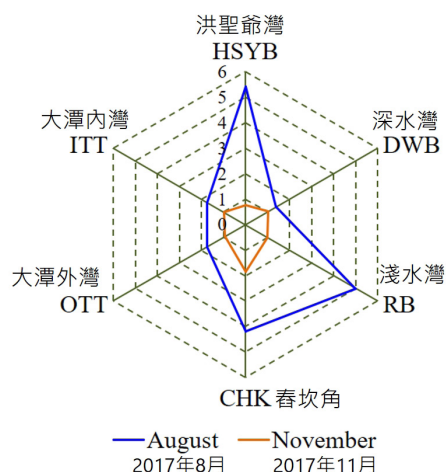
Risk Assessment

Marine Ecosystem

A research team led by the SKLMP member, Professor Kenneth LEUNG launched an 18-month investigation on the toxicity of the 200 tonnes of palm stearin which reached the southwest coasts of Hong Kong following a marine accident in August 2017. The team conducted scientific ecological risk assessment at sites including Hung Shing Yeh Beach, Deep Water Bay, Repulse Bay, Chung Hom Kok, Outer Tai Tam and Inner Tai Tam, and found that the ecological risk was very high right after the accidental spill. The concentration of fatty acids in both seawater and sediment samples returned to the natural levels four months after the incident following efforts by the Government of the Hong Kong SAR and the public to remove the palm stearin from the impacted shores. It was the first ever comprehensive study on the impacts of palm stearin on the marine ecosystem and the results have been published in Environmental Science & Technology. The findings will provide useful scientific information to authorities around the world for informed decision to be made in risk assessment and management of similar crises in future.



2017年8月初，棕櫚硬脂在淺水灣的污染情況。
 In early August 2017, there were a lot of palm stearin being found on the shore of Repulse Bay.



綜合所得數據，團隊進行了科學化的生態風險評估，結果發現在污染事故初期，硬脂的生態風險甚高，在所有6個研究海岸的風險係數皆遠高於1（表示高風險）。在4個月後，風險才回落到較安全水平（4個研究海岸的風險係數皆低於1；其他兩個的風險係數低於2）。

By integrating the above findings, the research team conducted a scientific ecological risk assessment. The results indicated that the ecological risk was very high right after the accidental spill in early August 2017 (risk quotient (RQ) at all sites >> 1). Fortunately, the ecological risk was substantially reduced after 4 months of the incident (RQ < 1 in four sites; RQ < 2 in the other two sites).



結果反映，事故發生後政府與市民合力盡快把硬脂移除，大大減少了硬脂對海洋生物的長遠負面影響。
 Our results highlighted the importance of the immediate action for removal of the palm stearin from the shores jointly by the government and citizens, because these could minimize their long-term impacts to the marine environment.

SKLMP member assists government in Tung Chung's rst eco-shoreline project to encourage biodiversity
 SKLMP成員協助政府在東涌首條生態海岸線上進行提高生物多樣性的研究

Marine Ecosystem Pollution Control and Bioremediation

A land reclamation project in Tung Chung touted as Hong Kong's first "eco-shoreline" involves a 5km sea wall with a 3.8km stretch boasting special design to recreate natural tidal zone for marine animals. The shoreline is expected to be completed by 2023. The Hong Kong SAR Government is working with our SKLMP member, Professor Kenneth LEUNG to run a two-year on-site experiment on increasing biodiversity on seashores, and initial results at an experiment site in Ma Liu Shui revealed marine animals have been settling on the seawalls, 1.5 times more than nearby artificial shorelines. It has initially proven successful with the discovery of 11 kinds of marine life settling on the seawalls, although artificial shorelines do not usually favor organism growth. Professor Leung said the organisms which cannot be found on traditional seawalls, such as seaweed, coralline algae, crabs, and snails, were found. He also said any reclamation work should seek to minimise its impact on the marine ecosystem. He said it would be difficult to plant mangroves on coastline since they have to find the right kind of salinity for mangroves.

The research team set up monitoring equipment at sites in Sai Kung, Lung Kwu Tan in Tuen Mun, and Ma Liu Shui in Ma On Shan. Researchers hope to understand whether the add-ons are effective in encouraging marine life growth in different environments. The research began in January 2018 and is expected to conclude in 2021 after two years of on-site experiments.




SKMLP members drew world wide attention on hypoxia induced impairment of fish reproductive success
 SKMLP 成員就低氧環境會損害魚類生育及繁殖能力的研究獲得了國際關注

Marine Ecosystem Pollution Control and Bioremediation

A paper by Prof. Rudolf Shiu Sun WU, Dr. Richard Yuen Chong KONG and Dr. Doris Wai Ting AU recently published in *Environmental Science and Technology*, 53, 3917 on “Hypoxia Causes Transgenerational Impairment of Ovarian Development and Hatching Success in Fish” has attracted world wide attention, and the European Commission’s Environment Directorate-General has written an article and featured in EU in the 536 issue of “Science for Environment Policy” and inform government public policy.

Please visit the following EU website for more details of the article.
https://ec.europa.eu/environment/integration/research/newsalert/pdf/low_oxygen_levels_affect_reproduction_female_fish_536na5_en.pdf



Science for Environment Policy

Low oxygen levels affect reproductive function in female fish – across multiple generations

Low oxygen levels ('hypoxia') are a pressing concern for marine and freshwater ecosystems worldwide, and this may deteriorate as ocean temperatures rise. Hypoxia causes stress in organisms, which can cause reproductive impairments that persist across generations – even the offspring that have never been exposed to hypoxia. Previous studies discovered that hypoxia can disrupt sex hormones, resulting in birth defects and affecting reproduction of male fish over several generations. This study shows how hypoxia can also affect female marine medaka (*Oryzias latipes*) over multiple generations – and thus may pose a significant threat to the sustainability of natural fish populations worldwide.

Hypoxia is of great concern to aquatic ecosystems and over 400 coastal 'dead zones' (zones with less than 2 mg/L of dissolved oxygen) have been identified worldwide. Oxygen-depleted zones in European seas have increased hugely in size in past decades. The Baltic Sea, for example, has the largest oxygen-depleted zone in the world at 60 000km² in size – and this has resulted in the loss of about three million tonnes of large ocean organisms.

Such oxygen loss is largely caused by agricultural fertiliser run-off, but climate change exacerbates the problem. The majority of oceanic dead zones face a temperature increase of 2°C by the end of this century – causing both a further decrease in oxygen solubility, and a rise in demand for oxygen from aquatic organisms. Understanding the effects of climate change and the resultant hypoxia on aquatic ecosystems and fish populations in the future is key: it falls within the European strategy on adaptation to climate change and can inform fisheries management and conservation strategies.

This study explored the transgenerational effects of hypoxia on marine medaka. This fish was selected for the following reasons:

- the researchers have established the fish as the model for marine fish (as zebra fish is the model for freshwater fish);
- it can be kept from generation to generation in the lab;
- the biology, e.g. feeding requirements, growth, reproduction, have all been researched;
- the genome of this species has already been established;
- the life-cycle is relatively short (three to four months), which is good for transgenerational studies.

First-generation fish (F0) were split into two groups and exposed to either normoxia (normal oxygen levels of 5.8 mg/L, F0N) or hypoxia (low oxygen levels of 1.5 mg/L, F0H) for one month. Any embryos produced were collected within one hour of fertilisation; embryos from F0N were immediately transferred to the same normoxic conditions for the development of the F1 and F2 generations (F1N, F2N); whereas the embryos gathered from F0H were split into two groups. Half were reared in hypoxia for two generations (F1H, F2H) and half returned to normoxia and kept for another two generations (F1T, F2T).

Continued on next page.

The contents and views included in Science for Environment Policy are based on independent, peer-reviewed research and do not necessarily reflect the position of the European Commission. Please note that this article is a summary of only one study. Other studies may come to other conclusions.

To cite this article/service: "Science for Environment Policy", European Commission DG Environment News Alert Service, edited by SCU, The University of the West of England, Bristol.



Science for Environment Policy

Low oxygen levels affect reproductive function in female fish – across multiple generations (continued)

Each group consisted of five identical net cages, each containing 45 male and 45 female fish. From each treatment group, three cages were chosen at random and 100 embryos sampled 10 days after fertilisation. Hatching success was calculated as a percentage of hatched embryos. Nine female fish from each group and generation were used to create three sets of pooled RNA and DNA for analysis. Fish were anaesthetised in an ice bath before having their ovaries removed. Three ovaries were pooled to produce an RNA sample from a given treatment group, and three more ovaries pooled to create a DNA sample. Each exposure condition and generation (i.e. normoxia control (F0N) and hypoxia (F0H) in the F0 generation, along with F2 normoxia (F2N), hypoxia (F2H), and transgenerational (F2T) groups) had three sets of pooled RNA and DNA. Ingenuity Pathway Analysis software was used to explore the transgenerational effect of hypoxia on the medaka’s ovarian function.

