



# 年度報告

# Annual Report 2015



海洋污染國家重點實驗室  
State Key Laboratory in  
Marine Pollution

# The State Key Laboratory in Marine Pollution

## 海洋污染國家重點實驗室

envisions a solid base where coordinated and long-term research can be conducted to tackle marine pollution problems.

希望通過堅實的長期協作研究平台以解決海洋污染問題

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這些問題的解決，以保護香港和華南地區的海洋環境安全。



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## A Message from the Director 主任致辭

The State Key Laboratory in Marine Pollution (SKLMP) celebrated its fifth anniversary last year. Over these past five years we have worked hard to establish a strong reputation as an international hub for research. For example, the SKLMP research and technical teams have made significant headway in tackling marine pollution problems, in particular those related to chemicals of emerging concern and marine algal toxins in marine ecosystems.

Through our strategic internal funding schemes, the SKLMP has allocated over HK\$11 million as seed money for 10 major research projects. These funds have enabled SKLMP members to build up resources, experience and leadership in their respective fields. More importantly, the increasing cross-disciplinary and institutional collaboration among core members has widened the research spectrum and enhanced the SKLMP's ability to scrutinize environmental changes. The synergy between our members and collaborators lies at the heart of the SKLMP, and it is the core value for which we strive.

Last year was particularly rewarding for the SKLMP. Our members attracted over HK\$34 million in external research funding. These projects covered a dynamic range of focus areas. Their ultimate goals entailed addressing hot topics such as threats to marine ecosystems in terms of sustainable aquaculture, applications technology, seafood safety, marine ecosystem monitoring, and the toxic mechanisms of microalgae in response to climate change.

Moreover, three SKLMP projects earned a total of around HK\$16 million from the Research Grants Council's Collaborative Research Fund (CRF) Scheme. They are the "Fe-enhanced primary sedimentation and sludge acidogenesis for resource (P and PHA) recovery during wastewater treatment"; "Four-dimensional live imaging of zebrafish embryonic development using light sheet microscopy and biocomputational tools"; and "Benthic and epiphytic toxic algae (BETA): an emerging threat to coral ecosystems in Hong Kong waters".

In addition, two applications to the Sustainable Fisheries Development Fund were approved: "Depuration of Hong Kong oysters" and "Circulating seawater nursery systems for fish fry: industrial applications, demonstrations and knowledge transfer". Both projects are cross-sectorial collaborations between academia and the local fisheries industry with a common goal to energise our local sustainable fisheries and sustainably utilise marine resources.

In addition to these outstanding awards, our members have been recognized in various important international and national events. Professor Cheng Shuk Han and her team won the Grand Prix at the 43<sup>rd</sup> Geneva International Exhibition of Inventions for their work "*In vivo* testing without animal experimentation". Professor Gan Jianping was awarded the National Natural Science Award (2<sup>nd</sup> class) for his work "Linkage and dynamics between the South China Sea and adjacent tropical oceans".

Meanwhile, since the early 90s, Professor Hong Huasheng from Xiamen University has endeavoured to build up important research collaboration with institutions in Hong Kong promoting marine environmental research and training many outstanding young scientists from Hong Kong and the mainland. Following her successful example, the SKLMP assisted our partner laboratory, the State Key Laboratory of Marine Environmental Science (MEL), Xiamen University, to successfully establish the Centre of Major Equipment and Technology (COMET). This Centre enables effective information management to allow open access, a real time booking system, together with usage, training and assessment by users and administrators. This allowed the laboratory to be ranked as first in the "Assessment on the Openness and Sharing of Scientific and Technological Information" among 400 science

and technology resources sharing platforms for three consecutive years. Under the joint efforts of the two laboratories, MEL was graded as “Outstanding” State Key Laboratory during the nation-wide reviews organized by the Ministry of Science and Technology) both in 2010 and 2015. It is the only “Outstanding” laboratory in ocean sciences in 2015.

This year we have established a field-based integrated research platform that offers multifunctional support to research on mariculture and marine ecosystems, and to various educational activities. In addition to facilitating investigations into marine pollution monitoring and the development of innovative marine technology for science, we anticipate that this platform, which is in support of current government policy on sustainable fisheries, will improve and promote sustainable and ecological methods of aquaculture.

New research ideas for tackling harmful algal blooms are also been developed; for example, the “Submersible & Switchable Mariculture Rearing Cage” with a patent pending. More upcoming inventions will focus on the development of integrated unmanned surface vehicles and remotely operated underwater vehicles.

Using SKLMP internal funding, a collaborative project, “Functional responses of marine ecosystem to hypoxia”, has been established. The project comprises interdisciplinary environmental science, ecotoxicology and biology experts from City University of Hong Kong, The University of Hong Kong, Chinese University of Hong Kong and Hong Kong Baptist University. Together with local diving experts we have launched in situ underwater experiments in Tolo Harbour and Port Island. In addition, our underwater research team was awarded a CRF grant to launch our work on “Benthic and epiphytic toxic algae (BETA): An emerging threat to coral ecosystems in Hong Kong waters”.

To enhance the underwater exploration capabilities, heighten public awareness in protecting the ocean, promote scientific diving and the development of marine innovative technology, the SKLMP held two important events last summer: the International Diving Education and Application Symposium and the International Conference on Underwater Science, Technology and Education.

Along with research and collaboration, we emphasized the importance of community service and public education. By promoting scientific diving and sailing, we initiated campaigns such as “Citizen Scientist” and “Ocean Oasis” to ignite people’s passion for the protection of the marine environment and their interest in marine science research.

We are looking forward to advancing collaboration between local and mainland marine scientists. With the common goal of bringing new breakthroughs to marine science education, research and technology that will make Hong Kong a pioneer in this “Blue Technology”, I believe that we will mutually benefit from our country’s development and success.

For me, the SKLMP is a big family consisting of people holding similar views and pursuing similar goals. Let us continue to work hard together to ensure better oceans for future generations!

Thanks to you all!

Professor Paul Kwan Sing Lam

Director of the State Key Laboratory in Marine Pollution

31<sup>st</sup> December 2015

海洋污染國家重點實驗室(SKLM)經過五個年頭的砥礪前行，至今行政團隊基本已經可以系統化地支援各成員的日常運作，而在發展相關設備和技術解決新興持久性污染物與藻毒素等威脅海洋環境的主要問題方面，研究與技術支撐團隊也取得顯著成就。

本人作為一所六校聯合的國家重點實驗室主任，深知我的任務不單要培養人材與做好科學研究，更重要的是認識到各成員的所長，然後創造出讓其施展才華的舞台，使成員對實驗室產生投入感與歸屬感，從而建立具有親和力的「實驗室文化與精神」。為了彙集團隊優勢申請重大研究專項，實驗室設立多項內部科研經費，作為重大研究專項及協作研究項目的種子基金，總資助金額超過一千一百萬港元，資助項目多達10項。經過多年的合作，實驗室核心成員間已經形成了一種相互信任、相互支持的團隊文化。而這種「團隊精神」，正是實驗室凝聚力和戰鬥力的來源。

在實驗室成員的不懈努力下，今年取得了超過三千四百萬研究經費，研究範圍涵蓋水產養殖、應用技術、海產品與海洋生態安全、有害微藻響應全球變化的機理與機制，其中的三個「協作研究金」：「採用鐵混凝沉澱及污泥酸化實現廢水處理中的資源（磷和生物塑膠）回收」，「底棲附生產毒藻類：香港水域生態系統的新興威脅」與「利用光片照明顯微鏡和生物計算工具的斑馬魚胚胎發育四維實時成像技術」，資助金額超過一千六百萬港幣；另外也獲得兩項「漁業持續發展基金」：「漁排上建立示範及教育單位，展示商業上可行的循環海水育苗系統」與「知識交流：經濟可行的牡蠣養殖技術」。同時成員鄭淑嫻教授研究團隊的「不含動物實驗過程的活體測試」榮膺「第43屆日內瓦國際發明展最高榮譽大獎」，甘劍平教授研究團隊參與的「南海與鄰近熱帶區域海洋聯繫及動力機制」的研究榮膺「國家自然科學二等獎」。

廈門大學洪華生教授早於九十年代初便與香港各所大學開展海洋環境科學的聯合研究，並且通過合作在兩地培養出許多傑出青年科學家，這些青年科學家現在都在不同的科研崗位上獨當一面，貢獻良多。在此基礎上，我們承先啟後，團結一心，與夥伴實驗室廈門大學近海海洋環境科學國家重點實驗室（MEL）成功建立了海洋與環境大型儀器和技術服務中心，實現了從資訊公開到即時預約、使用、培訓、考核等的全流程資訊化管理，並促使MEL連續3年在400多個科技資源網路共用平台公開評估中排名第一。在兩個實驗室共同努力下，MEL自2005年成立以來，連續兩次（2010年、2015年）在全國評估中均躋身「優秀國家重點實驗室」；MEL是在2015年全國海洋研究領域評估中唯一獲此殊榮的國家重點實驗室。

為了振興香港水產養殖業、推進海洋污染研究與海洋創新科技發展，實驗室除了為成員提供常規大型儀器服務外，今年更建立了海上科研多功能綜合公共平台，具有水質監測、水產養殖研究與教學、海洋生態系統研究與公眾教育等功能。過去一年，在此平台上衍生出不少新的研究方向，孕育出不少創新的研究理念。為了應對赤潮，發明了赤潮防護水產養殖系統(專利正在申請中)。為了監測及預警赤潮，現正研發綜合海洋環境監察無人船與遠程遙控潛航器。

在實驗室內部科研經費資助下，香港大學、香港城市大學、香港中文大學及香港浸會大學的海洋環境化學家、生態毒理學家及生物學家共同開展「海洋生態系統對環境缺氧的功能響應」研究項目，並聯合本地潛水業界精英在香港吐露港及赤洲海域開展水下原位實驗。而實驗室培育的水下科學研究隊伍，成功申請到研究資助局的「協作研究金」開展「底棲附生產毒藻對珊瑚礁生態系統的新興威脅」的研究工作。

為了加強我國海洋勘探與探索能力、提高公眾保護海洋的意識、推動科研潛水與促進相關海洋創新科技的發展，實驗室分別在七月份舉辦了國際潛水教育與應用研討會，八月份舉辦了國際水下科學、技術與教育研討會。

實驗室一直注重基礎與應用研究，同時致力於社會經濟發展及公眾教育服務，通過推動科研潛水與帆船運動，率先倡導「公民海洋家」與「海洋綠舟」計劃，點燃人們保護海洋環境的熱情，激發人們從事海洋研究的興趣。

目前香港社會充滿挑戰，開放和包容的核心價值逐漸消失，海洋污染國家重點實驗室希望以開展香港海洋環境聯合研究，團結香港涉海科學家與內地海洋科學家，從而提升香港海洋科學教育、研究與科技創新水準，共同打造香港成為藍色科技龍頭，讓參與者親身感受國家發展成就，增強國家意識，互信互惠，達致共贏。

2016年將是任重道遠的一年，是充滿期盼與希望的一年，在我的心中，實驗室就像是一個大家庭，成員雖然來自五湖四海，但共同的理想與追求，使我們合作無間。最後，我希望大家和衷共濟，繼續努力為海洋環境科學研究作出貢獻。

謝謝大家!

林群聲

海洋污染國家重點實驗室(SKLMF)主任

二零一五年十二月三十一日

# Research Scopes in SKLMP

## 實驗室研究範疇

Research  
Scope  
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



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**Prof. Wen-Xiong WANG 王文雄 教授**  
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**Prof. Xiaoyan LI 李曉岩 教授**  
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**Dr. Vengatesen THIYAGARAJAN**  
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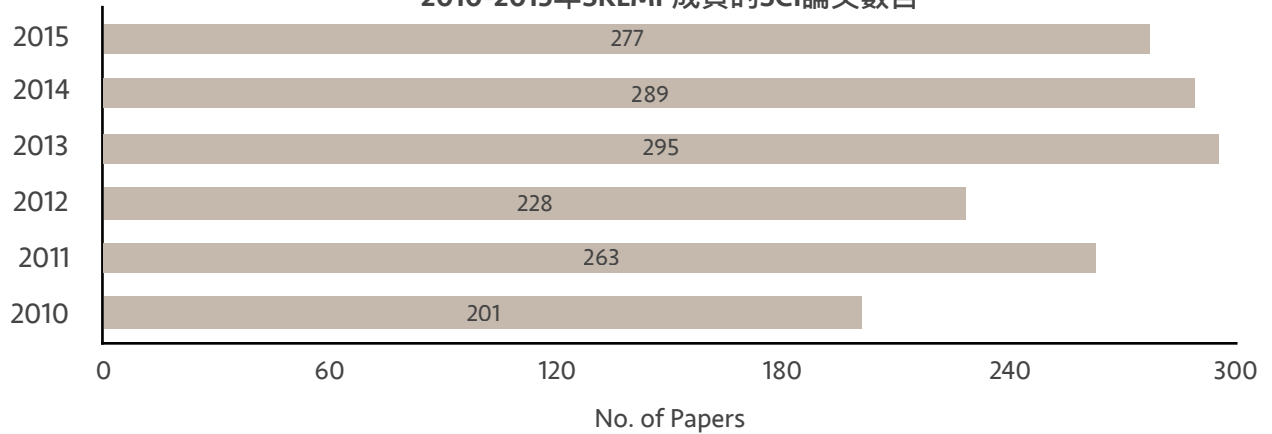
## Xiamen University 廈門大學

**Prof. Minhan DAI 戴民漢 教授**  
Cheung Kong Chair Professor of Marine Biogeochemistry 長江學者, 海洋生物地球化學特聘教授  
Director of the State Key Laboratory of Marine Environmental Science 近海海洋環境科學國家重點實驗室主任

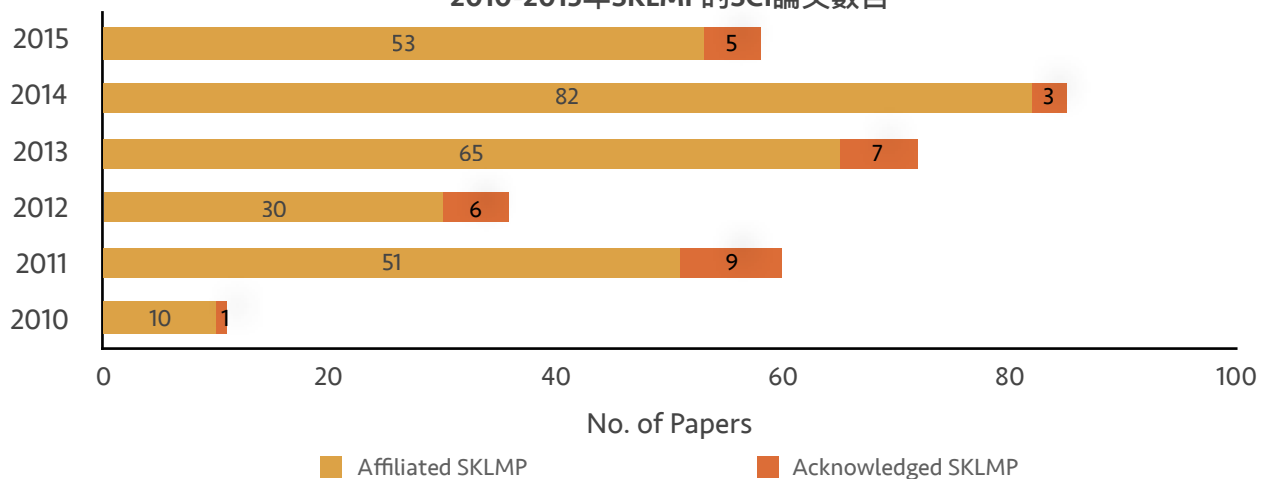
# Research Output

## 研究成果

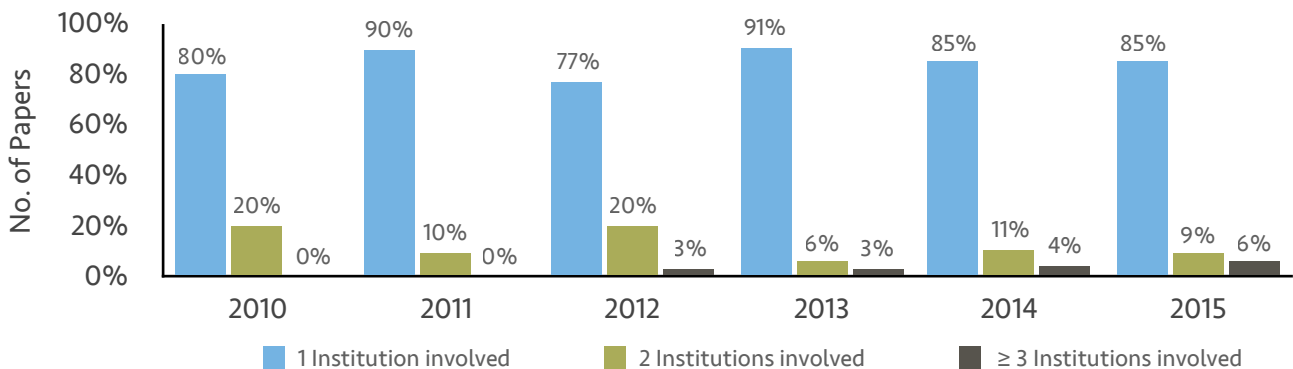
Number of SCI publications of SKLMP members (2010-2015)  
2010-2015年SKLMP成員的SCI論文數目



Number of SCI publications of SKLMP (2010-2015)  
2010-2015年SKLMP的SCI論文數目

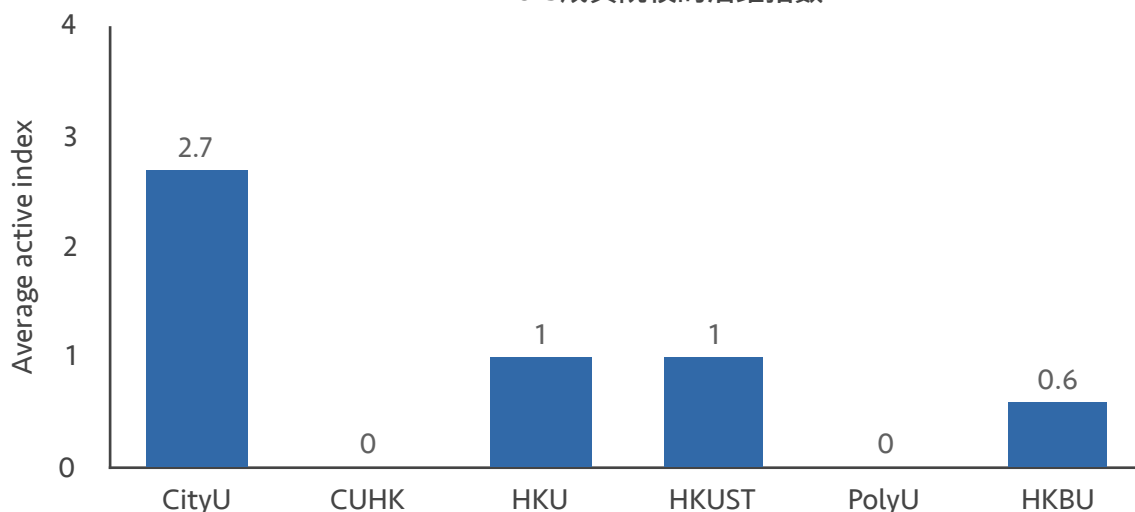


Degree of collaboration among member institutions based on SCI publications in 2010-2015  
2010-2015年成員院校合作發表SCI文章的情況

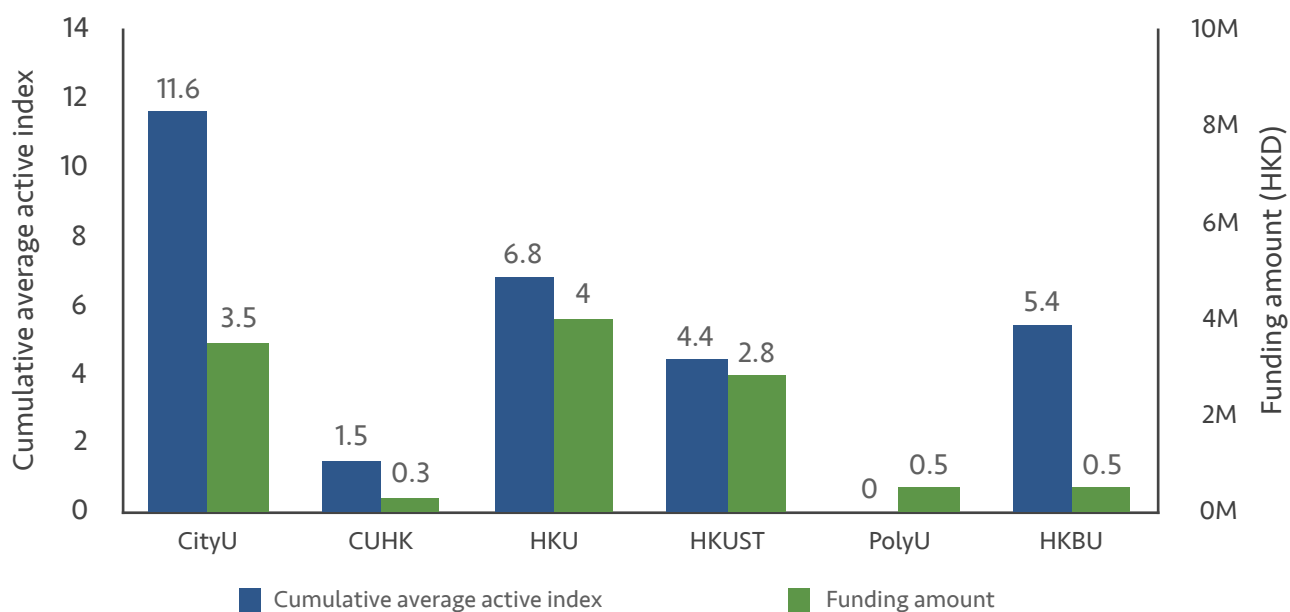


Number of members in 2010-12: CityU (13), CUHK (3), HKU (5), HKUST (6), PolyU (1), HKBU (2)  
 Number of members in 2013: CityU (18), CUHK (2), HKU (5), HKUST (5), PolyU (1), HKBU (7)  
 Number of members in 2014: CityU (18), CUHK (2), HKU (5), HKUST (5), PolyU (1), HKBU (5)  
 Number of members in 2015: CityU (18), CUHK (2), HKU (6), HKUST (5), PolyU (1), HKBU (5)

Average active index<sup>#</sup> of 6 institutions (2015)  
2015成員院校的活躍指數



Cumulative average active index & total ITC\* funding amount of 6 institutions (2010-2015)  
2010-2015成員院校的累積活躍指數及獲ITC\*資助金額



#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

\* The Innovation and Technology Commission (ITC)  
創新科技署

## Part 1. Papers with the SKLMP included as the first affiliation

### 以SKLMP為第一單位的期刊論文

- 1 Seemann, F., Peterson, D.R., Witten, P.E., Guo, B.S., Shantanagouda, A.H., Ye, R., Zhang, G., **Au, D.W.T.** (2015)  
**Insight into the transgenerational effect of BaP on bone formation in a teleost fish (*Oryzias latipes*).**  
*Comparative Biochemistry and Physiology - Part C: Toxicology & Pharmacology*, 178:60-67.
- 2 Peterson, D.R., Mok, H.L., **Au, D.W.T.** (2015)  
**Modulation of telomerase activity in fish muscle by biological and environmental factors.**  
*Comparative Biochemistry and Physiology - Part C: Toxicology & Pharmacology*, 178:51-59.
- 3 Zeng, L.X., **Lam, J.C.W.**, Wang, Y.W., Jiang, G.B., **Lam, P.K.S.** (2015)  
**Temporal trends and pattern changes of short- and medium-chain chlorinated paraffins in marine mammals from the South China Sea over the past decade.**  
*Environmental Science & Technology*, 49(19): 11348-11355.
- 4 Lin, B.K., Lyu, J.L., Lyu, X.J., Yu, H.Q., Hu, Z., **Lam, J.C.W.**, **Lam, P.K.S.** (2015)  
**Characterization of cefalexin degradation capabilities of two *Pseudomonas* strains isolated from activated sludge.**  
*Journal of Hazardous Materials*, 282: 158-164.
- 5 Kwok, K.Y., Wang, X.H., Ya, M.L., Li, Y.Y., Zhang, X.H., Yamashita, N., **Lam, J.C.W.**, **Lam, P.K.S.** (2015)  
**Occurrence and distribution of conventional and new classes of per- and polyfluoroalkyl substances (PFASs) in the South China Sea.**  
*Journal of Hazardous Materials*, 285: 389-397.
- 6 Ho, K.L., Yau, M.S., **Murphy, M.B.**, Wan, Y., Fong, B.M.W., Tam, S., Giesy, J.P., Leung, K.S.Y., **Lam, M.H.W.** (2015)  
**Urinary bromophenol glucuronide and sulfate conjugates: Potential human exposure molecular markers for polybrominated diphenyl ethers.**  
*Chemosphere*, 133: 6-12
- 7 Wang, J., **Wang, W.X.** (2015)  
**Optimal dietary requirements of zinc in marine medaka *Oryzias melastigma*: Importance of daily net flux.**  
*Aquaculture*, 448:54-62

## Part 2. Papers with the SKLMP as one of the affiliations

## 以SKLMP為作者單位之一的期刊論文

- 1 Chen, L., Lam, J.C.W., Zhang, X.H., Pan, K., Guo, C., Lam, P.K.S., Wang, W.X., Liu, H.B., Qian, P.Y. (2015)  
**Relationship between metal and polybrominated diphenyl ether (PBDE) body burden and health risks in the barnacle *Balanus amphitrite*.**  
*Marine Pollution Bulletin*, DOI: 10.1016/j.marpolbul.2015.08.020
- 2 Tian, R.M., Lee, O.O., Wang, Y., Cai, L., Bougouffa, S., Chiu, J.M.Y., Wu, R.S.S., Qian, P.Y. (2015)  
**Effect of polybrominated diphenyl ether (PBDE) treatment on the composition and function of the bacterial community in the sponge *Haliclona cymaeformis*.**  
*Frontiers in Microbiology*, 5: 799.
- 3 Chen, L.G., Sun, J., Zhang, H.M., Au, D.W.T., Lam, P.K.S., Zhang, W.P., Bajic, B.V., Qiu, J.W., Qian, P.Y. (2015)  
**Hepatic Proteomic Responses in Marine Medaka (*Oryzias Melastigma*) Chronically Exposed to Antifouling Compound Butenolide [5-Octylfuran-2(5H)-One] or 4, 5-Dichloro-2-N-Octyl-4-Isothiazolin-3-One (DCOIT).**  
*Environmental Science and Technology*, in press.
- 4 Fan, W.H., Xu, Z.Z., Wang, W.X. (2015)  
**Contrasting metal detoxification in polychaetes, bivalves and fish from a contaminated bay.**  
*Aquatic Toxicology*, 159: 62-68.
- 5 Wang, Q.W., Lam, J.C.W., Man, Y.C., Lai, N.L.S., Kwok, K.Y., Guo, Y.Y., Lam, P.K.S., Zhou, B.S. (2015)  
**Bioconcentration, metabolism and neurotoxicity of the organophorous flame retardant 1,3-dichloro 2-propyl phosphate (TDCPP) to zebrafish.**  
*Aquatic Toxicology*, 158: 108-115
- 6 Wang, Q.W., Lam, J.C.W., Han, J., Wang, X.F., Guo, Y.Y., Lam, P.K.S., Zhou, B.S. (2015)  
**Developmental exposure to the organophosphorus flame retardant tris(1,3-dichloro-2-propyl) phosphate: Estrogenic activity, endocrine disruption and reproductive effects on zebrafish.**  
*Aquatic Toxicology*, 160: 163-171
- 7 Wang, Q.W., Lai, N.L.S., Wang, X.F., Guo, Y.Y., Lam, P.K.S., Lam, J.C.W., Zhou, B.S. (2015)  
**Bioconcentration and transfer of the organophorous flame retardant 1,3-dichloro-2-propyl phosphate causes thyroid endocrine disruption and developmental neurotoxicity in zebrafish larvae.**  
*Environmental Science & Technology*, 49(8): 5123-5132
- 8 Zhou, C.C., Liu, G.J., Fang, T., Lam, P.K.S., Lam, J.C.W. (2015)  
**Atmospheric emissions of toxic elements (As, Cd, Hg, and Pb) from brick making plants in China.**  
*RSC Advances*, 5(19): 14497-14505
- 9 Man, Y.B., Chow, K.L., Man, M., Lam, J.C.W., Lau, F.T.K., Fung, W.C., Wong, M.H. (2015)  
**Profiles and removal efficiency of polybrominated diphenyl ethers by two different types of sewage treatment work in Hong Kong.**  
*Science of the Total Environment*, 505: 261-268
- 10 Yamazaki, E., Yamashita, N., Taniyasu, S., Lam, J.C.W., Lam, P.K.S., Moon, H.B., Jeong, Y., Kannan, P., Achyuthan, H., Munuswamy, N., Kannan, K. (2015)  
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- 12 Jiang, X.W., Wang, J., Gao, Y., Chan, L.L., Lam, P.K.S., Gu, J.D. (2015)  
**Relationship of proteomic variation and toxin synthesis in the dinoflagellate *Alexandrium tamarense* CI01 under phosphorus and inorganic nitrogen limitation.**  
*Ecotoxicology*, 24(7-8): 1744-1753.

- 13 Lai, K.P., Li, J.W., Wang, S.Y., **Chiu, J.M.Y.**, Tse, A., Lau, K., Lok, S., **Au, D.W.T.**, Tse, W.K.F., **Wong, C.K.C.**, Chan, T.F., **Kong, R.Y.C.**, **Wu, R.S.S.** (2015)  
**Tissue-specific transcriptome assemblies of the marine medaka *Oryzias melastigma* and comparative analysis with the freshwater medaka *Oryzias latipes*.**  
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- 14 Yu, R.M.K., Chaturvedi, G., Tong, S.K.H., Nusrin, S., Giesy, J.P., **Wu, R.S.S.**, **Kong, R.Y.C.** (2015)  
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*Environmental Science & Technology*, 49(2): 1138-1147
- 15 Ng, C.Y.P., Kong, E.Y., Konishi, T., Kobayashi, A., Suya, N., **Cheng, S.H.**, **Yu, K.N.** (2015)  
**Low-dose neutron dose response of zebrafish embryos obtained from the neutron exposure accelerator system for biological effect experiments (NASBEE) facility.**  
*Radiation Physics and Chemistry*, 114: 12-17
- 16 Ng, C.Y.P., Kong, E.Y., Kobayashi, A., Suya, N., Uchihori, Y., **Cheng, S.H.**, Konishi, T., **Yu, K.N.** (2015)  
**Neutron induced bystander effect among zebrafish embryos.**  
*Radiation Physics and Chemistry*, 117: 153-159
- 17 Lam, R.K.K., Fung, Y.K., Han, W., Li, L., Chiu, S.K., **Cheng, S.H.**, **Yu, K.N.** (2015)  
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*Radiation Protection Dosimetry*, DOI: 10.1093/rpd/ncv217
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**Combined effects of depleted uranium and ionising radiation on zebrafish embryos.**  
*Radiation Protection Dosimetry*, DOI: 10.1093/rpd/ncv269
- 19 Ding, J., Ding, Z.W., Fu, L., Lu, Y.Z., **Cheng, S.H.**, Zeng, R.J. (2015)  
**New primers for detecting and quantifying denitrifying anaerobic methane oxidation archaea in different ecological niches.**  
*Applied Microbiology and Biotechnology*, 99(22): 9805-9812
- 20 Ng, J.C.Y., Chan, Y., Tun, H.M., Leung, F.C.C., **Shin, P.K. S.**, **Chiu, J.M.Y.** (2015)  
**Pyrosequencing of the bacteria associated with *Platygyra camosus* corals with skeletal growth anomalies reveals differences in bacterial community composition in apparently healthy and diseased tissues.**  
*Frontiers in Microbiology*, 6, DOI: 10.3389/fmicb.2015.01142
- 21 Deng, D., **Tam, N.F.Y.** (2015)  
**Isolation of microalgae tolerant to polybrominated diphenyl ethers (PBDEs) from wastewater treatment plants and their removal ability.**  
*Bioresource Technology*, 177: 289-297
- 22 Li, C.H., Wong, Y.S., Wang, H.Y., **Tam, N.F.Y.** (2015)  
**Anaerobic biodegradation of PAHs in mangrove sediment with amendment of NaHCO<sub>3</sub>.**  
*Journal of Environmental Sciences-China*, 30: 148-156
- 23 Wang, Y.F., Wu, Y., Wu, Z.B., **Tam, N.F.Y.** (2015)  
**Genotypic responses of bacterial community structure to a mixture of wastewater-borne PAHs and PBDEs in constructed mangrove microcosms.**  
*Journal of Hazardous Materials*, 298: 91-101
- 24 Chen, J., Zhou, H.C., Wang, C., Zhu, C.Q., **Tam, N.F.Y.** (2015)  
**Short-term enhancement effect of nitrogen addition on microbial degradation and plant uptake of polybrominated diphenyl ethers (PBDEs) in contaminated mangrove soil.**  
*Journal of Hazardous Materials*, 300: 84-92
- 25 Wang, X., **Tam, N.F.Y.**, He, H.D., Ye, Z.H. (2015)  
**The role of root anatomy, organic acids and iron plaque on mercury accumulation in rice.**  
*Plant and Soil*, 394(1-2): 301-313
- 26 Deng, D., Chen, H.X., **Tam, N.F.Y.** (2015)  
**Temporal and spatial contamination of polybrominated diphenyl ethers (PBDEs) in wastewater treatment plants in Hong Kong.**  
*Science of the Total Environment*, 502: 133-142