The results show that hypoxia caused two distortions in ovarian development: follicle atresia (the breakdown of follicles due to cell death) and retarded oocyte development (in the form of a greater number of primary oocytes; but fewer vitellogenic oocytes – those containing egg yolk). Hatching success was greatly reduced by hypoxia in F0 fish. Interestingly, similar reproductive impairments were seen in F2 fish of the transgenerational group – although these fish have never been exposed to hypoxia. Hypoxia had no effect on the number of eggs produced, but the quality of the eggs was adversely affected (as seen transgenerationally in the impact on F2 fish). This, coupled with previous findings by the researchers that hypoxia can cause transgenerational reproductive impairment (reduced sperm quality and quantity) in male fish, demonstrated the population-level effects that hypoxia can have on a marine species.

This study highlights that hypoxia poses a significant and lasting threat to the sustainability of natural marine medaka fish populations worldwide and may also impact other fish species. These findings help inform policymakers on the effects of marine hypoxia, and highlight trends and concerns to consider in efforts to mitigate and regulate climate change.

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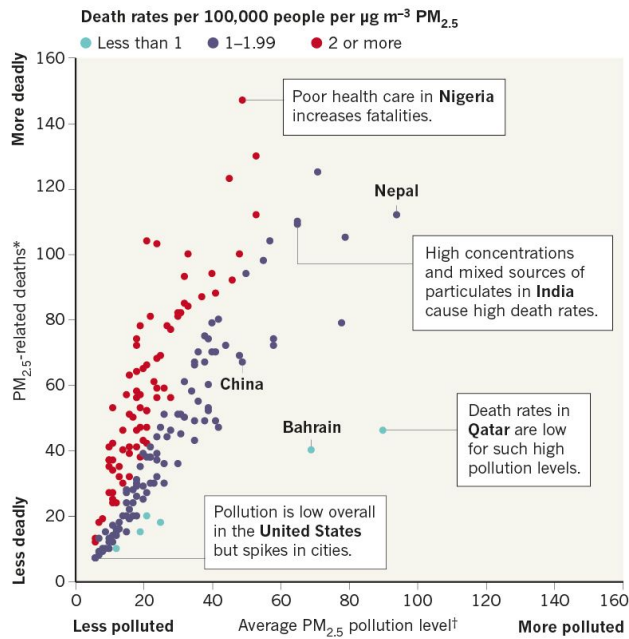
SKLMP members' commentary on Nature paved new direction for research on fine particulate matter pollution
 SKLMP成員在NATURE刊登的評論開拓了懸浮粒子空氣污染研究的新方向

Risk Assessment Pollution Control and Bioremediation

Invited by Nature, our team including Dr. Ling JIN (SKLMP member), Prof. Haidong KAN (Fudan University School of Public Health) and Prof. Xiangdong LI (SKLMP member) wrote a comment article entitled "Air Pollution: a global problem needs local fixes" (*Nature* 2019, 570, 437-439). They identified a globally important but overlooked issue, i.e., people worldwide exposed to similar mass concentrations of airborne fine particulate matter (PM_{2.5}) have different health consequences. To reveal the myth, they called for a new way of thinking and strategies to find and reduce the critical toxic ingredients of PM_{2.5} cocktails instead of focusing on its mass concentration, which is no longer sufficient to link toxicity to health effects. The invitation was extended from Nature's comment desk based on our recent work (e.g., *Environ. Sci. Technol.*, 2019, 53, 2881-2891; *Environ. Sci. Technol.*, 2019, 53, 963-972).

Please visit the following website for more details of the project.
<https://www.nature.com/articles/d41586-019-01960-7>

The health impacts of fine particulates (PM_{2.5}) in air pollution differ between countries. Toxicity depends on the blend of particles as well as mixing, weather, atmospheric chemistry and pathogens.



©nature

*Age-standardized annual deaths per 100,000 people, attributable to outdoor PM_{2.5} exposure. [†]Population-weighted annual median concentration of PM_{2.5} ($\mu\text{g per m}^3$).

Figure 1.

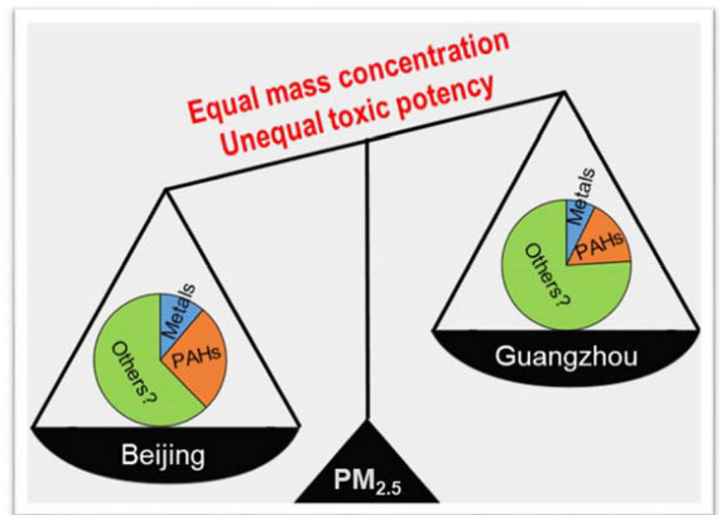


Figure 2.

Differential toxicities of PM_{2.5} at equal mass concentrations due to varying cocktail combinations

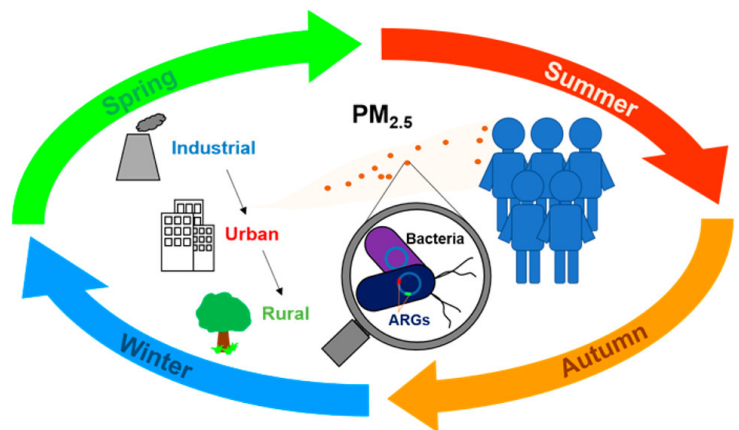


Figure 3.

First proof of aerial transport of inhalable antibiotic resistance genes as part of fine aerosols

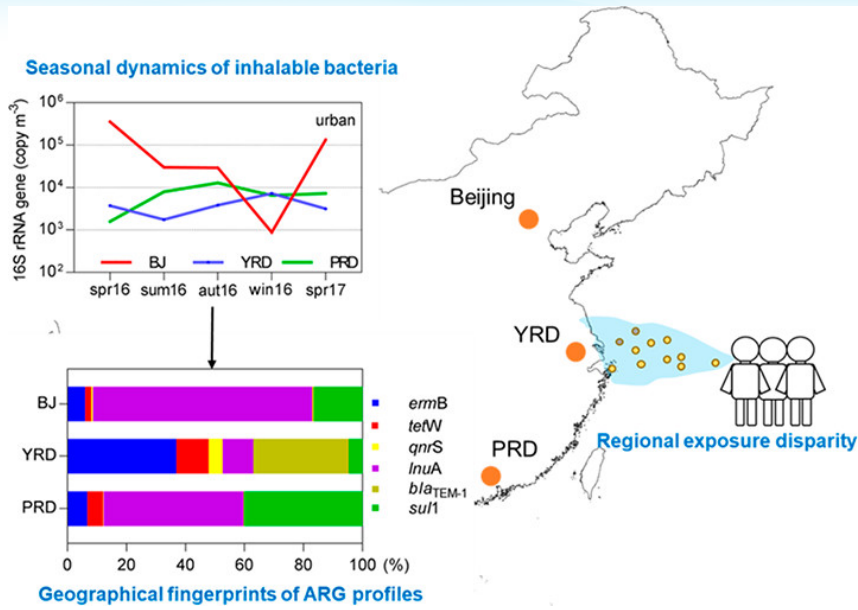


Figure 4.
We are where we breathe: geographical dependence of airborne bacteria and antibiotic resistance genes