- 27 Wang, X.W., Yuan, K., Yang, L.H., Lin, L., **Tam, N.F.Y.**, Chen, B.W., Luan, T.G. (2015)  
**Characterizing the parent and oxygenated polycyclic aromatic hydrocarbons in mangrove sediments of Hong Kong.**  
*Marine Pollution Bulletin*, 98(1-2):335-340
- 28 Wang, H.Z., **Yu, K.N.**, Hou, J., Liu, Q., Han, W. (2015)  
**Radiation-induced bystander effect: Early process and rapid assessment.**  
*Cancer Letters*, 356(1): 137-144
- 29 Choi, V.W.Y., **Yu, K.N.** (2015)  
**Embryos of the zebrafish *Danio rerio* in studies of non-targeted effects of ionizing radiation.**  
*Cancer Letters*, 356(1): 91-104
- 30 Lam, R.K.K., Fung, Y.K., Han, W., **Yu, K.N.** (2015)  
**Rescue effects: Irradiated cells helped by unirradiated bystander cells.**  
*International Journal of Molecular Sciences*, 16(2): 2591-2609
- 31 Sun, P.Y., Foley, H.B., Bao, V.W.W., **Leung, K.M.Y.**, Edmands, S. (2015)  
**Variation in tolerance to common marine pollutants among different populations in two species of the marine copepod *Tigriopus***  
*Environmental Science and Pollution Research*, 22(20): 16143-16152
- 32 Jin, X.W., Wang, Z.J., Wang, Y.Y., Lv, Y.B., Rao, K.F., Jin, W., Giesy, J.P., **Leung, K.M.Y.** (2015)  
**Do water quality criteria based on nonnative species provide appropriate protection for native species?**  
*Environmental Toxicology and Chemistry*, 34(8): 1793-1798
- 33 Tse, A.C.K., Li, J.W., Chan, T.F., **Wu, R.S.S.**, Lai, K.P. (2015)  
**Hypoxia induces miR-210, leading to anti-apoptosis in ovarian follicular cells of marine medaka *Oryzias melastigma***  
*Aquatic Toxicology*, 165: 189-196
- 34 Kwan, B.K.Y., Chan, A.K.Y., **Cheung, S.G.**, **Shin, P.K.S.** (2015)  
**Responses of growth and hemolymph quality in juvenile Chinese horseshoe crab *Tachypleus tridentatus* (*Xiphosura*) to sublethal tributyltin and cadmium.**  
*Ecotoxicology*, DOI: 10.1007/s10646-015-1524-7
- 35 Kwan, B.K.Y., **Cheung, S.G.**, **Shin, P.K.S.** (2015)  
**A dual stable isotope study for diet composition of juvenile Chinese horseshoe crab *Tachypleus tridentatus* (*Xiphosura*) on a seagrass-covered intertidal mudflat.**  
*Marine Biology*, 162(5): 1137-1143
- 36 Zhang, H., **Shin, P.K.S.**, **Cheung, S.G.** (2015)  
**Physiological responses and scope for growth upon medium-term exposure to the combined effects of ocean acidification and temperature in a subtidal scavenger *Nassarius conoidalis*.**  
*Marine Environmental Research*, 106: 51-60
- 37 Gao, S.X., Wan, Y., Zheng, G.M., Luo, K., Kannan, K., Giesy, J.P., **Lam, M.H.W.**, Hu, J.Y. (2015)  
**Organobromine compound profiling in human adipose: Assessment of sources of bromophenol.**  
*Environmental Pollution*, 204: 81-89
- 38 Xu, Y., Wei, S., Qin, Q.D., **Lam, M.H.W.**, Giesy, J.P. (2015)  
**AhR-mediated activities and compounds in sediments of Meiliang Bay, Taihu Lake, China determined by in vitro bioassay and instrumental analysis.**  
*RSC Advances*, 5(69): 55746-55755
- 39 Tsui, M.M.P., Leung, H.W., Kwan, B.K.Y., Ng, K.Y., Yamashita, N., Taniyasu, S., **Lam, P.K.S.**, **Murphy, M.B.** (2015)  
**Occurrence, distribution and ecological risk assessment of multiple classes of UV filters in marine sediments in Hong Kong and Japan.**  
*Journal of Hazardous Materials*, 292: 180-187
- 40 Zhou, C.C., Liu, G.J., Fang, T., **Lam, P.K.S.** (2015)  
**Investigation on thermal and trace element characteristics during co-combustion biomass with coal gangue.**  
*Bioresource Technology*, 175: 454-462
- 41 Lyu, X.J., Li, W.W., **Lam, P.K.S.**, Yu, H.Q. (2015)  
**Insights into perfluorooctane sulfonate photodegradation in a catalyst-free aqueous solution.**  
*Scientific Reports*, 5: 9353

- 42 Shen, X.F., Chu, F.F., **Lam, P.K.S.**, Zeng, R.J. (2015)  
**Biosynthesis of high yield fatty acids from *Chlorella vulgaris* NIES-227 under nitrogen starvation stress during heterotrophic cultivation.**  
*Water Research*, 81: 294-300
- 43 Shen, X.F., Liu, J.J., Chu, F.F., **Lam, P.K.S.**, Zeng, R.J. (2015)  
**Enhancement of FAME productivity of *Scenedesmus obliquus* by combining nitrogen deficiency with sufficient phosphorus supply in heterotrophic cultivation.**  
*Applied Energy*, 158:348-354
- 44 Lyu, X.J., Li, W.W., **Lam, P.K.S.**, Yu, H.Q. (2015)  
**Boiling significantly promotes photodegradation of perfluorooctane sulfonate.**  
*Chemosphere*, 138:324-327
- 45 Chu, F.F., Shen, X.F., **Lam, P.K.S.**, Zeng, R.J. (2015)  
**Polyphosphate during the Regreening of *Chlorella vulgaris* under Nitrogen Deficiency.**  
*International Journal of Molecular Sciences*, 16(10): 23355-23368
- 46 Lyu, X.J., Li, W.W., **Lam, P.K.S.**, Yu, H.Q. (2015)  
**Photodegradation of perfluorooctane sulfonate in environmental matrices.**  
*Separation and Purification Technology*, 151:172-176

### Part 3. Papers with the SKLMP grant or support acknowledged

#### 致謝SKLMP支持的期刊論文

- 1 Yin, R.S., Feng, X.B., Chen, B.W., Zhang, J.J., Wang, X.W., **Li, X.D.** (2015).  
**Identifying the sources and processes of mercury in subtropical estuarine and ocean sediments using Hg isotopic composition.**  
*Environmental Science and Technology*, 49, 1347-1355.
- 2 Liu, Z., **Gan, J.P.** (2015).  
**Upwelling induced by the frictional stress curl and vertical squeezing of the vortex tube over a submerged valley in the East China Sea**  
*Journal of Geophysical Research-Oceans*, 120 (4), 2571-2587
- 3 Dineshram,, R., Chandramouli, K., Ginger, K.W.K., Zhang, H., **Qian, P.Y.**, Ravasi, T., **Thiyagarajan, V.** (2015)  
**Quantitative analysis of oyster larval proteome provides new insights into the effects of multiple climate change stressors.**  
*Global Change Biology*, in press.
- 4 Li, C., Meng, Y., He, C., Chan, V.B.S., Yao, H., **Thiyagarajan, V.** (2015)  
**Mechanical robustness of the calcareous tubeworm *Hydroides elegans*: warming mitigates the adverse effects of ocean acidification.**  
*Biofouling*, in press.
- 5 Wen, Q., Liu, H.L., Zhu, Y.T., Zheng, X.M. Su, G.Y., Zhang, X.W., Yu, H.X., Giesy, J.P., **Lam, M.H.W.** (2015)  
**Maternal transfer, distribution, and metabolism of BDE-47 and its related hydroxylated, methoxylated analogs in zebrafish (*Danio rerio*).**  
*Chemosphere*, 120:31-36

## Attendance at International Conferences & Titles of Presentations 出席的國際會議與報告標題

### Dr. Ang, P.O.

**When dominant species are not dominant anymore: Possible impacts of environmental change on Hong Kong coral community structure.**

6th Cross Strait Meeting on Coral Reef and Marine Protected Areas  
12-14 Oct, 2015, Daya Wan, Shenzhen, China

### Dr. Au, D.W.T.

**Japanese medaka: A unique model for studying age-related bone metabolism in vivo**

4th meeting on Interdisciplinary Approaches in Fish Skeletal Biology (IAFSB)  
27-30 April 2015, Tavira, Portugal

**Hypoxia induces epigenetic changes, lifelong and transgenerational toxicity in fish**

17th International Symposium on Toxicity Assessment (ISTA17)  
2-7 Aug 2015, Bellingham, Washington, USA

**A holistic and multigenerational approach for assessing the risk of estrogenic EDCs on fish population**

17th International Symposium on Toxicity Assessment (ISTA17)  
2-7 Aug 2015, Bellingham, Washington, USA

**Early life stage and parental exposure to aquatic hypoxia induce lifelong and multi-generational impairments in fish, possibly via epigenetic changes**

Society of Experimental Biology (SEB) Annual Main Meeting  
30 June – 3rd July, 2015, Prague, Czech Republic.

**Parental exposure to estrogenic EDCs (EEDCs) perturbs reproductive success and survival fitness of medaka offspring in a multigenerational manner**

Society of Experimental Biology (SEB) Annual Main Meeting  
30 June – 3rd July, 2015, Prague, Czech Republic.

### Dr. Chan, L.L.

**Benthic and epiphytic toxic algae (BETA): An emerging threat to coral ecosystems in south China**

The Second Xiamen Symposium on Marine Environmental Sciences  
07-09 Jan 2015, Xiamen, China

### Prof. Cheng, S.H

**Healthy ageing: From molecules to organisms**

Wellcome Trust Scientific Conferences  
18-20 May 2015, Cambridge, UK

**From development biology to regenerative biology: Chaining research topics as we age**

The Campbell Family Institute Symposium  
21-22 June 2015, Toronto, Canada

**In vivo screening of traditional Chinese herbal medicine for estrogenic activities and their effects on breast cancer stem cells**

ISSCR 2015 Annual Meeting  
24-27 June 2015, Stockholm, Sweden

**Zebrafish embryos as an vivo model for alpha particle radiation biology**

9th European Zebrafish Meeting  
28 June-2 July 2015, Oslo, Norway

## **Biomonitoring with transgenic medaka**

K.C. Wong Education Foundation 30th Anniversary Commemoration  
19-21 September 2015, Ningbo, China

## **Developmental and regenerative biology in zebrafish animal model**

The Joint Symposium of Biomedical Research by City University of Hong Kong and Sichuan University  
15-18 October 2015

## **Dr. Lam, J.C.W.**

### **Assessment of several important groups of emerging persistent organic pollutants in coastal region of South China**

The 2nd Xiamen Symposium on Marine Environmental Sciences  
07-09 Jan 2015, Xiamen University

## **Prof. Leung, K.M.Y.**

### **How to prepare for a successful academic career**

The 2nd Sino-Finnish Summer School in Environmental Science,  
3-24 August 2015, Tongji University, Shanghai, China

### **Key elements of good science and essential basic statistics**

The 2nd Sino-Finnish Summer School in Environmental Science,  
3-24 August 2015, Tongji University, Shanghai, China

### **How to set environmental quality benchmarks for ecosystem protection**

The 2nd Sino-Finnish Summer School in Environmental Science,  
3-24 August 2015, Tongji University, Shanghai, China

### **Temperature-dependent chemical toxicity models**

The 2nd Sino-Finnish Summer School in Environmental Science,  
3-24 August 2015, Tongji University, Shanghai, China

### **Revealing ecological risks of endocrine disrupting chemicals in marine protected areas of Hong Kong through a novel integrative approach**

The 1st BK21Plus CHEER International Workshop - Challenges and Perspectives in Environmental Health Research  
5-6 Feb 2015, Seoul National University, Seoul, Korea

### **Retinoic acids produced by marine algae and cyanobacteria can trigger sex change in the marine gastropod *Reishia clavigera***

The XI Biofouling, Benthic Ecology and Marine Biotechnology Meeting - BIOINC  
27-31 July 2015, Arraial do Cabo, Rio de Janeiro, Brazil

### **Retinoic acids produced by microalgae and cyanobacteria can trigger sex change in marine gastropods**

The International Conference on Biodiversity, Ecology and Conservation of Marine Ecosystems (BECOME 2015)  
1-4 June 2015, the University of Hong Kong, Hong Kong

### **A tale of marine ecotoxicological research in Hong Kong: past, present and future**

The 2nd National Ecotoxicology Conference of China  
26-27 April 2015, Xiamen, China

### **When boys become girls: impacts of endocrine disrupting chemicals to humans and the environment**

The Joint School Staff Development Day of the Yuen Long District for 500 school teachers and principals  
16 March, Tin Shui Wai, Yuen Long, N.T., Hong Kong

### **Seasonality can lower biotic resistance to ascidian invasion in subtropical marine fouling communities**

The International Conference on Underwater Science, Technology and Education  
August 2015, City University of Hong Kong, Hong Kong, China

### **Temperature-dependent chemical toxicity models and their implications on derivation of water quality criteria and ecological risk assessment**

The School of Life Science, The Chinese University of Hong Kong  
15 January 2015, Hong Kong, China

**Prof. Li, X.Y.**

**Fe-enhanced primary sedimentation and side-stream sludge acidogenesis for efficient nutrient removal and resource recovery in wastewater treatment**

6th IWA-ASPIRE Conference & Exhibition IWA World Water Congress and Exhibition 2012  
20-24 September 2015, Beijing, China

**Dr. Murphy, M.B.**

**Seasonal occurrence, distribution and ecological risk assessment of multiple classes of UV filters in marine sediments**

SETAC Europe 25th Annual Meeting  
3-7 May 2015, Barcelona, Spain

**Dr. Shin, P.K.S.**

***Tachypleus tridentatus*: Present findings and future challenges.**

Third International Workshop on the Science and Conservation of Horseshoe Crabs  
15-19 June 2015, Sasebo, Japan.

**Hemolymph quality, growth performance and morphological abnormalities in juvenile *Tachypleus tridentatus* under sublethal tributyltin and cadmium exposure.**

Third International Workshop on the Science and Conservation of Horseshoe Crabs  
15-19 June 2015, Sasebo, Japan.

**Saving the living fossils in a highly urbanized city through secondary school students.**

Third International Workshop on the Science and Conservation of Horseshoe Crabs  
15-19 June 2015, Sasebo, Japan.

**Dr. Wai, T.C.**

**Grazers influence the trophic dynamics of tropical rocky reefs: carbon use and ecological thresholds in alternate community states**

International Conference on Underwater Science, Technology and Education & Workshop on the Marine Innovative Technology and Industry Development in Hong Kong  
19-22 August 2015, City University of Hong Kong

**Food web studies in marine ecosystems: using stable isotope and fatty acid analyses to trace the ultimate carbon sources and trophic pathways**

Technical Workshop on Advanced Food Web and Trophodynamic Studies, BECoME 2015  
4 June 2015, The University of Hong Kong, Hong Kong

**Do we have harmful benthic dinoflagellates in coral communities in Hong Kong?**

Technical Workshop on Advanced Food Web and Trophodynamic Studies, BECoME 2015  
1-4 June 2015, The University of Hong Kong, Hong Kong

**Prof. Wong, C.K.C.**

**The impact of exposure to perfluoroalkyl acids on the development of metabolic diseases**

PacifiChem 2015  
Honolulu, Hawaii

**Prof. Yang, M.S.**

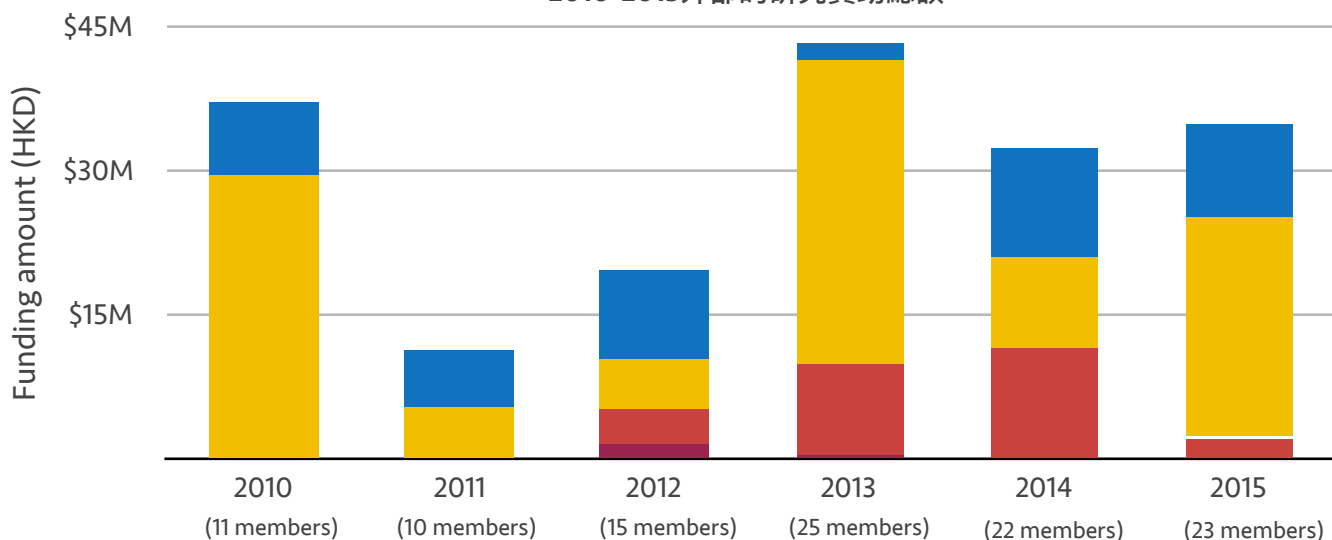
**Microfluidic analysis of cell communications and targeted destruction of cancer stem cells by nanomedicine**

International Conference on Nanomedicine and Nanobiotechnology (ChinaNanomedicine 2015)  
April 8, 2015, Hangzhou, China

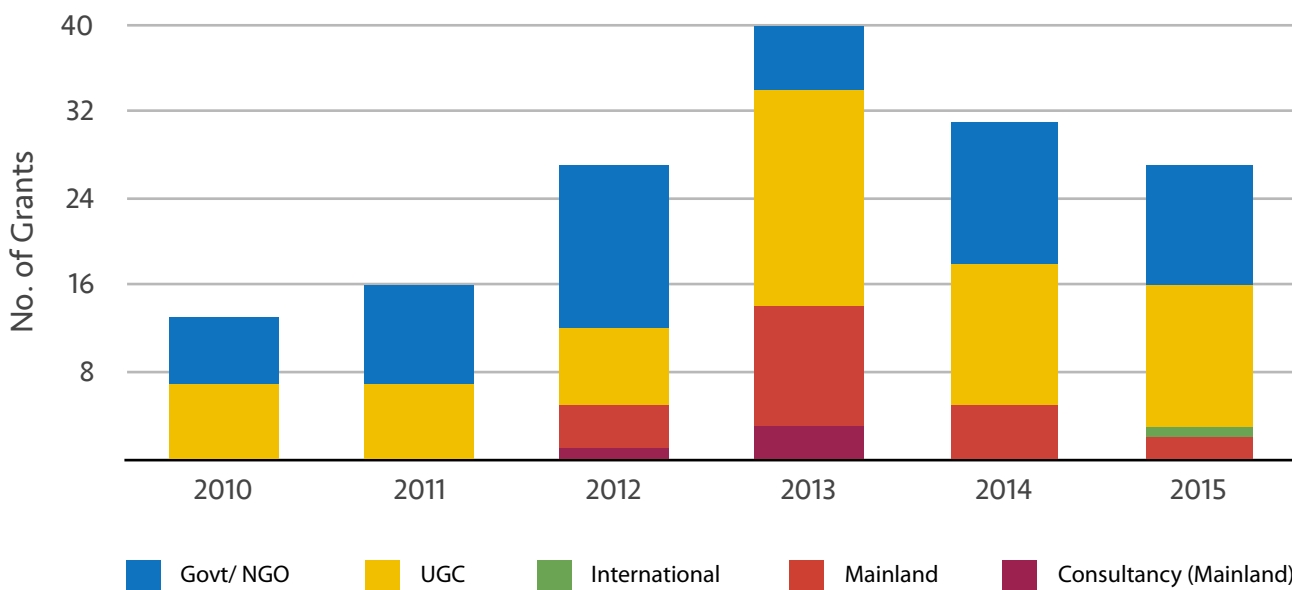
# Research Grants 研究資助\*

## Competitive External Research Grants 外部的研究資助

Amount of Competitive External Research Grants (2010-2015)#  
2010-2015外部的研究資助總額#



Number of Competitive External Research Grants (2010-2015)  
2010-2015外部的研究資助項目統計



\* Research Outputs information provided by members.

Number of members in 2010-12: CityU (13), CUHK (3), HKU (5), HKUST (6), PolyU (1), HKBU (2)

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

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

Number of members in 2015: CityU (18), CUHK (2), HKU (6), HKUST (5), PolyU (1), HKBU (5), XMU (1)

#1 CNY = 1.2 HKD (2016)

\* 項目名稱以英文譯本為準 #Person with underline is SKLMP member

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## Grants from Hong Kong 香港科研資助

## Government /Non-governmental Organisation 政府部門/公益項目

	Project Title * 項目名稱	Grant Type 資助類型	Status 狀態	Investigators #項目負責人 (PI/Co-I)	Amount 金額 (HKD)
<b>2015</b>					
1	<i>Lycium Barbarum</i> Polysaccharides Accelerate Axonal Regeneration: Possible Implications for Nerve Repair 枸杞多醣加速軸突再生：神經修復的啟示	Health and Medical Research Fund 醫療衛生研究基金	On-going	<b><u>Ma, E.C.H.</u></b>	997,908
2	International Conference on Biodiversity, Ecology and Conservation of Marine Ecosystems 2015 (BECOME 2015) 海洋生物多樣性、生態及生態系統保育國際會議	Environment and Conservation Fund 環境及自然保育基金	Completed	<b><u>Leung, K.M.Y.</u></b>	331,600
3	Valorization of the Exoskeletons of Crustaceans in Seafood Waste into Chemicals and Fuels 甲殼類海產品外骨骼廢棄物衍生的化學物和燃料的利用	Environment and Conservation Fund 環境及自然保育基金	On-going	<b><u>Horváth, I.T.</u></b>	1,373,720
4	Unraveling the Underlying Mechanisms Controlling Telomere Maintenance in Vertebrates 脊椎動物端粒修復機理的研究	CityU Strategic Research Grant	On-going	<b><u>Au, D.W.T.</u></b>	100,000
5	Assessing the Marine Biodiversity and Ecology of Tolo Harbour and Channel, with Particular Reference to Coastal Marine Environments of Ting Kok and Shuen Wan Hoi – Phase I 吐露港及赤門海峽(特別是汀角和船灣海沿岸海洋環境)的海洋生態及生物多樣性研究 — 第一階段研究	Environment and Conservation Fund 環境及自然保育基金	On-going	<b><u>Williams, G.A.</u></b> <u>Ang, P.O.</u> <u>Baker, D.</u> <u>Brander, L.</u> <u>Chu, K.H.</u> <u>Dingle, C.</u> <u>Hui, J.</u> <u>Lam, P.K.S.</u> <u>Lau, S.</u> <u>Leung, K.M.Y.</u> <u>Leung, P.T.Y.</u> <u>Liu, H.B.</u> <u>Ng, T.P.T.</u> <u>Qiu, J.W.</u> <u>Sadovy, Y.</u> <u>Tasuhara, M.</u> <u>Wai, T.C.</u> <u>Wong, C.K.</u> <u>Yau, C.Y.</u>	4,233,490
6	Research and Development (R&D) of the iGEM 2014 Project on DHA Production Using Genetically-engineered <i>Escherichia Coli</i> : Development of a Novel and Cost-effective Method for DHA Production 2014年iGEM大賽利用基因工程大腸桿菌生產DHA的研發: 開發一種新穎而經濟的DHA生產方法	CityU Idea Incubator Scheme	On-going	<b><u>Kong, R.Y.C.</u></b> <u>Lau, T.C.K.</u> <u>Chiu, D.S.K.</u>	240,000

## Government /Non-governmental Organisation 政府部門/公益項目

	<b>Project Title *</b> 項目名稱	<b>Grant Type</b> 資助類型	<b>Status</b> 狀態	<b>Investigators</b> #項目負責人 (PI/Co-I)	<b>Amount</b> 金額 (HKD)
7	Consultancy Services for Baseline Fisheries Survey for Tseung Kwan O Desalination Plant - Ichthyoplankton survey 將軍澳海水化淡廠 - 魚類浮游生物的調查研究	Water Supplies Department (via ERM-HK Ltd.) 水務署(經香港環境資源管理顧問有限公司承包)	On-going	<u>Wai, T.C.</u> Shao, K.T.	400,000
8	Agreement No. CE 14/2012 (EP) Provision of Compensatory Marine Park for Integrated Waste Management Facilities at an Artificial Island near Shek Kwu Chau - Investigation - Fisheries Survey 就綜合廢物管理設施位於毗鄰石鼓洲的人工島而提供補償性海岸公園 - 勘查-漁業資源研究	Environmental Protection Department (via ERM-HK Ltd.) 環境保護署(經香港環境資源管理顧問有限公司承包)	On-going	<u>Wai, T.C.</u> Leung, P.T.Y. Liu, M. Shao, K.T.	1,370,000
9	International Conference on Biodiversity, Ecology and Conservation of Marine Ecosystems 2015 (BECOME 2015) 海洋生物多樣性、生態及生態系統保育國際會議	The Croucher Foundation 裘槎基金會	Completed	<u>Leung, K.M.Y.</u>	100,000
10	Species Identification and Data Analysis of Epibenthic Communities of Hong Kong Marine Waters 香港海域的底棲生物群落的種屬鑑定和數據分析	Environmental Protection Department 環境保護署	Completed	<u>Leung, K.M.Y.</u> Lai, V.C.S.	201,200
11	Juvenile Horseshoe Crab Rearing Programme 幼鱉飼養計劃	Ocean Park Conservation Foundation Hong Kong 香港海洋公園保育基金	On-going	<u>Shin, P.K.S.</u>	238,000
<b>Subtotal</b>					<b>\$9,585,918</b>
<b>2014</b>					
12	Molecular Mechanism of Ciguatera Fish Poisoning Associated Neurological Effects and Identification of Potential Treatment 雪卡魚中毒對神經系統影響的分子機制及潛在治療方法探究	Health and Medical Research Fund 醫療衛生研究基金	On-going	<u>Ma, E.C.H.</u> Chan, L.L. Lam, P.K.S.	979,400
13	Therapeutic Potential of Heat Shock Protein 27 on Guillain-Barré Syndrome 熱休克蛋白27對吉巴氏綜合症的治療潛力	Health and Medical Research Fund 醫療衛生研究基金	On-going	<u>Ma, E.C.H.</u>	915,200
14	Assessment of Conventional, New Persistent Organic Pollutants (POPs) and Trace Elements in Hong Kong Cetaceans 香港鯨豚動物中傳統與新興持久性有機污染物和微量元素之評估	Environment and Conservation Fund 環境及自然保育基金	On-going	<u>Lam, J.C.W.</u> Lam, P.K.S.	986,000
15	Provision of Services to Study the Aquatic Ecosystem and Water Quality Management of Deep Bay 后海灣水域生態系統與水質管理研究	Environmental Protection Department 環境保護署	Completed	<u>Lam, P.K.S.</u> Chan, L.L. Wai, T.C. Lam, J.C.W.	648,440

\* 項目名稱以英文譯本為準 #Person with underline is SKLMP member

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## Government / Non-governmental Organisation 政府部門/公益項目

	<b>Project Title *</b> 項目名稱	<b>Grant Type</b> 資助類型	<b>Status</b> 狀態	<b>Investigators</b> #項目負責人 (PI/Co-I)	<b>Amount</b> 金額 (HKD)
16	Ecology and Biodiversity of Benthic Dinoflagellates in Hong Kong 底栖渦鞭毛藻的生態及生物多樣性	Environment and Conservation Fund 環境及自然保育基金	On-going	<u>Wai, T.C.</u> Lam, P.K.S. Chan, L.L. Ang, P.O. Lu, C.K.	500,000
17	Extended Fish Resources Study for the Proposed Marine Park in the Brothers Islands (under Agreement No. CE10/2013(EP) Detailed Study of the Marine Park in the Brothers Islands – Design and Construction) 擬建大小磨刀海岸公園漁業資源附加研究 (合約編號：CE10/2013(EP) 大小磨刀海岸公園詳細研究)	Highways Department (via Ove Arup & Partners Hong Kong Ltd.) 路政署 (經奧雅納工程顧問承包)	Completed	<u>Wai, T.C.</u> Lam, P.K.S.	440,000
18	Field Study on Constructed Wetland in Removing Pollutants from Combined Village Sewage 研究利用人工濕地處理鄉村污水	Drainage Services Department 渠務署	On-going	<u>Wong, M.H.</u> Man, Y. B. Chow, K. L. Li, W. C. Leung, A.O.W.	1,190,000
19	Ecological and Health Risk Assessments of Major Persistent Toxic Substances (PTS) in Deep Bay Area, in Relation to their Removal Efficiency in Yuen Long and Shek Wu Hui Sewage Treatment Works 元朗及石湖墟污水處理廠對主要持久性有毒物質的清除效率及在後海灣海域的生態和健康風險評估	Drainage Services Department 渠務署	On-going	<u>Wong, M.H.</u> Man, Y.B.	1,420,000
20	Exploring Microbial Diversity and Antibiotic Resistant Genes of Hong Kong Marine Sediment using Advanced Molecular Techniques 採用先進的分子生物學技術探索香港海洋沉積物的微生物多樣性和抗生素抗性基因	Environment and Conservation Fund 環境及自然保育基金	On-going	<u>Zhang, T.</u> Leung, K.M.Y. Li, X.D.	494,760
21	Sensitization of Anterior Cingulate Cortex, Upregulation of NR2B Receptors and Astroglial Glutamate-glutamine Shuttle Contribute to Pain Responses in Rats with Chronic Pancreatitis 前額葉皮層敏化，NR2B受體上調以及星形膠質谷氨酸-谷氨酰胺穿梭參與慢性胰腺炎引起的疼痛的研究	Health and Medical Research Fund 醫療衛生研究基金	On-going	<u>Li, Y.</u> Wu, J.C.Y.	1,000,000
22	The Direct Effect of Estrogen on Telomere Maintenance of Medaka 雌激素對青鱗魚維持端粒長度的影響	CityU Strategic Research Grant	Completed	<u>Au, D.W.T.</u>	100,000
23	Development of Anti-cancer Therapy with Externally Activated Nanomedicine 外部激活納米藥物用於腫瘤治療的研究	Innovation and Technology Fund 創新及科技基金	On-going	<u>Yang, M.M.S.</u>	2,400,000
24	Juvenile Horseshoe Crab Rearing Programme 幼鱈飼養計劃	Ocean Park Conservation Foundation Hong Kong 香港海洋公園保育基金	Completed	<u>Shin, P.K.S.</u>	238,000