Figure 5.
Coastal air-quality supersite at the southern tip of Hong Kong Island (Cape D'Aguilar)

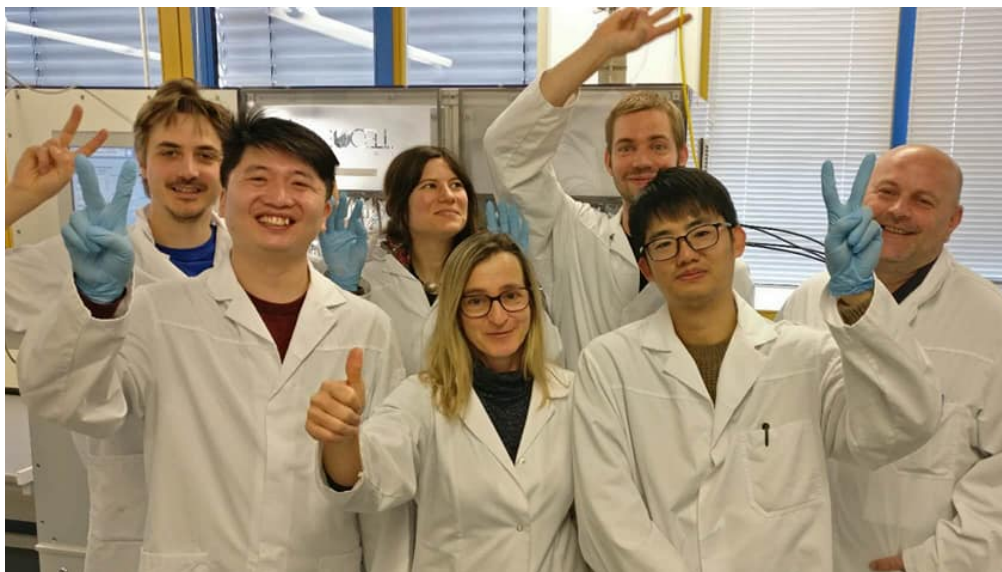


Figure 6.
Collaborative work on air-liquid-interface cell exposure to toxic particles at Helmholtz Zentrum München

SKLMP member assists government in mapping the benthic habitat in Tung Ping Chau Marine Park

SKLMP成員協助政府繪製東平洲海岸公園底棲生境的地圖

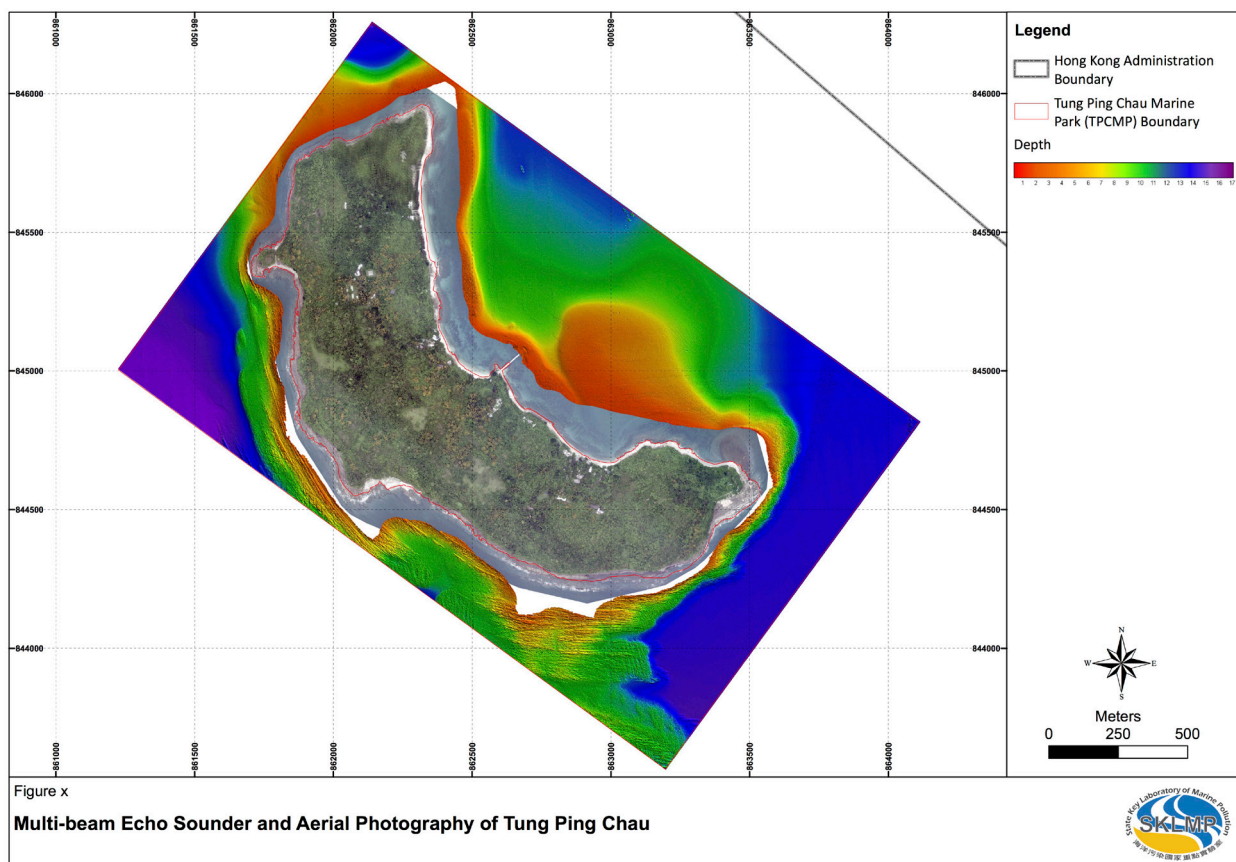
Marine Ecosystem

Pollution Monitoring Technology

Tung Ping Chau Marine Park is famous with its diverse benthic habitats, including macroalgae, hard coral and octocoral/black coral communities. Within the 270 hectares area of the marine park, 65 hard coral species and 65 marine algae species have been found. However, certain important information about the marine park has never been recorded, e.g. the distribution and extent of each of these benthic habitats. In the view of this, a research team led by the SKLMP member, Dr. Leo CHAN launched a 20-month project to accurately record the distribution and extent of these benthic habitats in the Tung Ping Chau Marine Park. This project will provide a detail map of all these ecologically important habitats, with such information, AFCD will be able to better conserve different core habitat areas and manage these habitats over time.

Please visit the following website for more details of the project.

<http://www.arcgis.com/apps/MapJournal/index.html?appid=91f2a57f61f34c15be61bf9a68d43044&fbclid=IwAR24gEt-BrQ-7y-S32diBT5tMYPTGh8IMsTLTSCCHgr9NgQCGmrrldZotCHK>



Academic Exchange and Cooperation 學術交流與合作

Meetings and Conferences – 會議及講座

海洋污染國家重點實驗室2018年度會議及學術委員會會議於2019年3月13-14日在香港城市大學成功召開。

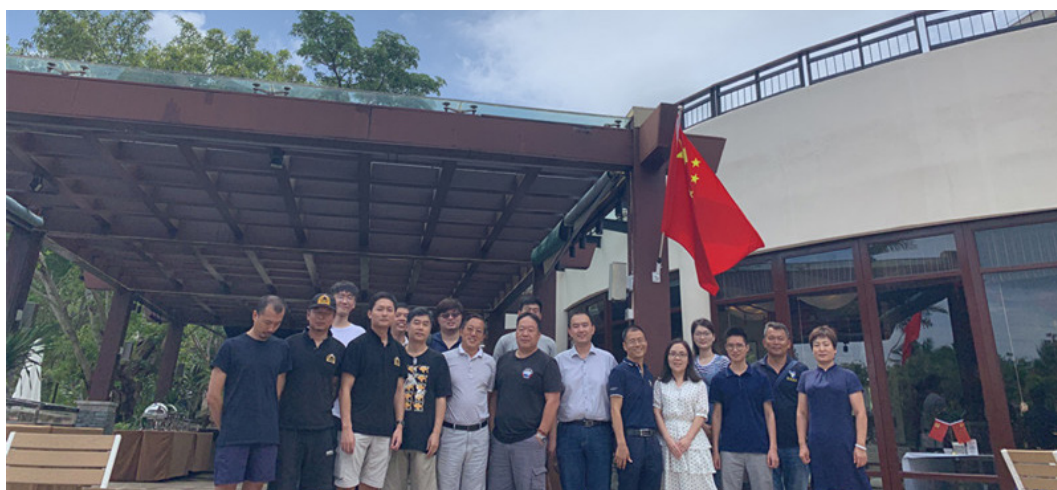
From 13 to 14 March 2019, the SKLMP 2018 Annual and Academic Committee Meetings were successfully held in City University of Hong Kong.

由香港城市大學深圳研究院深圳海洋生物多樣性可持續利用重點實驗室主辦的“海洋藥源微生物水下原位採集與培養研討會”於2019年10月8日在海南省三亞市成功舉辦。來自中國海洋大學、中山大學、寧波大學、自然資源部第二海洋研究所、自然資源部第三海洋研究所、深圳市智慧海洋科技有限公司的十餘名專家學者代表出席了本次會議並作主題報告。此次研討會促進了多學科之間的交叉融合，並推動了科學潛水培訓課程的開展工作。

會議結束後，在中國海洋大學山東省海洋環境地質工程重點實驗室主任賈永剛教授的引薦下，我室副主任陳荔博士和參會人員一行參觀了海南省熱帶海洋學院，並與副校長茅雲翔教授、生態環境學院院長徐功娣教授等學院老師進行了面對面的學術交流，為以後的合作奠定了基礎。

The Seminar on Underwater In-situ Collection and Cultivation of Marine Microorganisms, sponsored by Shenzhen Key Laboratory for the Sustainable Use of Marine Biodiversity, City University of Hong Kong, Shenzhen Research Institute, was successfully held on 8 October 2019 in Sanya, Hainan. More than ten experts and scholars from Ocean University of China, Sun Yat-sen University, Ningbo University, Second Institute of Oceanography, Ministry of Natural Resources, Third Institute of Oceanography, Ministry of Natural Resources and Shenzhen Smart Ocean Technology Co., Ltd. attended the meeting and made thematic presentations. The seminar promoted the integration of multi-disciplines and the development of scientific diving training courses.

After the Seminar, with the recommendation from Prof. Yonggang JIA, the Director of The Shandong Provincial Key Laboratory of Marine Environment and Geological Engineering (MEGE), Ocean University of China, Dr. Leo Lai CHAN, the Associate Director of the State Key Laboratory of Marine Pollution, City University of Hong Kong, and other participants visited Hainan Tropical Ocean University. They had face-to-face academic exchanges with Prof. Yunxiang MAO, the Associate President of the University and Prof. Jongdi XU, the President of the College of Ecological Environment. The Seminar laid the foundation for future cooperation.



The 9th International Conference on Marine Pollution and Ecotoxicology (ICMPE-9) 第九屆海洋污染與生態毒理學國際會議 (ICMPE-9)

The 9th International Conference on Marine Pollution and Ecotoxicology (ICMPE-9) is part of a very successful international conference series created by members of SKLMP that aimed to promote knowledge exchange and foster research collaborations among marine scientists, governmental regulators, environmental practitioners, and research postgraduates from all over the world. The conference was held fruitfully during 10 – 14 June, 2019 at the University of Hong Kong (HKU), Hong Kong, and attracted the participation of 303 delegates from 17 countries across the five continents. The 4-day academic conference included three plenary lectures, 18 keynote lectures, and 12 invited lectures by 33 local and overseas marine scientists. There were also 78 platform presentations and 138 poster presentations during the academic conference, covering 11 different research themes. Furthermore, two training workshops, including a 1-day training workshop on the adverse outcome pathways (AOPs), and an academic writing workshop, were held on 10 June and 12 June, respectively for conference participants, especially research postgraduate students. During the conference, we also specially organised a session for discussion and identification of priority areas for research collaborations among scientists and regulators within the Greater Bay Area of China. The Virtual Special Issue of the journal *Marine Pollution Bulletin* is currently under preparation, and will be published by Summer 2020. Based on the feedback from attendees of the conference, about 87% of the 55 respondents rated the conference as Excellent (69%) and Very Good (18%), and a majority of the respondents (83%) will likely or definitely return to join the next conference (i.e., ICMPE-10).

第九屆海洋污染與生態毒理學國際會議 (ICMPE-9) 是屬於一個由SKLMP成員創立而又非常成功的國際會議系列。此次會議旨在加強世界各地的海洋科學家，政府環境管理人員，環境工作者以及研究生之間的知識交流，並促進彼此之間的研究合作。會議於2019年6月10-14日在香港大學舉辦，來自五大洲十七個國家三百零三名代表應邀報名參加。為期四天的學術會議包括三場大會報告，十八場主題報告以及十二場由三十三名本地和海內外海洋科學家的特邀報告。此外，學術會議期間還有七十八個平台報告與一百三十八個海報展示，涵蓋了十一個不同的研究主題。此外，還為參會者，特別是研究生，於6月10日和6月12日舉辦了兩次培訓工作坊，包括為期一天的《不利結果途徑》(AOPs) 培訓工作班和一個學術寫作班。我們也特別組織了一次研討會，討論和確定在中國大灣區的政策下科學家和政府科研機構之間研究合作的優先領域。我們目前正在籌備 *Marine Pollution Bulletin* 雜誌的特刊，將於2020年夏季出版。據統計的五十五名參會人員的意見，約87%的人員對會議感到滿意，當中評價等級分別為優秀 (69%) 和非常好 (18%)，大多數受訪者 (83%) 表示願意或者一定會參加下一次ICMPE-10會議。



Figure 1. A group photo taken after the opening ceremony of the ICMPE-9 at Rayson Huang Theatre, HKU on 11 June, 2019



Figure 2. During the opening ceremony, Mr Chin-wan Tse delivering an officiating speech (Left) and our honourable guests jointly marked the opening of the ICMPE-9 Conference (Right; from left to right: Prof. Paul Lam, Prof. Joseph Lee, Prof. Andy Hor, Mr. Chin-wan Tse, Ms. Aimee Gonzales, Prof. Kenneth Leung, Prof. Gui-Bin Jiang, Prof. Rudolf Wu, Prof. Matthew Evans and Dr. Timothy Bonebrake).

NSFC-RGC Young Scholars Forum: Frontiers in Ecology and Environmental Science and Green Development 國家自然科學基金委員會-香港研究資助局青年學者論壇：生態環境學科前沿與綠色發展

With the generous support from NSFC and RGC, we successfully co-organised the NSFC-RGC Young Scholars Forum on Frontiers in Ecology and Environmental Science and Green Development at Guangxi University, Guangxi, China during 24-27 September 2019. Our Associate Director (Research), Professor Kenneth LEUNG led a group of 20 young environmental scientists from Hong Kong to participate in this very meaningful forum where they shared their latest scientific discoveries, developed friendships and initiated ideas for research collaboration with young scholars from Macau and Mainland China. These Hong Kong young scientists are Chinese National and consisted of Associate Professors, Assistant Professors, Research Assistant Professors and Postdoctoral Researchers coming from The Chinese University of Hong Kong, City University of Hong Kong, The Education University of Hong Kong, Hong Kong Baptist University, The Hong Kong Polytechnic University of Hong Kong, Lingnan University, The Open University of Hong Kong, The University of Hong Kong, and The Hong Kong University of Science and Technology, respectively. During this trip, they also had chances to get to know each other and build network for strengthening their research endeavours.

2019年9月24-27日，由國家自然科學基金委員會和香港研究資助局主辦，廣西大學承辦的“NSFC-RGC青年學者論壇：生態環境學科前沿與綠色發展”在廣西大學成功舉辦。我室研究副主任梁美儀教授帶領二十名來自香港的年輕環境科學家參加了此次論壇，與澳門和中國大陸的年輕學者分享了最新的科學發現，促進了彼此之間的知識交融，並探求研究合作的機會。這些香港年輕科學家是來自香港中文大學，香港城市大學，香港教育大學，香港浸會大學，香港理工大學，嶺南大學，香港公開大學，香港大學以及香港科技大學等等的副教授，助理教授，研究助理教授或者博士後研究人員組成。通過此次論壇，也加強了他們之間的了解，形成網絡以便於推動日後的研究合作。



A group picture taken at the opening ceremony of the NSFC-RGC Young Scholar Forum held at Guangxi University.