## Government /Non-governmental Organisation 政府部門/公益項目

	<b>Project Title *</b> 項目名稱	<b>Grant Type</b> 資助類型	<b>Status</b> 狀態	<b>Investigators</b> #項目負責人 (PI/Co-I)	<b>Amount</b> 金額 (HKD)
<b>Subtotal</b>					<b>\$11,311,800</b>
<b>2013</b>					
25	Development of Osmium-based Compounds as Anti-cancer Drugs (2013-2015) 開發含銻配合物的抗癌藥物	Innovation and Technology Fund 創新及科技基金	Completed	<u>Lau, T.C.</u> Lam, Y.W.	971,000
26	Fish Resources Study for the Proposed Marine Park in the Brother Islands - Additional Ichthyoplankton Survey (Contract No. HHZMB 2/2012 (EP)) 大小磨刀島嶼 (規劃中的) 海岸公園的魚類資源研究 – 魚類浮游生物調查	Highways Department 路政署	Completed	<u>Lam, P.K.S.</u> <u>Wai, T.C.</u>	238,000
27	Assessment of Human Exposure to Per- and Polyfluorinated Compounds (PFCs) in Hong Kong via Food Consumption 香港市民通過食物攝入全氟化合物的風險評估	CityU Strategic Research Grant	Completed	<u>Lam, P.K.S.</u> <u>Lam, J.C.W.</u>	70,000
28	Establishment of an in Vitro Co-culture System for Studying Synapse Formation in Primary Neuron and Muscle Cell 建立體外共培養體系研究原代神經細胞和肌肉突觸的形成	CityU Seed Grant	Completed	<u>Ma, E.C.H.</u>	100,000
29	MicroRNA 204 Inhibits Runx2 to Suppress Osteoblastic Activity in Vivo: Evidence from a Unique Medaka Model MicroRNA-204降低Runx2的表達從而抑制成骨細胞的活性：來自模式生物日本青鱒的證據	CityU Seed Grant	Completed	<u>Au, D.W.T.</u>	100,000
30	Contract P152 - Third Runway EIA Review - Consultancy Services: Provision of QA/QC Auditing for Ecological & Fisheries Surveys 機場三跑道系統環境影響評估報告 -生態及漁業調查審核	Hong Kong International Airport Authority (via ERM-HK Ltd.) 香港機場管理局 (經香港環境資源管理顧問有限公司承包)	Completed	<u>Wai, T.C.</u>	157,000
<b>Subtotal</b>					<b>\$1,636,000</b>
<b>2012</b>					
31	Survey of Juvenile Fish Resources at the Three Marine Parks at Northeast Hong Kong 香港東北地區三個海岸公園的幼魚資源調查	Agriculture Fisheries and Conservation Department 漁農自然護理署	Completed	<u>Leung, K.M.Y.</u> Leung, P.T.Y. Yau, C. Lai, V.C.S.	798,000
32	Dosing of Ferric Iron for the Control of Odour Problems in Typhoon Shelters 投加三價鐵控制避風塘臭味問題	Environment and Conservation Fund 環境及自然保育基金	Completed	<u>Li, X.Y.</u> Shang, T. Shih, K.	1,058,500

\* 項目名稱以英文譯本為準 #Person with underline is SKLMP member

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	<b>Project Title *</b> 項目名稱	<b>Grant Type</b> 資助類型	<b>Status</b> 狀態	<b>Investigators</b> #項目負責人 (PI/Co-I)	<b>Amount</b> 金額 (HKD)
33	Field Sampling, Species Identification and Data Analysis of Benthic Infaunal Communities of Hong Kong Marine Waters 香港水域底棲水生動物群落的採樣、種類鑒定和數據分析	Environmental Protection Department 環境保護署	Completed	<b>Qiu, J.W.</b> <u>Leung, K.M.Y.</u> Li, X.Z.	800,000
34	Analysis of the Relationship between Marine Water Quality Parameters and Climatic and Other Environmental Factors 海洋水質參數與氣候及其他環境因子的關係研究	Environmental Protection Department 環境保護署	Completed	<b>Li, W.K.</b> <u>Leung, K.M.Y.</u>	515,000
35	Fish Resources Study for the Proposed Marine Park in the Brothers Islands 大小磨刀島嶼（規劃中的）海岸公園的魚類資源研究	Highways Department 路政署	Completed	<b>Lam, P.K.S.</b> Wai, T.C.	1,180,000
36	Application of Cold Plasma Techniques for Disinfection of Bacteria of Air Ventilation Systems in Hospitals and Healthcare Facilities 冷等離子體技術在醫院及其他醫療保健場所通風系統殺菌中的應用	Research Fund for the Control of Infectious Diseases 控制傳染病研究基金	Completed	<u>Kong, R.Y.C.</u>	1,000,000
37	Erosion and Growth of Massive Corals in Hong Kong 香港大型珊瑚的侵蝕與生長	Environment and Conservation Fund 環境及自然保育基金	Completed	<b>Qiu, J.W.</b>	981,000
38	Decontamination Effect of Biochemical Processes in Sewage Plants of Hong Kong 香港污水處理廠有毒化學物質的清除效率研究	Drainage Services Department 渠務署	Completed	<b>Lam, P.K.S.</b> <b>Lam, J.C.W.</b>	400,000
39	A Review of Marine Biodiversity and Ecological Surveys in Hong Kong 香港海洋生物多樣性和生態調查	Environment and Conservation Fund 環境及自然保育基金	Completed	<b>Williams, G.A.</b> <u>Leung, K.M.Y.</u>	456,380
40	Provision of Services for the Technical Review and Statistical Analysis of the Datasets of Waterbird Monitoring Programme for the Deep Bay Area and Baseline Ecological Monitoring Programme for the Mai Po Inner Deep Bay Ramsar Site 后海灣水鳥監控程序數據集和米埔內后海灣拉姆薩爾國際重要濕地生態基線監控程序數據集的技术評審和統計分析服務供給	Agriculture Fisheries and Conservation Department 漁農自然護理署	Completed	<b>Lam, P.K.S.</b>	793,500
41	Identificaiton of Mammalian Species Used in Food by Flow-Through DNA Hybridization System 採用導流DNA雜交技術識別食物中哺乳動物的種類	CityU Applied Research Grant	Completed	<b>Cheng, S.H.</b>	170,235
42	Photosynthetic and Proteomic Responses of the Marine Diatom <i>Thalassiosira Pseudonana</i> to Triphenyltin Exposure 三苯基錫對假微型海鏈藻的光合和蛋白組的影響研究	HKU Small Project Funding	Completed	<b>Leung, K.M.Y.</b> Lo, C. Leung, P.T.Y.	80,000

## Government /Non-governmental Organisation 政府部門/公益項目

	<b>Project Title *</b> 項目名稱	<b>Grant Type</b> 資助類型	<b>Status</b> 狀態	<b>Investigators</b> #項目負責人 (PI/Co-I)	<b>Amount</b> 金額 (HKD)
43	Conservation of Horseshoe Crabs in Ha Pak Nai, Hong Kong: Bridging Science and Community Participation 結合科研與社區參與的香港下白泥馬蹄蟹的保育計劃	Ocean Park Conservation Foundation Hong Kong 香港海洋公園保育基金	Completed	<u>Shin, P.K.S.</u> <u>Cheung, S.G.</u> <u>Kong, R.Y.C.</u>	420,876
44	Effects of Ocean Acidification on the Inorganic Carbon Utilization and PSII Function of Marine Picophytoplankton 海洋酸化對海洋微型浮游植物無機碳利用和光系統II的影響	University Research Project Competition	Completed	<u>Liu, H.B.</u>	200,000
45	Gender-specific Regulation of Complement Component C3 in the Japanese Medaka: Implications for Fish Immunotoxicology 日本青鱗補體成分C3的性別調節作用：魚類免疫毒理學的啟示	CityU Strategic Research Grant	Completed	<u>Au, D.W.T.</u>	70,000
<b>Subtotal</b>					<b>\$8,923,491</b>
<b>2011</b>					
46	Effect of Vaccine Combined with Traditional Chinese Medicine on Prevention of Disease in Grey Mullet 結合傳統中藥的疫苗對鱘魚疾病防治的研究	Agriculture Fisheries and Conservation Department 漁農自然護理署	Completed	<u>Wong, M.H.</u>	410,000
47	Removal Efficiencies of Toxic Chemicals in Sewage Treatment Works in Hong Kong 香港污水處理廠有毒化學物質的清除效率研究	Drainage Services Department 渠務署	Completed	<u>Wong, M.H.</u>	900,000
48	Integrated Fish Pond Farming Using Food Processing Waste: for Quality Fish Production and Habitat Conservation 利用食品加工廢棄物用於池塘漁業養殖：用於高質量魚產品的養殖以及生境保護	Environment and Conservation Fund 環境及自然保育基金	Completed	<u>Wong, M.H.</u>	1,900,900
49	International Conference on Deriving Environmental Quality Standards for the Protection of Aquatic Ecosystems (EQSPA-E-2011) 水生生態保護的環境品質標準國際會議	Environment and Conservation Fund 環境及自然保育基金	Completed	<u>Leung, K.M.Y.</u>	495,800
50	Review and Development of Marine Water Quality Objectives-feasibility Study 海水水質目標的回顧與發展- 可行性分析	Environmental Protection Department 環境保護署	Completed	<u>Kong, R.Y.C.</u>	860,000
51	Qualification of Antibiotic Residues and Microbial Antibiotic-resistant Genes in Fish Ponds and Marine Culture Zones of Hong Kong 香港魚塘和海洋養殖區的抗生素殘留以及微生物抗生素耐藥基因的定量分析	Environment and Conservation Fund 環境及自然保育基金	Completed	<u>Zhang, T.</u> <u>Leung, K.M.Y.</u> <u>Li, X.D.</u>	499,880
52	The Developmental Toxicity of UV Sunscreens 紫外光遮光劑的發育毒性研究	CityU Strategic Research Grant	Completed	<u>Cheng, S.H.</u>	180,000

\* 項目名稱以英文譯本為準 #Person with underline is SKLMP member

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## Government / Non-governmental Organisation 政府部門/公益項目

	<b>Project Title *</b> 項目名稱	<b>Grant Type</b> 資助類型	<b>Status</b> 狀態	<b>Investigators</b> #項目負責人 (PI/Co-I)	<b>Amount</b> 金額 (HKD)
53	Impact of Sea-level Rise on Protection and Management of Coastal Mangrove Wetland 海平面上升對沿海紅樹林濕地保護與管理的影響研究	Ocean Park Conservation Foundation Hong Kong 香港海洋公園保育基金	Completed	<u>Tam, N.F.Y.</u>	200,115
54	The 1st International Conference on Deriving Environmental Quality Standards for the Protection of Aquatic Ecosystems (EQSPA-2011) 第一屆推導保護水生生態環境品質標準國際研討會	Environment and Conservation Fund 環境及自然保育基金	Completed	<u>Leung, K.M.Y.</u>	495,800
<b>Subtotal</b>					<b>\$5,942,495</b>
<b>2010</b>					
55	Development of Highly Efficient Semiconductor Nanoparticles as Photocatalysts for the Degradation of Organic Pollutants in Water under Visible Light 可作光催化劑對水中有機污染物進行可見光降解的高效半導體納米粒子的開發	Innovation and Technology Fund 創新及科技基金	Completed	<u>Lau, T.C.</u>	998,430
56	Time-series and Spatial Statistical Studies on Marine Water Quality Monitoring Data in Hong Kong: Implications of the Effectiveness of Environmental Policy and Management, and Definition of Water Pollution Control Zones 對香港海洋水質監測數據的時間和空間統計研究:環境政策及管理有效性的影響, 以及水污染管制區的定義	HKU Small Project Funding	Completed	<u>Leung, K.M.Y.</u> <u>Li, W.K.</u>	72,000
57	Smart Ambience of Affective Learning (SAMAL): An Innovative Exploration of Smart Ambience for Integrating Affect and Cognition in Learning Life Science and Information Management 智慧情境的情感學習: 智慧情境對整合在學習生命科學與資訊管理中產生的情感與認知的創新探索	Teaching Development Grant, CityU	Completed	<u>Cheng, S.H.</u>	800,000
58	Understanding the Estrogen Dynamics and Longevity Gender Gap in Medaka 青鱗魚雌性激素動力學以及雌雄壽命差異的研究	CityU Strategic Research Grant	Completed	<u>Au, D.W.T.</u>	180,000
59	Provision of Service on Water Quality Monitoring at Fish Culture Zones 海魚養殖區水質監測	Agriculture Fisheries and Conservation Department 漁農自然護理署	On-going	<u>Liu, H.B.</u> <u>Lau, S.C.K.</u>	4,303,930
60	Surface Functionalization of Vertically Aligned SiNW Array for Conditioning of Stem Cell 製備功能化的垂直矽納米線陣列調控間充質幹細胞行為的研究	Innovation and Technology Fund 創新及科技基金	Completed	<u>Yang, M.M.S.</u>	1,172,670
<b>Subtotal</b>					<b>\$7,527,030</b>

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	<b>Project Title *</b> 項目名稱	<b>Grant Type</b> 資助類型	<b>Status</b> 狀態	<b>Investigators</b> # 項目負責人 (PI/Co-I)	<b>Amount</b> 金額 (HKD)
<b>2015</b>					
1	Conventional and Emerging Halogenated Flame Retardants in Marine and Estuarine Food Webs in Subtropical Hong Kong Waters: Accumulation Profiles, Trophic Transfer, and Source Identification 亞熱帶香港水域海洋與河口食物網中傳統與新興鹵化阻燃劑研究：富集特徵、營養轉移及源辨識	General Research Fund 優配研究金	On-going	<u>Lam, P.K.S.</u> Lam, J.C.W.	717,749
2	Fe-enhanced Primary Sedimentation and Sludge Acidogenesis for Resources (P and PHA) Recovery during Wastewater Treatment 採用鐵混凝沉澱及污泥酸化實現廢水處理中的資源(磷和生物塑膠)回收	Collaborative Research Fund 協作研究金	On-going	<u>Li, X.Y.</u> Leung, K.M.Y. Lee, P.H.H. Li, X.D. Shih, K.M. Zhang, T. Zhang, X.R. Hu, H.Y. Zhang, J.J.	8,893,440
3	Physico-chemical Characterization and Inhalation Toxicity of Urban Ambient Airborne Particulate Matters (PMs) in Subtropical Regions 亞熱帶地區城市環境中大氣顆粒物的物理-化學表徵及吸入毒性的研究	General Research Fund 優配研究金	On-going	<u>Li, X.D.</u> Chen, L.C. Guo, H. Zhang, G.	875,000
4	Brain Astrocytes Drive Mood and Cognitive Dysfunction in Chronic Visceral Pain 腦膠質細胞在慢性內臟痛伴隨的情緒及認知功能障礙的作用	General Research Fund 優配研究金	On-going	<u>Li, Y.</u> Chan, H.M.	929,664
5	An Innovative Membrane Bioreactor (MBR) Process with Iron Dosing for Phosphorus Removal and Recovery during Biological Wastewater Treatment 鐵強化除磷與生物磷回收的新型膜生物反應器工藝開發	General Research Fund 優配研究金	On-going	<u>Li, X.Y.</u>	500,000
6	Managing Pharmaceutical Waste from Households in Hong Kong 香港家居棄置藥物的管理	General Research Fund 優配研究金	On-going	<b>Chung, S.S.</b> Brooks, B.W. <u>Wong, C.K.C.</u>	497,992
7	Comparative Studies on Physiological Tolerances of Corals along a Latitudinal Gradient 亞熱至熱帶緯度的珊瑚品種對環境變化生理反應的對比	General Research Fund 優配研究金	On-going	<u>Ang, P.O.</u>	1,411,229
8	Nurturing Global Environmental Leadership 培育下一代具國際視野的環保領袖	Funding Scheme for Teaching and Learning Related Proposals 教與學資助計劃	On-going	<u>Chiu, J.M.Y.</u> Ang, P.O. Ng, C.N. Tam, N.F.Y. <u>Wu, R.S.S.</u>	3,982,770