Visits and Cooperation 訪問與合作

2019年2月18日，北京數聯空間科技股份有限公司總裁倪涵先生前往香港城市大學海洋污染國家重點實驗室訪問，並就水下環境監測、水下生境繪測以及生物多樣性調查等方面與陳荔博士和吳佳俊博士進行了交流，尋找雙方合作的機會。

On 18 February 2019, Mr. Han NI, President of Beijing iSpatial Co., Ltd., visited the State Key Laboratory of Marine Pollution, City University of Hong Kong, and exchanged with Dr. Leo Lai CHAN and Dr. Jiajun WU on underwater environmental monitoring, underwater habitat mapping and biodiversity survey. The two sides were looking for opportunities for cooperation.



香港城市大學海洋污染國家重點實驗室副主任陳荔博士於2019年4月28日參觀並訪問了日本琉球大學，並與田中教授就海洋天然產物進行了學術交流和探討。

Dr. Leo Lai CHAN, Associate Director of the State Key Laboratory of Marine Pollution, City University of Hong Kong, visited University of the Ryukyus in Japan on 28 April 2019, and had academic exchanges and discussions with Prof. Tanaka on marine natural products.



2019年6月17日，我室副主任陳荔博士和香港城市大學深圳研究院深圳海洋生物多樣性可持續利用重點實驗室馮麗敏博士前往北京大學環境模擬與污染控制國家重點聯合實驗室，與胡敏教授就大氣污染控制和海洋環境保護等方面相關的研究成果展開討論，並共同探討合作的可行性與模式。

On 17 June 2019, Dr. Leo Lai CHAN, Associate Director of SKLMP, and Dr. Limin FENG from Shenzhen Key Laboratory for the Sustainable Use of Marine Biodiversity, CityUSRI, went to the State Key Joint Laboratory of Environment Simulation and Pollution control, Peking University. They have academic exchanges and discussions with Prof. Min HU about the research results related to air pollution control and marine environmental protection.



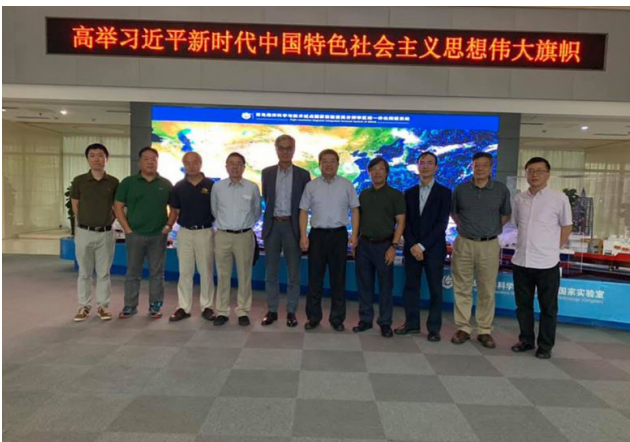
2019年7月16日，我室陳荔博士前往俄羅斯科學院遠東分院海洋技術問題研究所進行參觀，並對水下機器人應用與研發等方面展開了合作交流。同日下午，陳荔博士受邀出席了由遠東聯邦大學舉辦的“PACON (Pacific Congress on Marine Science and Technology) 26th International Conference Marine Science and Technology for Sustainable Development”。

On 16 July 2019, Dr. Leo Lai CHAN had a visit to the Russian Institute of Marine Technical Problems, and carried out cooperation and exchange on the application and development of underwater robots with Alexander SCHERBATYUK, Director of the Russian Institute of Marine Technical Problems. In the afternoon, Dr. Chan attended the “PACON (Pacific Congress on Marine Science and Technology) 26th International Conference Marine Science and Technology for Sustainable Development” organized by the Far Eastern Federal University.



2019年8月2日，我室陳荔博士前往青島海洋科學與技術試點國家實驗室進行參觀和交流。8月3日，陳荔博士代表香港城市大學海洋污染國家重點實驗室出席港澳海洋研究中心簽約儀式。

On 2 August 2019, Dr. Leo Lai CHAN, Associate Director of SKLMP, had a visit and academic exchanges in the Pilot National Laboratory for Marine Science and Technology (Qingdao). Subsequently, Dr. Chan, on behalf of the State Key Laboratory of Marine Pollution, City University of Hong Kong, attended the signing ceremony of the Centre for Ocean Research (Hong Kong and Macau).



由中山大學主辦的“古季風-海上絲路水下考古-海洋文化交叉研討會”於2019年10月20日在珠海校區成功舉辦。研討會由中山大學社會學與人類學學院朱鐵權教授主持，誠邀了國內外相關現代季風氣候、古季風氣候記錄、海洋沉積、海洋測繪、海洋考古等領域的專家，圍繞海洋絲綢之路的古氣候、海洋考古、海洋文化傳播交叉研究開展研討，旨在推動在南海海洋科學與工程廣東省實驗室（珠海）開展該領域的研究。

香港城市大學海洋污染國家重點實驗室副主任陳荔博士，廣西大學海洋學院院長余克服教授，自然資源部第一海洋研究所周興華研究員，印尼科學院海洋研究所Intan Suci Nurhati博士應邀出席了該研討會，並做相關主題報告。

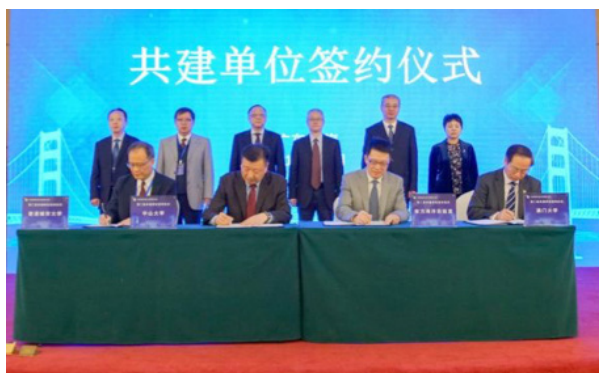
The Seminar on Palaeomonsoon - Maritime Silk Road Underwater Archaeology-Intersections in Marine Culture hosted by Sun Yat-sen University was successfully held in Zhuhai Campus on 20 October 2019. The seminar was hosted by Prof. Tiequan ZHU from School of Sociology & Anthropology Sun Yat-sen University, and invited experts from home and abroad in the fields of modern monsoon climate, Palaeomonsoon climate records, marine sedimentation, marine mapping, marine archaeology, etc. to carry out research and discussion around the interdisciplinary research of palaeomonsoon climate, marine archaeology and marine culture communication of the Maritime Silk Road, aiming to promote the research in this filed in the South China Sea Marine Science and Engineering Guangdong Provincial Laboratory (Zhuhai).

Dr. Leo Lai CHAN, Associate Director of the State Key Laboratory OF Marine Pollution, City University of Hong Kong, Prof. Kefu YU, the President of school of Marine Sciences, Guangxi University, Prof. Xinghua ZHOU from the First Institute of Oceanography, Ministry of Natural Resources, and Dr. Intan Suci NURHATI from Institute of Oceanography, Indonesian Academy of Sciences, were invited to participate the seminar and made relevant reports.



2019年12月3日，南方海洋科學與工程廣東省實驗室（珠海）（以下簡稱“南方海洋實驗室”）第二批共建單位簽約儀式在珠海隆重舉行。第二批合作共建單位包括香港、澳門、廣東等地高校，以及國家海洋環境預報中心和相關企事業單位等十四家。我室主任林群聲教授代表香港城市大學與南方海洋實驗室進行簽約。南方海洋實驗室目前已有十七個創新團隊，聚集了優秀人才六百餘人，包括院士十三人，高層次人才九十三人。

On 3 December 2019, the signing ceremony of the second batch of Collaborating Units of the Southern Marine Science and Engineering Guangdong Laboratory (Zhuhai) (“Zhuhai Lab”) was successfully held in Zhuhai. The second batch of Collaborating Units included 14 enterprises and institutions – including universities in Hong Kong, Macau and Guangdong, as well as the National Marine Environment Prediction Centers. On behalf of City University of Hong Kong, Prof. Paul K.S. Lam, Director of SKLMP, signed the cooperation contract with the Zhuhai Lab. Currently, there are 17 innovation teams in the Zhuhai Lab, which has gathered more than 600 outstanding talents, including 13 Academicians and 93 High-Level Talents.



為加強珊瑚的物種保護與科普宣傳等工作，進一步提高公眾對珊瑚的關注和保護意識，由水生野生動物保護分會舉辦的“中國珊瑚保護聯盟成立大會”於2019年12月9日在海南陵水縣順利召開。中國珊瑚保護聯盟是中國第六個水生野生動物的全國性保護聯盟，我室陳荔博士受聘為專家諮詢委員會專家。

In order to strengthen the work of coral species protection and popularization of science, and further increase public's awareness and protection of corals, the “China Coral Conservation Alliance Founding Conference” held by the National Aquatic Wildlife Conservation Association was successfully held in Lingshui, Hainan on 9 December 2019. China Coral Conservation Alliance is the sixth national conservation alliance of aquatic wildlife in China. Dr. Leo Lai CHAN, Associate Director of SKLMP, was recruited as an expert on the Expert Advisory Committee.



Scholars and Students Exchange 學者與學生交流

2019 PhD Students

- **GE Meng 葛夢**
University of Science and Technology of China 中國科學技術大學
- **WANG Shanshan 王珊珊**
University of Science and Technology of China 中國科學技術大學
- **JIN Jing 金晶**
University of Science and Technology of China 中國科學技術大學

Delegation 參訪機構

Date	Name of Institution
5 - Mar - 2019	Beihai Marine Industrial Science and Technology Park and Beihai National (Marine) Agricultural Science and Technology Park, Guangxi 廣西省北海海洋產業科技園區及北海國家（海洋）農業科技園區
1 - Apr - 2019	Zhejiang University 浙江大學

Attendance at International Conference & Titles of Presentations

出席的國際會議與報告標題

Dr. Doris Wai Ting AU

Impaired osteoblast maturation and activity in early bone development and associated vertebral compression in F1-F3 medaka induced by ancestral exposure to benzo[a]pyrene

The First Graduate Symposium on Marine Environmental Research
12 Mar 2019, Hong Kong, China
Participant

Sex-specific immunomodulatory action of the environmental estrogen 17 α -ethynylestradiol alongside with reproductive impairment in fish

The 9th International Conference on Marine Pollution and Ecotoxicology (ICMPE-9)
10 - 14 Jun 2019, Hong Kong, China
Participant

Transgenerational reproductive impairments induced by 17 α -ethynylestradiol on marine medaka (*Oryzias melastigma*)

The 9th International Conference on Marine Pollution and Ecotoxicology (ICMPE-9)
10 - 14 Jun 2019, Hong Kong, China
Participant

Deregulation of miRNA/mRNA in transgenerational bone deformity in medaka induced by ancestral exposure to BaP

The 9th International Conference on Marine Pollution and Ecotoxicology (ICMPE-9)
10 - 14 Jun 2019, Hong Kong, China
Participant

Development of immune-stimulating antimicrobial peptide feeding regime for the hybrid grouper

The 9th International Conference on Marine Pollution and Ecotoxicology (ICMPE-9)
10 - 14 Jun 2019, Hong Kong, China
Participant

Dr. Leo Lai CHAN

**Relationships between ciguatera fish poisoning incidences,
average sea surface temperature and ocean acidification**

The 4th Global Ocean Acidification Observing Network (GOA-ON)
International Workshop
15 Apr 2019, Hangzhou, China
Oral Presenter

The coral communities in Hong Kong living at the metabolic tolerance limits

The 12th Cross-Strait Marine Science Symposium
14 - 17 May 2019, Taipei, Taiwan
Oral Presenter

Scientific diving: Creating a new generation of professional divers from institutional to citizen-science

The International Symposium on Ecological Protection and Restoration for
Watershed-Coastal-Marine Environment
25 - 27 May 2019, Fujian, China
Invited Speaker

Marine biotoxins: From poison to potion

The 9th International Conference on Marine Pollution and Ecotoxicology (ICMPE-9)
10 - 14 Jun 2019, Hong Kong, China
Invited Speaker

**Advancing regional understanding on the origin and impacts of benthic and
epiphytic toxic microalgae in Asian typical coastal coral reef ecosystem**

The 8th Cross Strait Coral Reef Conference
7 - 10 Sep 2019, Hainan, China
Invited Speaker

Marine biotoxins: From poison to potion

The 14th Chinese Annual Symposium on Marine Drugs
& 2019 International Marine Drugs Symposium
11 - 14 Nov 2019, Guangzhou, China
Invited Speaker

Relationships between coral bleaching and ciguatera fish poisoning incidences under climate changes

The 10th International Workshop on Tropical Marine Environmental Changes:
"The Oceans and Climate: Variations from Small to Global Scales"
24 - 25 Nov 2019, Guangzhou, China
Invited Speaker

Dr. Jinping CHENG

Microplastic in the estuary environment and its impact to aquatic organisms

The 9th International Conference on Marine Pollution and Ecotoxicology (ICMPE-9)

10 - 14 Jun 2019, Hong Kong, China

Speaker

Response of microbial communities to heavy metal contamination in the tidal sediments

Gordon Research Conference: Marine Molecular Ecology-Novel Insights into

Marine Patterns and Processes

14 - 19 Jul 2019, Hong Kong, China

Poster Presenter

Impacts of urban development and human activities on two mangrove ecosystems along shenzhen river: a comparison study between Mai-po and Fu-tian Mangrove nature reserves

The 13th Asia Impact Assessment Conference cum
the 6th China Strategic Environmental Assessment Forum

22 - 23 Aug 2019, Hainan, China

Invited Speaker

Dr. Siu Gin CHEUNG

Does *laguncularia racemosa* have more advantages on leaf energetic cost than *Sonneratia apetala* in Southern China?

The 9th International Conference on Marine Pollution and Ecotoxicology (ICMPE-9)

10-14 Jun 2019, Hong Kong, China

Participant

Changes in soil microbial biomass and community structure of a constructed mangrove wetland for municipal wastewater treatment during 10-yesars operation periods

The 9th International Conference on Marine Pollution and Ecotoxicology (ICMPE-9)

10 - 14 Jun 2019, Hong Kong, China

Participant

The influence of temperature on seed germination and seedling growth of an exotic mangrove species *Laguncularia racemose*

The 9th International Conference on Marine Pollution and Ecotoxicology (ICMPE-9)

10 - 14 Jun 2019, Hong Kong, China

Participant

Implication of tannin changes in two mangrove plants, *Kandelia obovata* and *Bruguiera gymnorhiza* under PBDE contamination

The 9th International Conference on Marine Pollution and Ecotoxicology (ICMPE-9)
10 - 14 Jun 2019, Hong Kong, China
Participant

Are the distribution and expansion of exotic invasive Asteraceae plants in overseas Chinese town wetland related to their leaf construction cost?

The 9th International Conference on Marine Pollution and Ecotoxicology (ICMPE-9)
10 - 14 Jun 2019, Hong Kong, China
Participant

Predator prey interaction between predatory gastropod *Reishia clavigera*, barnacle *Amphibalanus amphitrite* amphitrite and mussel *Brachidontes variabilis* under ocean acidification

The 9th International Conference on Marine Pollution and Ecotoxicology (ICMPE-9)
10 - 14 Jun 2019, Hong Kong, China
Participant

Responses of two intertidal benthic copepod communities to seawater acidification

The 9th International Conference on Marine Pollution and Ecotoxicology (ICMPE-9)
10 - 14 Jun 2019, Hong Kong, China
Participant

The potential of using marine mussels as bioindicators of microplastics: A field transplantation experiment

The 9th International Conference on Marine Pollution and Ecotoxicology (ICMPE-9)
10 - 14 Jun 2019, Hong Kong, China
Participant

Heavy metal contamination of sedimentary microplastics in Hong Kong

The 9th International Conference on Marine Pollution and Ecotoxicology (ICMPE-9)
10 - 14 Jun 2019, Hong Kong
Participant

A territory-wide study of microplastics in barnacles of Hong Kong

The 9th International Conference on Marine Pollution and Ecotoxicology (ICMPE-9)
10 - 14 Jun 2019, Hong Kong
Participant

Field test of beach litter monitoring by commercial aerial drone

The 9th International Conference on Marine Pollution and Ecotoxicology (ICMPE-9)
10 - 14 Jun 2019, Hong Kong
Participant

A new cause of microplastics fragmentation in Hong Kong waters

The 9th International Conference on Marine Pollution and Ecotoxicology (ICMPE-9)
10 - 14 Jun 2019, Hong Kong
Participant

Population genetic structure of juvenile tri-spine horseshoe crabs in Hong Kong

4th International Conference on the Science and Conservation of Horseshoe Crabs
15 - 20 Jun 2019, Guangxi, China
Participant