\* 項目名稱以英文譯本為準 #Person with underline is SKLMP member

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9	Near-inertial Oscillations, Internal Tides and their Interactions with Mean Circulation in the South China Sea 南海的慣性振蕩，內潮及其與平均環流場的相互作用	General Research Fund 優配研究金	On-going	<b><u>Gan, J.P.</u></b>	706,972
10	Influences of Temperature and Salinity on the Physicochemical Properties and Toxicities of Nano Zinc Oxide to Marine Organisms 溫度和鹽度對納米氧化鋅理化特性及海洋生物毒性效應的影響研究	General Research Fund 優配研究金	On-going	<b><u>Leung, K.M.Y.</u></b> A.B. Djurišić	706,972
11	Quantitative Study of Cancer Stem Cells Growth, Migration and Communication with Cancer Cells in a Microfluidic-based Biomimetic Microenvironment 基於微流控生物仿生微環境構建技術的癌症幹細胞的生長、遷移和與癌細胞通訊的定量研究	General Research Fund 優配研究金	On-going	<b><u>Yang, M.M.S.</u></b> Au, S.K. Guan, X.Y.	706,972
12	Four Dimensional Live Imaging of Zebrafish Embryonic Development Using Light Sheet Microscopy and Biocomputational Tools 利用光片照明顯微鏡和生物計算工具的斑馬魚胚胎發育四維實時成像技術	Collaborative Research Fund 協作研究金	On-going	<b><u>Cheng, S.H.</u></b>	2,412,000
13	On the Generalized Conditional Autoregressive Wishart Process and its Extensions 廣義的條件Wishart 自回歸過程及其延伸	General Research Fund 優配研究金	On-going	<b><u>Li, W.K.</u></b> Yu, P.L.H.	631,972
<b>Subtotal</b>					<b>\$22,972,732</b>
<b>2014</b>					
14	Estrogenic Chemicals Impair Immune Function and Reproduction in Fish: Unraveling Gender Specific Effects and Underlying Mechanisms 外源性雌激素對魚類免疫以及生殖系統的影響：揭示其機理以及性別特異性反應	General Research Fund 優配研究金	On-going	<b><u>Au, D.W.T.</u></b>	818,400
15	Population Trends, Food Sources, Habitat Use, and Race Element Exposure of Marine Mammals in Pearl River Delta: Using Teeth as Biological Time Capsules for Tracing Environmental Changes (2014-2016) 珠江三角洲海洋哺乳動物種群趨勢、食物源、棲息地利用與微量元素暴露量：利用牙齒作為生物時間囊以追蹤與檢測環境變化	General Research Fund 優配研究金	Completed	<b><u>Lam, P.K.S.</u></b> <b><u>Lam, J.C.W.</u></b> Wai, T.C. Chang, C.W. Huang, S.L. Wang, C.H. Yao, C.J.	435,614
16	Trophic and Growth Analysis of Marine Subtidal Gastropod Assemblages in Contrasting Subtropical Environments 不同亞熱帶環境下海洋潮下帶腹足類群落營養及生長分析	General Research Fund 優配研究金	On-going	<b><u>Shin, P.K.S.</u></b> <b><u>Cheung, S.G.</u></b>	850,444

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17	Uncovering the Cellular and Molecular Mechanisms of Delayed Heart Regeneration in the Zebrafish Mutant Breakdance 揭開在斑馬魚突變體霹靂舞的延遲心臟再生的細胞和分子機制	General Research Fund 優配研究金	On-going	<u>Cheng, S.H.</u>	836,100
18	Response of Air-sea CO <sub>2</sub> Fluxes in the Northern South China Sea to Carbon Export Associated with the Pearl River Plume 南海北部海-氣二氧化碳碳通量對珠江沖淡水輸出的碳和營養鹽的響應	NSFC/RGC Joint Research Scheme 國家自然科學基金/研究資助局聯合研究計劃	On-going	<u>Gan, J.P.</u>	1,125,000
19	Phylogenetic Diversity and Contribution of Anaerobic Ammonium Oxidation (Anammox) Bacteria to Nitrogen Removal in Mangrove Wetland Ecosystem 紅樹林濕地生態系統中厭氧氨氧化細菌的系統發育多樣性和豐度	General Research Fund 優配研究金	On-going	<u>Gu, J.D.</u>	656,521
20	Nutritional Niche of <i>E. Coli</i> in Marine Sediment 大腸桿菌於海洋沉積物中的營養生態位	General Research Fund 優配研究金	On-going	<u>Lau, S.C.K.</u> Lam, H.H.N.	606,223
21	Quantification of Organic Ultraviolet Filters in Hong Kong Surface Waters and Assessment of their Toxicities to Local Coral Species 有機紫外防曬劑在香港表層水體中的定量及其對本地珊瑚物種的毒性評估	General Research Fund 優配研究金	On-going	<u>Murphy, M.B.</u> Fan, T.Y.	369,579
22	Numerical Modeling Study of Slope Currents and Cross-Slope Transports in the Northern South China Sea 南海北部陸坡流和跨陸坡輸運的數值模擬研究	General Research Fund 優配研究金	On-going	<u>Gan, J.P.</u>	692,894
23	Metal Catalyzed Oxidation of Organic Substrates by Nitrogen Oxyanions and Oxides (2014-2016) 金屬催化含氮酸根離子以及氧化物氧化有機物	General Research Fund 優配研究金	On-going	<u>Lau, T.C.</u>	974,193
24	Evaluation and Comparison of Ultraviolet Radiation Exposure in High-rise City Environments 高樓城市環境中紫外線輻射水準的評估和比較	General Research Fund 優配研究金	On-going	<u>Yu, P.K.N.</u>	491,960
25	Geographic and Temporal Variations in the Phylogenetic Diversity of the Marine Cyanobacteria <i>Synechococcus</i> in Estuarine and Coastal Waters of Hong Kong 海洋藍青細菌聚球藻系統多樣性在香港河口和近岸海域的時空變化	General Research Fund 優配研究金	On-going	<u>Liu, H.B.</u>	822,731
26	Brainstem-cortex Synaptic Plasticity in the Trigeminal Neuropathic Pain 三叉神經源性疼痛中腦幹-大腦皮質突觸可塑性的研究	General Research Fund 優配研究金	On-going	<u>Li, Y.</u> Wang, C.Y.	822,731
<b>Subtotal</b>					<b>\$9,502,390</b>

\* 項目名稱以英文譯本為準 #Person with underline is SKLMP member

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Project Title * 項目名稱	Grant Type 資助類型	Status 狀態	Investigators # 項目負責人 (PI/Co-I)	Amount 金額 (HKD)
<b>2013</b>				
27 Personal Genomics and the Lay Construction of Scientific Knowledge in Online Forums 個人基因與網上討論區上外行建構的科學知識	General Research Fund 優配研究金	Completed	<b>Jones, R.H.</b> <u>Kong, R.Y.C.</u>	483,855
28 Evaluation of Glucuronide and Sulfate Metabolic Conjugates of Bisphenol-A (BPA) and Tetrabromobisphenol-A (TBBPA) in Municipal Wastewaters as Population Exposure Markers for the Endocrine Disrupting Chemicals 以葡糖苷酸和雙酚-A與四溴雙酚-A的硫酸代謝配合物作為城市污水中內分泌干擾物人群暴露標記的評價	General Research Fund 優配研究金	On-going	<b>Lam, M.H.W.</b>	559,800
29 Pharmaceuticals in Municipal Sewage Treatment Works of China: Behaviour and Risk Assessment 城市污水處理廠污水中殘留藥物的性狀及其風險評估	NSFC/RGC Joint Research Scheme 國家自然科學基金/研究資助局聯合研究計劃	On-going	<b>Lam, P.K.S.</b> <b>Yu, H.Q.</b> <u>Lam, J.C.W.</u>	1,122,301
30 Green- and Blue-Colored Oysters in the Pearl River Estuary: Metal Biodynamics, Acclimation, and Remediation 珠江口藍色和綠色牡蠣的金屬生物動力學、適應和治理	General Research Fund 優配研究金	On-going	<b>Wang, W.X.</b>	1,299,049
31 Green Slope Engineering: Bioengineered, Live Cover Systems for Man-made Fill slopes and Landfill Capillary Barriers in Hong Kong 香港綠色斜坡工程：人造斜坡生態複蓋系統及垃圾堆填區毛細複蓋層	Collaborative Research Fund 協作研究金	On-going	<b>Ng, C.W.W.</b> Tham, L.G. <u>Wong, M.H.</u> Zhang, L.M. Zhang, Q. Pryor, M. Chu, L.M. Wang, Y.H. Hau, B.C.H. Yan, W.	8,000,000
32 Molecular Determinants of Critical Period in Peripheral Nerve Regeneration 周圍神經再生關鍵時期的分子決定因素	General Research Fund Early Career Scheme 優配研究金傑出青年學者計劃	Completed	<b>Ma, E.C.H.</b>	1,030,520
33 Ecology and Biodiversity of Benthic Marine Ecosystems Before and After the Trawling Ban in Hong Kong Coastal Waters 研究禁止拖網捕魚對香港水域海洋底棲生態系統及生物多樣性之影響	Collaborative Research Fund 協作研究金	On-going	<b>Leung, K.M.Y.</b> Cheung, W. Chu, K.H. <u>Li, X.D.</u> Sadovy, Y.J. <u>Lam, P.K.S.</u> Dudgeon, D. Williams, G.A. <u>Li, W.K.</u> <u>Qiu, J.W.</u>	7,300,000

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34	Phylogenetics of Chinese Sargassum (Brown Algae, Fucales, Phaeophyceae) 中國馬尾藻的譜系及類群進化關係	General Research Fund 優配研究金	On-going	<u>Ang, P.O.</u>	900,000
35	Adaptive Strategies of Corals to Elevated Sea Surface Temperature along a Temperature Gradient in Northern South China Sea 南中國海北部造礁珊瑚對海水溫度變化的適應策略	General Research Fund 優配研究金	On-going	<u>Ang, P.O.</u>	779,429
36	Therapeutic Potential of Heat Shock Protein 27 on Chemotherapy-induced Peripheral Neuropathy 熱休克蛋白27對化療引起的周圍神經病變的治療潛力	General Research Fund 優配研究金	On-going	<u>Ma, E.C.H.</u>	692,826
37	The Diversity and Population Dynamics of <i>Escherichia Coli</i> in Response to the Dissolved Nutrients and Microbial Communities of Marine Sediment 海洋沉積物中微生物多樣性及其大腸桿菌多樣性和群體動態對溶解營養鹽的響應	General Research Fund Early Career Scheme 優配研究金傑出青年學者計劃	On-going	<u>Lau, S.C.K.</u>	1,700,000
38	Oxidation Chemistry of Manganese Nitrido Complexes 氮化錳復合物的化學氧化研究	General Research Fund 優配研究金	Completed	<u>Lau, T.C.</u>	813,750
39	Composite MoS <sub>2</sub> /Me/TiO <sub>2</sub> Catalyst Film as a Visible Light-driven Photoelectrode for (MEC) Concurrent Hydrogen Generation and Wastewater Organic Degradation MoS <sub>2</sub> /Me/TiO <sub>2</sub> 多層複合物光電極的制備及其在可見光作用下光解水制氫並同時降解有機污染物	General Research Fund 優配研究金	On-going	<u>Li, X.Y.</u> Chan, G.K.Y.	500,000
40	Mechanistic Study on the Organotin-mediated Imposex in the Rock Shell <i>Thais clavigera</i> using RNA-sequencing Analysis 利用RNA測序分析研究有機錫誘導疣荔枝螺 ( <i>Thais clavigera</i> )性畸變機制	General Research Fund 優配研究金	Completed	<u>Leung, K.M.Y.</u> <u>Qiu, J.W.</u>	850,000
41	Sources and Biodynamics of Mercury in Marine Fish in Hong Kong Coastal Waters 香港沿海水域海洋魚體內汞的來源和生物動力學研究	General Research Fund 優配研究金	On-going	<u>Wang, W.X.</u> Feng, X.B.	1,348,250
42	Multiple Stressor Effect of Uranium and Gamma Ray on Zebrafish 鈾和伽馬射線對斑馬魚的多重脅迫效應	PROCORE-France/ Hong Kong Joint Research Scheme 法國與香港合作研究計劃	Completed	<u>Yu, P.K.N.</u> <u>Cheng, S.H.</u> Guillermin, C.A. Laplace, J.G. Pereira, S.	90,000

\* 項目名稱以英文譯本為準 #Person with underline is SKLMP member

State Key Laboratory in Marine Pollution

## University Grants Committee 大學教育資助委員會

	<b>Project Title *</b> 項目名稱	<b>Grant Type</b> 資助類型	<b>Status</b> 狀態	<b>Investigators</b> # 項目負責人 (PI/Co-I)	<b>Amount</b> 金額 (HKD)
43	The Impact of Perinatal Exposure to Perfluoroalkyl Acids, and its Linkage to Predisposition of Metabolic Disorders in Adult Offspring 全氟烷基酸在孕期暴露的影響，及其與成年子代的代謝紊亂傾向的聯繫	General Research Fund 優配研究金	Completed	<b>Wong, C.K.C.</b>	1,098,250
44	A Study of Responses of the Invasive Apple Snail <i>Pomacea Canaliculata</i> to Environmental Stressors Using Shotgun Proteomics 福壽螺回應環境脅迫的分子機制研究	General Research Fund 優配研究金	Completed	<b>Qiu, J.W.</b> Wong, C.K.C. Zhang, H.M.	750,000
45	Response of the Phytoplankton, Microzooplankton and the Prokaryotic Communities to Atmospheric Dust Deposition: An -Omics Approach 用“組學(-Omics)”方法研究浮游植物，微型浮游動物和原核細胞群落對大氣沉降的反應	General Research Fund 優配研究金	Completed	<b>Liu, H.B.</b>	950,000
46	The Prefrontal Cortex as a Key Target of the Visceral Pain Processing in Adult Rats Following Maternal Separation Stress in Infancy 對於前額葉皮層在經歷嬰兒期母嬰分離應激的成年大鼠中作為內臟痛資訊處理的關鍵位元點的研究	General Research Fund 優配研究金	On-going	<b>Li, Y.</b> Wu, J.C.Y.	1,252,838
<b>Subtotal</b>					<b>\$31,520,868</b>
<b>2012</b>					
47	Air-surface Exchange of Persistent Organic Pollutants (POPs) and Heavy Metals (MNs) in Peri-urban Agricultural Ecosystems of the Pearl River Delta, South China 典型持久性有機污染物和重金屬在珠江三角洲城郊農田生態系統的大氣沉降與擴散交換	NSFC/RGC Joint Research Scheme 國家自然科學基金/研究資助局聯合研究計劃	Completed	<b>Li, X.D.</b>	863,800
48	Polybrominated Diphenyl Ethers: Bioaccumulation, Maternal Transfer and Effects on Darwinian Fitness Traits of the Parental and F1 Generations of Marine Gastropod <i>Crepidula Onyx</i> 多溴聯苯醚在海洋腹足動物的生物累積，母源性傳遞，以及對母代和子代的適合度性狀的影響	General Research Fund 優配研究金	Completed	<b>Chiu, J.M.Y.</b> Wu, R.S.S.	871,240
49	Integration of Biomimetic Microparticle-based Multiplexed Assays and Microfluidic Systems for High Throughput Quantitative Detection and Discrimination of Endocrine Disrupting Chemicals 聯合基於多復路分析的仿生微粒技術與微流體系統用於高通量辨別與檢測內分泌干擾物的研究	General Research Fund 優配研究金	Completed	<b>Yang, M.M.S.</b>	775,000
50	Assessment of Benthic Community Health in Subtropical Waters Using Biological Indices and Life-trait Analysis 應用生物指數和生命特徵分析法評估亞熱帶海域底棲生物群落健康狀況	General Research Fund 優配研究金	Completed	<b>Shin, P.K.S.</b> Cheung, S.G.	699,264