**Oyster rubble reduces the home range and disturbs the foraging behaviour
of *Tachypleus tridentatus***

4th International Conference on the Science and Conservation of Horseshoe Crabs
15 - 20 Jun 2019, Guangxi, China
Participant

Prof. Jianping GAN

**Progress on the study of ocean circulation, wecosystem and hypoxia
around Hong Kong Waters (OCEAN_HK)**

The 4th Xiamen Symposium on Marine Environmental Sciences (XMAS)
Jan 2019, Xiamen, China
Participant

Coupled physics-biogeochemistry modeling study in multi-scale China Seas

The 4th Global Ocean Acidification Observing Network (GOA-ON)
International Workshop
Apr 2019, Hangzhou, China
Invited Speaker

Dr. Keith Wing Kei HO

Surface structure tuning induced enhancement of visible-light-driven g-C₃N₄ photocatalysts for the environmental purification

3rd International Workshop on Graphene and C₃N₄-based Photocatalysts
23 - 26 Mar 2019, Wuhan, China
Keynote Speaker

Surface structure tuning induced enhancement of visible-light-driven photocatalysts for the environmental purification

The 16th Cross-strait Workshop for Aerosol Science and Technology
15 - 18 Nov 2019, Loyang, China
Invited Speaker

Dr. Richard Yuen Chong KONG

Genetic and epigenetic responses in gonads of male and female medaka fish to environmental hypoxia

5th International Congress on Epigenetics & Chromatin
22 - 23 Aug 2019, Vienna, Austria
Keynote Speaker

Dr. Brian Chin Wing KOT

Diagnosis of fatal café coronary in stranded cetaceans: A virtopsy approach

50th International Association for Aquatic Animal Medicine
18 - 22 May 2019, Durban, South Africa
Oral Presenter

Virtopsy-driven stranding response program for the assessment of cetacean biological health and profiles in Hong Kong waters: achievements, challenges and way forward

Scientific Studies of Marine Mammals in Asia
6 - 11 Jun 2019, Tokyo, Japan
Invited Speaker

Diagnostic imaging in stranded marine mammals

3rd Asian Marine Mammal Stranding Network Symposium & Workshop
1 - 8 Sep 2019, Taipei, Taiwan
Invited Speaker

Cetacean virtopsy: 3D surface and radiological scanning and reconstruction for postmortem investigation

World Marine Mammal Science Conference 2019
9 - 12 Dec 2019, Barcelona, Spain
Oral Presenter

Dr. James Chung Wah LAM

Emerging contaminants in marine wildlife

The 9th International Conference on Marine Pollution and Ecotoxicology (ICMPE-9)
10 - 14 Jun 2019, Hong Kong, China
Invited Speaker

Prof. Paul Kwan Sing LAM

Environmental fate and risks of emerging chemicals of concern in coastal region of South China

Aoshan Symposium: Joint Symposium on Marine Pollution and Sustainable Development
3 - 7 Jul 2019, Qingdao, China
Keynote Speaker

Assessing and managing risks of emerging chemicals of concern

The 10th National Conference on Environmental Chemistry
16 - 18 Aug 2019, Tianjin, China
Keynote Speaker

Status and trends of some important groups of emerging chemicals of concern with particular reference to coastal region of South China

The 10th National Conference on Environmental Chemistry
16 - 18 Aug 2019, Tianjin, China
Keynote Speaker

Assessment of the environmental fate and effects of emerging chemicals of concern in the coastal regions of South China

16th International Symposium on Persistent Toxic Substances
25 - 29 Oct 2019, Hoboken, United States of America
Keynote Speaker

Prof. Kenneth Mei Yee LEUNG

Putting 'eco' into ecotoxicology: A revisit

2019 International Symposium on Chemical Risk Prediction and Management,
as part of the 6th National Ecotoxicology Conference
26 - 29 Apr 2019, Guangzhou, China
Invited Speaker

Putting 'eco' into ecotoxicology: A revisit

The 9th International Conference on Marine Pollution and Ecotoxicology (ICMPE-9)
10 - 14 Jun 2019, Hong Kong
Keynote Speaker

Trawling ban drives the recovery of benthic ecosystem and associated fisheries resources in the marine environment of tropical Hong Kong

Aoshan Symposium: Joint Symposium on Marine Pollution and
Sustainable Development
3 - 7 Jul 2019, Qingdao, China
Invited Speaker

Enhancing sustainable coastal development through ecological engineering

5th Korea-China Symposium on Environmental Health and Ecological Safety cum
Yellow Sea Ecosystem (YES) Symposium 2019
17 - 20 Jul 2019, Shantou, China
Keynote Speaker

Ecological engineering on shorelines

5th International Conference on Environmental Pollution and Health
4 - 6 Aug 2019, Harbin, China
Invited Speaker

**Ecologically engineered shorelines for enhancing marine biodiversity
and ecological conservation**

NSFC-RGC Young Scholars Forum: Frontiers in Ecology and Environmental Science and Green Development
24-27 Sep 2019, Guangxi, China
Hong Kong Leader and Plenary Speaker

**Environmental rate and ecological risks of retinoic acids and their metabolites
in highly urbanised coastal city**

11th IWA Micropol & Ecohazard Conference 2019, organized by IWA and Seoul National University
20 - 24 Oct 2019, Seoul, Korea
Keynote Speaker

**Design options, implementation issues and evaluating success
of ecologically-engineered shorelines**

8th IWA-ASPIRE Conference on Smart Solutions for Water Resilience
(IWA: International Water Association)
31 Oct - 2 Nov 2019, Hong Kong, China
Participant

Enhancing sustainable coastal development through ecological engineering

Joint CEDD – HKIE International Conference on Intelligent and
Sustainable Development from Reclamation and Beyond
2 Dec 2019, Hong Kong, China
Invited Speaker

Prof. Xiangdong LI

**Differentiating between “old” and clinically emerging ARGs in the atmosphere
at pristine, regional background, and human impacted sites**

2019 International Symposium on Chemicals Risk Prediction and
Management (ISCRPM-2019) cum the 6th National Ecotoxicology Conference
26 - 29 Apr 2019, Guangzhou, China
Keynote Speaker

**Risk-oriented source apportionment of PM_{2.5}-associated trace metals:
A comparative study of the Yangtze River Delta and
Pearl River Delta regions in China**

The 15th International Conference on the Biogeochemistry
of Trace Elements (ICOBTE)
5 - 9 May 2019, Nanjing, China
Invited Speaker

**Bacteria and associated antibiotic resistance genes in air PM_{2.5} and
the exchange of ARGs at the human-atmosphere interface**

The 5th International Symposium on the Environmental Dimension
of Antibiotic Resistance (EDAR5)
9 - 14 Jun 2019, Hong Kong, China
Invited Speaker

**Antibiotic Resistant Genes (ARGs) in the atmosphere at pristine,
regional background, and human impacted sites**

The 3rd International Conference on Bioresources, Energy, Environment
and Materials Technology (BEEM2019)
12 - 15 Jun 2019, Hong Kong
Plenary Speaker

**Differentiating between old and clinically emerging ARGs in the atmosphere
at pristine, regional background, and human impacted sites**

The 10th National Conference on Environmental Chemistry (NCEC2019)
15 - 19 Aug 2019, Tianjin, China
Keynote Speaker

**Source-influenced airborne antibiotic Resistance in PM_{2.5}
of typical urban environments**

The 10th National Conference on Environmental Chemistry (NCEC2019)
15 - 19 Aug 2019, Tianjin, China
Keynote Speaker

Differential toxicities and contributing components in urban PM_{2.5}

The 10th National Conference on Environmental Chemistry (NCEC2019)
15 - 19 Aug 2019, Tianjin, China
Keynote Speaker

**Environmental chemistry and toxicology
for the anthropocene sustainability challenges**

The 10th National Conference on Environmental Chemistry (NCEC2019)
15 - 19 Aug 2019, Tianjin, China
Keynote Speaker

**Environmental chemistry and toxicology
for the anthropocene sustainability challenges**

The 16th International Symposium on Persistent Toxic Substances (ISPTS)
25 - 29 Oct 2019, United States of America
Keynote Speaker

Prof. Xiaoyan LI

Advanced Wastewater Treatment and Water Reuse

CIB World Building Congress 2019 (CIB WBC 2019)
17 - 21 Jun 2019, Hong Kong, China
Invited Speaker