## University Grants Committee 大學教育資助委員會

	<b>Project Title *</b> 項目名稱	<b>Grant Type</b> 資助類型	<b>Status</b> 狀態	<b>Investigators</b> # 項目負責人 (PI/Co-I)	<b>Amount</b> 金額 (HKD)
51	Interactions among Biodegradable Chelants, Soil Microbes, and Plant Roots in the Phytomanagement Process of Metal-contaminated Soils 金屬污染土壤植物修復中可生物降解螯和劑，土壤微生物，和植物根系的主要相互作用	RGC/GRF 研究資助局/ 優配研究金	On-going	<u>Li, X.D.</u>	600,000
52	Effects of hypoxia on the structure and function of microbial communities in surface marine sediments 缺氧現象對洋裡表面沉積物的微生物群落架構及其功能的影響	General Research Fund 優配研究金	Completed	<b>Chiu, J.M.Y.</b> Pointing, S.B.	1,010,000
53	Effect of Variations in Diatom Silicon Content on Zooplankton Grazing and its Ecophysiological and Biogeochemical Implications for Carbon Flux to Depth 矽藻矽含量對浮游動物攝食和生態生理的影響及其在碳輸出的生物地球化學意義	General Research Fund 優配研究金	Completed	<u>Li, H.B.</u>	682,514
<b>Subtotal</b>					<b>\$5,501,818</b>
<b>2011</b>					
54	Comparison of the Acute Sensitivity to Chemicals of Tropical and Temperate Aquatic Animal Species: Meta Analysis and Mechanistic Studies 熱帶和溫帶水生動物對化學品的急性敏感度比較：薈萃分析及機理研究	General Research Fund 優配研究金	Completed	<u>Leung, K.M.Y.</u> <u>Lam, M.H.W.</u> Lee, J.S.	710,000
55	Biokinetics, Bioavailability, and Chronic Toxicity of Metal Nanoparticles in Aquatic Organisms 金屬納米材料在水生生物的生物動力學，生物有效性和慢性毒性	General Research Fund 優配研究金	Completed	<u>Wang, W.X.</u>	1,050,000
56	Uncovering the Molecular Links between Hypoxia and Endocrine Disruption: A Functional Study of Zebrafish Leptin 低氧與內分泌物分解之間的分子聯繫：斑馬魚瘦素的功能研究	General Research Fund 優配研究金	Completed	<u>Kong, R.Y.C.</u>	1,000,000
57	The Functional Roles of Zebrafish irx1a Gene in Heart Development and Regeneration irx1a 基因在斑馬魚心臟發育和再生的職能作用	General Research Fund 優配研究金	Completed	<u>Cheng, S.H.</u>	820,500
58	Risk Assessment and Remediation of Cadmium Contamination in Registered Vegetable Farms in the Pearl River Delta Region 珠江三角洲區域蔬菜農場的鎘污染風險評估及其修復	General Research Fund 優配研究金	Completed	<u>Wong, M.H.</u>	787,755

\* 項目名稱以英文譯本為準 #Person with underline is SKLMP member

## University Grants Committee 大學教育資助委員會

Project Title * 項目名稱	Grant Type 資助類型	Status 狀態	Investigators # 項目負責人 (PI/Co-I)	Amount 金額 (HKD)
59 Measurement and Assessment of Novel Halogenated Flame Retardants in Waterbirds and Marine Cetaceans in Hong Kong 香港水域水鳥和鯨類動物中新興阻燃劑的測量和評估	General Research Fund 優配研究金	Completed	<u>Lam, P.K.S.</u>	462,000
60 Microfluidics-based Biomimetic Platform for the Study of Cell Communication and Osteogenesis in Mesenchymal Stem Cells 仿生研究幹細胞通訊和成骨過程	General Research Fund 優配研究金	Completed	<u>Yang, M.M.S.</u> Wong, M.S.	600,900
<b>Subtotal</b>				<b>\$5,431,155</b>
<b>2010</b>				
61 Marine Environmental Research and Innovative Technology, MERIT 海洋環境研究與創新型技術, MERIT	Areas of Excellence Scheme 卓越學科領域計劃	Completed	<u>Au, D.W.T.</u>	700,000
62 Automated Micro/Nano-scale Execution of Tasks with Multiple Biological Cells Using a Table-Top Robotic Bio-manipulation System 使用臺式機械人生物操縱系統對多種生物細胞自動執行微/納米級任務	Competitive Earmarked Research Grant 角逐研究用途補助金	Completed	<u>Cheng, S.H.</u>	1,484,960
63 C-H Bond Activation by Nitrido Imido and Amido Complexes of Ruthenium bearing Salen Ligands 具有Salen配基的鈦的Nitrido, Imido, Amido 絡合物對碳氫鍵的活化作用	Competitive Earmarked Research Grant 角逐研究用途補助金	Completed	<u>Lau, T.C.</u>	1,115,000
64 Centre for Marine Environmental Research and Innovative Technology 海洋環境研究及創新科技中心	Areas of Excellence Scheme 卓越學科領域計劃	Completed	<u>Wu, R.S.S.</u>	23,580,000
65 Understanding the Relationship Between Gender, Estrogen and Telomere Biology in Fish: Towards Developing an Alternative Vertebrate Model for Aging Studies 闡明魚類性別, 雌激素和端粒生物學之間的關係: 為衰老研究開發一種備擇脊椎動物模型	General Research Fund 優配研究金	Completed	<u>Au, D.W.T.</u> Holt, S. Ge, W.	730,000
66 Multifunctional Heterostructured Nanocomposites for Targeted Imaging and Destruction of Tumor Cells 多功能異質納米複合物用於靶向成像和摧毀癌細胞的研究	General Research Fund 優配研究金	Completed	<u>Yang, M.M.S.</u>	700,340
67 Ecophysiological Study of Noctiluca scintillans, a Red tide-causing Dinoflagellate in Hong Kong Coastal Waters 香港海域夜光蟲(一種常引致紅潮發生的異養甲藻)的生理生態研究	General Research Fund 優配研究金	Completed	<u>Liu, H.B.</u>	1,263,490
<b>Subtotal</b>				<b>\$29,573,790</b>

## Grants from International 國際科研資助

### Research Grant 科研項目

Project Title *	Grant Type	Status	Investigators#	Amount
項目名稱	資助類型	狀態	項目負責人 (PI/Co-I)	金額 (HKD)
<b>2015</b>				
1 Brain Pool Fellowship 優秀人才科研者獎	Korean Federation of Science and Technology Society (KOFST) 韓國國家科學和技術委 員會	On-going	<u>Au, D.W.T.</u> Lee, J.S.	130,000
<b>Subtotal</b>				<b>\$130,000</b>

## Grants from Mainland China 內地科研資助

## Research Grant 科研項目

Project Title * 項目名稱	Grant Type 資助類型	Status 狀態	Investigators #項目負責人 (PI/Co-I)	Amount 金額 (CNY)
<b>2015</b>				
1 Mangrove Plant Polyphenols in Intertidal Zone: Their Transformation and Effects on Carbon and Nitrogen Mineralization 潮間帶紅樹林植物多酚對碳、氮礦化的影響作用	NSFC 國家自然科學基金	On-going	<b>Chao, Z.H.</b> <u>Tam, N.F.Y.</u>	260,000
2 Main Project: Carbon Cycle in the South China Sea: Budget, Controls & Global Implications 南海碳迴圈過程、機理及其全球意義 Sub-project: The Recycling and Export of Organic Carbon and its Coupling with the Biogeochemical Cycling of Nitrogen and Silica 有機碳的生物再迴圈、輸出及其與氮、矽等生源要素的耦合	Major National Science Research Program of China, MOST	On-going	<b>Dai, M.H.</b> <u>Liu, H.B.</u>	1,500,000
<b>Subtotal</b>			<b>CN¥1,760,000</b>	
<b>2014</b>				
3 Assessment of Antibiotics in Sewage and Characterization of Antibiotic-degrading Bacteria 城市污水中抗生素的檢測及其降解菌研究	Shenzhen Strategic Emerging Industry Development Special Fund 深圳市戰略性新興產業發展專項資金	On-going	<b>Lam, J.C.W.</b> Lin, B.K.	200,000
4 Deep Ocean Biogeochemical Processes and its Coupled Physical Dynamics Control the Sea-air CO <sub>2</sub> Fluxes in the Basin Area of the South China Sea 南海深部生物地球化學-物理耦合過程對海-氣界面CO <sub>2</sub> 通量的調控	NSFC 國家自然科學基金	On-going	<u>Gan, J.P.</u>	1,750,000
5 Combined Organic Pollutants in Soils 土壤中的複合有機污染物	National Basic Research Program of China 國家重點基礎研究發展計劃項目(973計劃)	On-going	<u>Li, X.D.</u>	4,500,000
6 Acute and Chronic Neurotoxic Actions on Brain Neuron and Astrocyte Correlated with Cognitive Deficits in Rats 急性及慢性蓄積性雪卡中毒對大鼠腦神經元、膠質細胞和腦認知功能損害的研究	Shenzhen Strategic Emerging Industry Development Special Fund 深圳市戰略性新興產業發展專項資金	On-going	<b>Li, Y.</b> <u>Chan, L.L.</u>	150,000
7 Shenzhen Key Laboratory for Sustainable Use of Marine Biodiversity 深圳市海洋生物多樣性可持續利用重點實驗室	Shenzhen Key Laboratory Program 深圳重點實驗室計劃	On-going	<b>Chan, L.L.</b>	3,000,000
<b>Subtotal</b>			<b>CN¥9,600,000</b>	

## Research Grant 科研項目

	<b>Project Title *</b> 項目名稱	<b>Grant Type</b> 資助類型	<b>Status</b> 狀態	<b>Investigators</b> #項目負責人 (PI/Co-I)	<b>Amount</b> 金額 (CNY)
<b>2013</b>					
8	Development, Optimization and Validation of Key Techniques for Mass culture of Toxic <i>Gambierdiscus</i> Spp. For Isolation and Purification of Ciguatoxins 用於高產雪卡毒素的有毒網比甲藻批量養殖術研究	Shenzhen Strategic Emerging Industry Development Special Fund 深圳市戰略性新興產業發展專項資金	Completed	<u>Chan, L.L.</u>	400,000
9	Meridional Circulation in the South China Sea 中國南海的經向環流	NSFC 國家自然科學基金	On-going	<u>Gan, J.P.</u>	1,000,000
10	Research on Long-term Efficiency of Constructed Mangrove Wetland for Wastewater Treatment and the Related Mechanisms 紅樹林人工濕地淨化系統的長期有效性及機制研究	Shenzhen Strategic Emerging Industry Development Special Fund 深圳市戰略性新興產業發展專項資金	On-going	<u>Tam, N.F.Y.</u> Li, F.L.	461,452
11	Metal Pollution Monitoring in PRE 珠江口的金屬污染監測	State Oceanic Bureau 國家海洋局	Completed	<u>Wang, W.X.</u>	320,000
12	Marine Environmental Science Conference and SMART Inauguration 海洋環境科學學術交流會暨深圳海洋研究與技術聯盟成立儀式	Shenzhen International Technology Cooperation and Communication Project 深圳市國際科技合作交流活動類項目	Completed	<u>Lam, P.K.S.</u>	100,000
13	Assessment and Characterization of Novel and Unknown Per- and Polyfluorinated Compounds in Pearl River and Yangtze River Delta 珠江三角洲和長江三角洲新型與未知全氟化合物污染狀況及其生態風險	National Natural Science Foundation of China 國家自然科學基金	On-going	<u>Lam, P.K.S.</u> <u>Lam, J.C.W.</u>	740,000
14	Assessment of Conventional & Emerging Halogenated Flame Retardants in Two Estuaries of China: Pearl River Delta and Yangtze River Delta 中國珠江與長江河口地區傳統及新興鹵系阻燃劑環境分布特徵與生態風險評估	National Natural Science Foundation of China 國家自然科學基金	Completed	<u>Lam, J.C.W.</u>	280,000
15	High Efficiency Photocatalytic and Electrocatalytic Water Splitting and Carbon Dioxide Reduction 分解水和還原二氧化碳的高效光/電催化體系研發及機理研究	Shenzhen Strategic Emerging Industry Development Special Fund 深圳市戰略性新興產業發展專項資金	Completed	<u>Lau, T.C.</u>	600,000
16	Biokinetics and Toxicology of Heavy Metals in Southern China Estuaries 華南河口重金屬的生物動力學與毒理學	National Natural Science Foundation of China 國家自然科學基金	On-going	<u>Wang, W.X.</u>	3,000,000

\* 項目名稱以英文譯本為準 #Person with underline is SKLMP member



## Research Grant 科研項目

	<b>Project Title *</b> 項目名稱	<b>Grant Type</b> 資助類型	<b>Status</b> 狀態	<b>Investigators</b> # 項目負責人 (PI/Co-I)	<b>Amount</b> 金額 (CNY)
17	Development, Optimization and Validation of Methods for Isolation, Purification and Trace Analysis of Ciguatoxins 雪卡毒素高純度提取與痕量分析技術研究	Shenzhen Strategic Emerging Industry Development Special Fund 深圳市戰略性新興產業發展專項資金	On-going	<u>Lam, P.K.S.</u> <u>Chan, L.L.</u>	300,000
18	Study of the Key Factors that Influence the Flux of Ciguatera Toxins through Marine Food Webs 西加毒素在海洋食物鏈傳遞之關鍵因子研究	National Natural Science Foundation of China 國家自然科學基金	On-going	<u>Chan, L.L.</u> Lu, C.K. Anderson D.M. Richlen M.	760,000
<b>Subtotal</b>					<b>CN¥7,961,452</b>
<b>2012</b>					
19	Development of Nanotechnology-based Detection Platform for Early Diagnosis of Lung Cancer 用於肺癌早期診斷的納米技術檢測平臺的建立	National Program on Key Basic Research Project of China (973 Program) 國家重點基礎研究發展計劃項目(973計劃)	On-going	<u>Yang, M.M.S.</u>	830,000
20	Integrated Technology Development for Algal Bloom Online Monitoring and Development and Validations in Lake Tai 水華在線檢測設備的集成與應用示範	National Science and Technology Major Project 國家重大科技專項	On-going	<u>Lam, P.K.S.</u> <u>Chan, L.L.</u>	800,000
21	Research Centre for Ocean and Human Health 海洋與人類健康研究中心	Supporting Fund from Shenzhen Virtual University Park 深圳虛擬大學園專項扶持經費	Completed	<u>Lam, P.K.S.</u>	500,000
21	Health Risk Assessment of Toxic Trace Elements and Polycyclic Aromatic Hydrocarbons (PAHs) Via Indoor Dust from Coal-burning Households in Rural China 中國農村燃煤家庭室內大氣顆粒物中有毒元素與多環芳烴的健康影響	NSFC/RGC Joint Research Scheme 國家自然科學基金/ 研究資助局聯合研究計劃	Completed	<u>Wong, M.H.</u> <u>Liu, W.X.</u> Wu, S.C. Wu, F.Y. Liu, W.K. Leung, C.K.M. Fu, X.F. Yu, Y.X. Liu, Y. Meng, B.J.	897,000
<b>Subtotal</b>					<b>CN¥3,027,000</b>

## Consultancy 諮詢項目

	<b>Project Title *</b> 項目名稱	<b>Grant Type</b> 資助類型	<b>Status</b> 狀態	<b>Investigators</b> # 項目負責人 (PI/Co-I)	<b>Amount</b> 金額 (CNY)
<b>2013</b>					
1	Training Program for Analysis of Emerging Pollutants in Source Water 水環境樣品中抗生素檢測技術人員培訓	Shenzhen Academy of Environmental Science	Completed	<u>Lam, J.C.W.</u>	60,000
2	Method Development and Determination of Antibiotic Compounds in Shenzhen Source Water 深圳水環境樣品中抗生素檢測方法開發與含量檢測	Shenzhen Academy of Environmental Science	Completed	<u>Lam, J.C.W.</u>	190,000
3	Marine Environmental Monitoring Programme for the Remediation and Development Project at the Estuary Area in the Eastern District of Shantou 汕頭市東部城市經濟帶河口治理及綜合開發項目 施工期海洋環境跟蹤監察	Cooperation Program with Shantou University	Completed	<u>Lam, P.K.S.</u> <u>Lam, J.C.W.</u>	120,000
<b>Subtotal</b>					<b>CN¥370,000</b>
<b>2012</b>					
4	Demonstration of Circular Economy: Study on the Eco-remediation of Shenzhen Overseas Chinese Town 循環經濟示範僑城濕地生態系統修復研究	Shenzhen Overseas Chinese Town Holding Company 深圳華僑城歡樂海岸項目	Completed	<u>Tam, N.F.Y.</u>	1,200,000
<b>Subtotal</b>					<b>CN¥1,200,000</b>