***In-situ* investigation of concentration polarization and initial membrane fouling
during crossflow ultrafiltration using
micro laser-induced fluorescence (micro-LIF)**

The 9th IWA Membrane Technology Conference & Exhibition for Water and
Wastewater Treatment and Reuse (IWA-MTC 2019)
23 - 27 Jun 2019, Toulouse, France
Participant

**Direct filtration of municipal wastewater using flat-sheet ceramic membrane
for pollutant removal and resource recovery**

The 8th IWA-ASPIRE Conference and Exhibition (ASPIRE 2019)
31 Oct - 2 Nov 2019, Hong Kong, China
Keynote Speaker

**A membrane bioreactor with iron dosing and acidogenic co-fermentation
for enhanced phosphorus removal and recovery in wastewater treatment**

2019 IWA Innovation Conference on Sustainable Wastewater Treatment and
Resource Recovery (IWA-WSWTRR 2019)
25 - 28 Nov 2019, Shanghai, China
Keynote Speaker

Dr. Vengatesen THIYAGARAJAN

Acclimation and epigenetic adaptation of Chinese edible oysters to ocean acidification: implications on aquaculture

World Society of Oysters
Nov 2019, Qingdao, China
Invited Speaker

Multiple stresses on oysters in China: a novel threat to global shellfish industries

UNCW Global Marine Summit
Nov 2019, North Carolina, USA
Invited Speaker

Prof. Tong ZHANG

Metagenomics insights into microbial bio-transformation of environmental pollutants

TransCon2019: Understanding and managing microbial biotransformation of environmental contaminants
28 Apr - 3 May 2019, Congressi Stefano Franscini, Switzerland
Invited Speaker

Mobile antibiotic resistome in wastewater treatment plants revealed by nanopore metagenomic sequencing

London Calling 2019 (Oxford Nanopore Technology Ltd. Annual User Congress)
22 - 24 May 2019, London, United Kingdom
Invited Speaker

5th International Symposium on Environmental Dimension of Antibiotics Resistance
9 - 14 June, 2019, Hong Kong, China
Chairman of the symposium

Wastewater resistome revealed by metagenomics approaches

AEM GRC : Shaping the Earth's Microverse
14 - 19 Jul 2019, South Hadley, United States of America
Invited Speaker

**Mobile antibiotic resistome in wastewater treatment plants revealed
by nanopore metagenomic sequencing**

11th International Symposium on Environmental Geochemistry
7 - 8 Aug 2019, Beijing, China
Keynote Speaker

**Application of nanopore 3rd generation sequencing for detection of ARGs
and pathogens in water environment**

2nd International Conference on All Material Fluxes in River Eco-Systems
12 - 13 Oct 2019, Beijing, China
Keynote Speaker

Antibiotics resistance genes as biological pollutants from WWTPs

IWA Microbial Ecology and Water Engineering (MEWE) 2019
17 - 20 Nov 2019, Hiroshima, Japan
Keynote Speaker

Communal Platform

共享平台

Member	Communal Platform	Access Level	Description of the Platform
Prof. Paul Kwan Sing LAM	Qingdao-Hong Kong Joint Research Center for Marine Environment and Ecology	Researchers	The Centre is jointly set up by City University of Hong Kong (through the State Key Laboratory of Marine Pollution) and Ocean University of China (through the Key Laboratory of Marine Chemistry Theory and Technology, Ministry of Education and the Key Laboratory of Marine Environment and Ecology, Ministry of Education). The Centre provides a platform for academic exchange between two universities and facilitates research collaboration in marine environmental research and related disciplines, especially among postgraduate students and young scholars from both sides. It also encourages academic exchange and research collaboration between Ocean University of China and other universities in Hong Kong in marine science and related fields.
Prof. Xiangdong LI	PacBio Sequel 3rd Generation DNA sequencer	Researchers	The PacBio Sequel signatures long read lengths. Such capability assists genome annotation and de novo assembly, especially with repetitive elements, including structural variations, as well as finishing draft genomes by filling in gaps and minimizing alignment errors, which is a challenge with second generation sequencers. Long read lengths also enable sequencing of full length transcripts and increased resolution of heterozygosity in diploid genomes via haplotype phasing. Sequencing can be performed on low DNA content samples and with the option of multiplexing to save both time and reagent cost.
	Thermo Scientific Neptune Plus Multicollector ICP-MS for metal isotope analyses in environmental and geological samples	Researchers	The Thermo Scientific Neptune Plus high resolution multicollector ICP-MS is used to characterize the isotope composition of different elements in a variety of different materials including sediments, fluids, rocks and biological phases. It enables a wide variety of disciplinary and interdisciplinary research projects, covering topics from chemical and environmental sciences, earth sciences, nuclear sciences and other fields requiring high-precision isotope ratio measurements. Its jet interface, double-focusing mass analyzer, retarding potential quadrupole lenses and fully flexible detection system offers ultimate high mass resolution, ground-breaking sensitivity, unsurpassed linearity and robust stability.

Public Education and Community Service 公眾教育與社會服務

隨著我國海洋科技的大力發展，海洋科普教育越來越受到重視。為了提升學生對海洋科學的認知，深入瞭解相關專業知識和應用情況，培養學生的全球意識，拓展學生的世界視野，我室副主任陳荔博士應香港公開大學李嘉誠專業進修學院，南方科技大學海洋科學與工程系及廣西都安瑤族自治縣高級中學邀請，分別於2019年2月28日，4月10日及5月23日進行訪問並作了主題講座。講座主要圍繞珊瑚礁生態系統，海洋環境保護，科學潛水基本知識和儀器設備等方面作報告。

With the rapid development of marine science and technology in China, marine science education has received more and more attention. In order to enhance students' understanding of marine science, in-depth understanding of relevant knowledge and application, as well as cultivate students' global awareness, and expand students' world vision, Dr. Leo Lai CHAN, the Associate Director of the State Key Laboratory of Marine Pollution, City University of Hong Kong, was invited by the Li Ka Shing School of Professional and Continuing Education of The Open University of Hong Kong, the Department of Ocean Science and Engineering of Southern University of Science and Technology and Guangxi Duan Senior Middle School to provide Invited Lectures on 28 February, 10 April and 23 May in 2019 respectively. The lecture focused on marine environment such as coral reef ecosystem, marine environmental protection and conservation, scientific diving knowledge and equipment.

由漁農自然護理署和香港潛水總會合辦的“香港潛攝大賽2019啟動禮暨授旗儀式及水底攝影工作坊”在2019年5月11日舉辦。我室副主任陳荔博士受邀參加。活動中有多位嘉賓講者分享潛水安全守則、海洋生態知識與潛攝技巧和心得。

Dr. Leo Lai CHAN was invited to participate “The Hong Kong Underwater Photo and Video Competition 2019 Kick-off Ceremony cum Flag Presentation and Underwater Photography Workshop” held on 11 May 2019. It was jointly organized by Agriculture, Fisheries and Conservation Department and Hong Kong Underwater Association. In the workshop, many guest speakers shared useful tips about diving safety rules, marine ecological knowledge and underwater photography.

2019年10月26日，由香港漁農自然護理署主辦的“與科學家對話系列：香港珊瑚群落最近概況—挑戰與機遇”講座在香港浸會大學成功舉辦。講座由香港浸會大學邱建文教授主講，我室副主任陳荔博士應邀出席。講座主要分享了香港水域內珊瑚健康狀況的調查結果，包括本港珊瑚白化及珊瑚生物侵蝕的情況。講座後設置了討論環節，公眾就珊瑚保育議題與在場專家進行了討論和交流，從而提高了公眾對珊瑚保護的意識。陳荔博士表示這是一次非常有意義的講座，可以使公眾瞭解科學家的工作，並與科學家近距離交流。

On 26 October 2019, the lecture on “Dialogue with scientists: A recent overview of coral communities in Hong Kong - challenges and opportunities” hosted by Agriculture, Fisheries and Conservation Department was successfully held at Hong Kong Baptist University. Prof. Jianwen QIU from Hong Kong Baptist University took charge of the lecture. Dr. Leo Lai CHAN, Associate Director of SKLMP, was invited to attend. The lecture mainly shared the results of the survey of coral health in Hong Kong, including the situation of coral bleaching and coral biological erosion. The public had discussions and exchanges on coral conservation issues with experts after the lecture. It has increased public awareness of coral conservation. Dr. Chan said that this is a very meaningful lecture that would enable the public to understand the work of scientists and communicate with them closely.



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