## Funding support from CityU 城大內部撥款資助項目

## CityU Internal Research Fund (IRF) 城大內部研究經費

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	Investigator# 項目負責人	Amount 金額 (HKD)
Feb 2015 - Jan 2017			
1	Pilot baseline study of marine biodiversity and aquaculture environment at O Pui Tong mariculture zone and its surrounding area 澳背塘及其周邊地區之海洋生物多樣性及水產養殖環境的基線調查	<u>Chan, L. L.</u>	150,000
2	Trophic interactions of the rocky shore community under ocean acidification 岩岸群落在海洋酸化下的營養互動	<u>Cheung, S.G.</u>	150,000
3	Design and development of microbead-based biosensors for multiplexed detection of waterborne pathogens in mariculture zone 設計開發新型微球生物傳感器及微流體陣列檢測平臺用於海水養殖區中病原體的多重檢測	<u>Yang, M.M.S.</u>	150,000
4	Functional monitoring the toxicity of water borne chemical pollutants on neuronal activities using whole-brain-wide imaging 基於全腦成像技術的水性化學污染物對神經活動的毒性檢測	<u>Cheng, S.H.</u>	150,000
5	Bone miRNAs deregulation and skeletal impairment in offspring induced by parental exposure to benzo[a]pyrene 青鱗魚苯並(a)芘暴露導致後代骨細胞小RNA表達異常以及骨質損害/損傷的研究	<u>Au, D.W.T.</u>	150,000
6	Effect of alternating aerobic-anaerobic conditions on microbial transformation of polybrominated diphenylethers (PBDEs) in mangrove sediments 紅樹林沉積物好氧-厭氧交替環境下多溴聯苯醚 (PBDEs) 的微生物轉化作用及機理研究	<u>Tam, N.F.Y.</u>	150,000
Nov 2012 - Oct 2014			
7	Expression of Plasma Immune Proteins is Gender-dependent and Related to Fish Susceptibility to Pathogen 血漿中免疫蛋白性別特異性的表達及其與魚類對病原物易感性的關係	<u>Au, D.W.T.</u>	200,000
8	Studies on Multiple Stressor Effect of Ionizing Radiation and Heavy Metals on Marine Fish Using Marine Medaka ( <i>Oryzias melastigma</i> ): Towards a Realistic Risk Assessment 利用海洋青鱗 ( <i>Oryzias melastigma</i> ) 研究電離輻射和重金屬在海洋魚類中的多重應激源效應：邁向實際的風險評估	<u>Yu, P.K.N.</u>	600,000 (From SKLMP: \$400,000) (From CSE: \$200,000)
9	Phytoremediation of Polybrominated Diphenyl Ethers (PBDEs) by Mangrove Wetlands 利用紅樹林濕地植物修復多溴聯苯醚的研究	<u>Tam, N.F.Y.</u>	200,000
10	Responses of Marine Organisms to Ocean Acidification: Does Ecosystem Matter? 不同生態系統中的海洋生物對海洋酸化的反應的比較	<u>Cheng, S.G.</u>	200,000

## CityU Internal Research Fund (IRF) 城大內部研究經費

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	Investigator# 項目負責人	Amount 金額 (HKD)
11	Risk Assessment of Pharmaceutical Residues and Occurrence of Antibiotic-resistant Bacterial Genes and Strains in Hong Kong Surface Waters and Sediments 在香港的地表水和沉積物中之藥物殘留風險評估及抗生素耐藥性細菌的基因和菌株的發生	<u>Murphy, M.B.</u>	200,000
12	Development of Radiation Biosimulator Using Transgenic Bacterial Sensor Strains Immobilized in Microfluidic Network 將轉基因細菌感應株固定於微流控芯片發展而成的電離輻射生物劑量計	<u>Cheng, S.H.</u>	500,000 (From SKLMP: \$200,000) (From CSE: \$300,000)
Jan 2011 - Dec 2012			
13	Development of Novel Technology for Early Diagnosis and Monitoring of Immunotoxic Pollutants in Marine Environment 建立新技術和方法用於早期監控和診斷海洋環境中的免疫毒性污染物	<u>Au, D.W.T.</u>	100,000
14	Quantification of Poly- and Perfluorinated Compounds (PFCs) and Species Identification of Shark Fins Purchased from Hong Kong Seafood Shops 在香港海味乾貨店購買的魚翅的聚和全氟化合物(全氟碳化物)之定量和鯊魚種屬鑑定	<u>Murphy, M.B.</u>	200,000
Jan 2010 - Dec 2011			
15	Development of Highly Efficient ZnO Tetrapods Nanoparticles for Photodegradation of Organic Pollutants in Water under Visible Light 可見光條件下光降解水中有機污染物的高效能四針狀納米ZnO的開發	<u>Lau, T.C.</u>	150,000
16	International Collaborative Research on Endocrine Disrupting Compounds (EDC) and Emerging Persistent Organic Pollutants (POPs) in South China Sea 中國南海環境內分泌干擾物 (EDC) 和新型持久性有機污染物 (POPs) 的國際合作研究	<u>Cheng, S.H.</u>	200,000
17	Long-term Measurements of Ultraviolet Radiation in Marine Environments in Hong Kong 香港海洋環境紫外輻射的長期監測	<u>Yu, P.K.N.</u>	150,000
18	Sorption and Degradation of Polybrominated Diphenyl Ethers (PBDEs) by Green Microalgae with and without the Effect of Metals 有和無金屬影響下綠藻對多溴聯苯醚 (PBDEs) 的吸收和降解作用	<u>Tam, N.F.Y.</u>	200,000
19	Unraveling Tissue-specific Mechanisms for <i>in vivo</i> Regulation of Estrogen Target Genes in Medaka 揭示青鱒中雌性激素靶基因之活體調節的組織特異性規律	<u>Au, D.W.T.</u>	200,000

\* 項目名稱以英文譯本為準 #Person with underline is SKLMP member

State Key Laboratory in Marine Pollution

## CityU Internal Research Fellowship Programme (RFP) 城大內部博士後基金

The fund aims to support and nurture young scientists to ensure sustainable research activity

	Project Title * 項目名稱	Investigator # 項目負責人	Amount 金額 (HKD)
Jan 2013 - Dec 2014			
1	A Holistic Approach to Unravel Xenoestrogen Induced Immunosuppressive Effects and Reproductive Impairment in Fish: Implications for Risk Assessment and Monitoring of Immunosuppressants in Waters 體研究方法揭示外源性雌激素引起的免疫抑制及對生殖系統的影響：對風險評估和監控水體中免疫抑制物的提示	<u><b>Au, D.W.T.</b></u>	400,000
2	Comparative Investigation on Resistance and Defense Mechanism of Coral Reef Fishes to Ciguatoxins (CTXs) 珊瑚礁魚類對雪卡毒素的抗性和防禦機制比較研究	<u><b>Chan, L.L.</b></u>	400,000
3	Significance of Roots and Microorganisms in Phytoremediation of Polybrominated Diphenyl Ethers (PBDEs) by Mangrove Plants 紅樹植物根系及其根際微生物對多溴聯苯醚的植物修復功能及機制	<u><b>Tam, N.F.Y.</b></u>	400,000
4	Identification of Biomarkers for Low Dose Radiation: Linking Radiation Induced Effects from Molecular to Physiological Levels 低劑量輻射生物標記的鑒定：放射性誘導的分子和生理層面影響之間的聯繫	<u><b>Cheng, S.H.</b></u>	400,000

## Shenzhen Key Laboratory for the Sustainable Use of Marine Biodiversity Internal Grant (SUMB)

### 深圳海洋生物多樣性可持續利用重點實驗室內部基金

The fund aims to encourage, facilitate and support excellent, collaborative and interdisciplinary research projects among members and non-members in the field of marine biodiversity

	Project Title *	Investigators#	Amount
	項目名稱	項目負責人	金額
May 2015 - Apr 2016			
1	Trans-generational effects of estrogenic EDCs in fish survival and fecundity 雌激素活性物質對魚類生存和繁殖的隔代影響	<u>Au, Doris W.T.</u>	HKD 35,000 + CNY 80,000
Sept 2015 - Aug 2016			
2	Effect of ocean acidification on multiple generations of marine benthic copepod, <i>Tigriopus japonicas</i> 海洋酸化對多世代海洋底棲橈足動物日本虎斑猛水蚤 ( <i>Tigriopus japonicas</i> ) 的影響	<u>Cheung, S.G.</u>	HKD 35,000 + CNY 80,000

\* 項目名稱以英文譯本為準 #Person with underline is SKLMP member

## 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 項目名稱	Investigator 項目負責人	Amount 金額 (HKD)
<b>May 2016 - Apr 2017</b>		
1 Studies on copepod feeding on microphytobenthos in coral reef ecosystem 珊瑚礁區橈足類對底棲微藻的攝食研究	<b>Liu, S. (South China Sea Institute of Oceanology, CAS)</b> <b>Chan, L.L. (CityU)</b> Xu, C.L. (South China Sea Institute of Oceanology, CAS)	100,000
<b>Jan 2015- Dec 2015</b>		
2 Design and evaluation of a FWM-LED light engine with visible spectrums modulated for photobioreactor (PBRs) 設計及評估具有可調控可見光波長的 LED 光學引擎的光生物反應器	<b>Shen, S.C. (NCKU)</b> Chen, Y.M. (NCKU)	80,000
<b>Oct 2013 - Oct 2014</b>		
3 Project PSI-FI an acronym for particle species identification by flow imaging using light sheet microscopy and flow cytometry. 使用光片顯微鏡與流式細胞儀的流式成像對PSI-FI粒子進行物種鑑定	<b>Chan, R.K.Y. (HKBU)</b> <b>Chan, L.L. (CityU)</b> Wu, V.J.J. (CityU) Wu, J.L. (HKBU)	100,000

## 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的項目

### 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	Amount 金額 (HKD)
Apr 2014 - Mar 2017			
1	Investigation of coupled circulation and ecosystem process in Mirs Bay-Tolo Habor (Hong Kong) during summer time 香港大鵬灣-吐露港夏天海流-生態耦合系統過程的研究	<u>Gan, J.P.</u> (HKUST) <u>Lam, P.K.S.</u> (CityU) <u>Chan, L.L.</u> (CityU) <u>Liu, H.B.</u> (HKUST) <u>Chan, R.K.Y.</u> (HKBU) <u>Ang, P.O.</u> (CUHK)	1,500,000
2	Identification and assessment of emerging persistent organic pollutants (POPs) in Hong Kong coral communities 香港的珊瑚群落中新興持久性有機污染物 (POPs) 的評估	<u>Lam, J.C.W.</u> (CityU) <u>Ang, P.O.</u> (CUHK)	900,000
3	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.</u> (HKU) <u>Tam, N.F.Y.</u> (CityU) <u>Shin, P.K.S.</u> (CityU) <u>Cheung, S.G.</u> (CityU) <u>Au, D.W.T.</u> (CityU) <u>Ang, P.O.</u> (CUHK) <u>Chiu, J.M.Y.</u> (HKBU) <u>Liang, Y.</u> (HKBU)	2,000,000
4	Transgenerational effects of hypoxia in fish and underlying mechanisms 缺氧對魚類的跨代影響及其內在機制	<u>Kong, R.Y.C.</u> (CityU) <u>Wong, C.K.C.</u> (HKBU) <u>Chiu, J.M.Y.</u> (HKBU) <u>Au, D.W.T.</u> (CityU) <u>Wu, R.S.S.</u> (HKU)	2,200,000
5	Development of electrochemical sensing platform based on AuNPs modified TiO <sub>2</sub> nanotubes for emerging chemicals of concern and pharmaceutical residues detection 開發基於金納米粒子修飾的二氧化鈦納米管的電化學傳感平台用於環境污染物的檢測	<u>Yang, M.M.S.</u> (CityU) <u>Wu, R.S.S.</u> (HKU) <u>Lam, P.K.S.</u> (CityU) <u>Lam, M.H.W.</u> (CityU) <u>Chan, L.L.</u> (CityU)	900,000
Nov 2011 - Oct 2014			
6	Assessing the Impacts of Organic and Metal Pollution on Symbiotic Microbial Communities in Marine Corals and Sponges by Metagenomics and Transcriptomics Approaches 利用宏基因組和宏轉錄組技術評估有機物污染和重金屬污染對海綿和珊瑚的共生微生物群落的影響	<u>Qian, P.Y.</u> (HKUST) <u>Wang, W.X.</u> (HKUST) <u>WU, R.S.S.</u> (HKU) <u>Qiu, J.W.</u> (HKBU) <u>Lee, O.O.</u> (HKUST) <u>Chiu, J.M.Y.</u> (HKU)	900,000

\* 項目名稱以英文譯本為準 #Person with underline is SKLMP member



## 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	Amount 金額 (HKD)
7	Establishing the Green Lipped Mussel <i>Perna viridis</i> as a Universal Marine Model Organism and Pollution Biomonitor for Ecotoxicology and Environmental Genomics 翡翠貽貝 ( <i>Perna viridis</i> ) 作為海洋生態毒理學和環境基因組學的通用模式生物以及相關污染物生物指示種的研究	<b><u>Leung, K.M.Y.</u></b> (HKU) <u>Lam, P.K.S.</u> (CityU) <u>Wong, C.K.C.</u> (HKBU) <u>Chan, L.L.</u> (CityU)	900,000
8	Health Risk Assessments of Residents in the Pearl River Delta exposed to Brominated Flame Retardants (BFRs) 在珠江三角洲暴露於防火劑的健康風險評估	<b><u>Wong, M.H.</u></b> (HKBU) <u>Wang, H.S.</u> (HKBU) <u>Man, B.Y.B.</u> (HKBU) <u>Wu, S.C.</u> (CityU) <u>Lam, P.K.S.</u> (CityU) <u>Wong, C.K.C.</u> (HKBU) <u>Jones, P.D.</u> (University of Saskatchewan, Canada) <u>Giesy, J.P.</u> (University of Saskatchewan, Canada)	300,000
9	Interactive Effects of Climate Change and Hypoxia on Fish Sex Determination: Estrogen synthesis and Masculinisation 2011 氣候變化及缺氧對魚類性別決定 (雌激素合成及雄性化) 的相互影響	<b><u>Kong, R.Y.C.</u></b> (CityU) <u>Wu, R.S.S.</u> (HKU) <u>Yu, R.M.K.</u> (University of Newcastle, Australia)	900,000
10	Sources and Bioaccumulation of Mercury and Cadmium in the Pearl River Estuary (PRE) and Hong Kong Coastal Waters 珠江河口和香港沿海水域汞、鎘的來源和生物富集	<b><u>Li, X.D.</u></b> (PolyU) <u>Wang, W.X.</u> (HKUST)	900,000

## Open Science Research Fund (OSRF) 開放科學研究基金

The fund aims to build research capacity, and to encourage, facilitate and support excellent, collaborative and interdisciplinary research programs among members and non-members in the field of marine environmental science

Project Title * 項目名稱	Investigators# 項目負責人	Amount 金額 (HKD)
Mar 2014 - Feb 2016		
1 Health risk assessments of residents in the Pearl River Delta exposed to brominated flame retardants (BFRs) 珠江三角洲暴露于防火劑的健康風險評估	<b>Wong, M.H. (HKIEd)</b> Man, Y.B. (HKIEd) Wang, H.S. (SYSU) Wu, S.C. (ZAFU) <u>Lam, P.K.S.</u> (CityU) <u>Lam, J.C.W.</u> (CityU) <u>Wong, C.K.C.</u> (HKBU) Jones, P.D. (University of Saskatchewan) Giesy, J.P. (University of Saskatchewan)	100,000

## Summary of the Internal Research Fund (IRF) Projects

### IRF項目概要

Nov 2012 – Oct 2014 (Ongoing)

#### STUDIES ON MULTIPLE STRESSOR EFFECT OF IONIZING RADIATION AND HEAVY METALS ON MARINE FISH USING MARINE MEDAKA (*ORYZIAS MELASTIGMA*): TOWARDS A REALISTIC RISK ASSESSMENT

利用海洋鯖鱒魚 (*ORYZIAS MELASTIGMA*) 研究電離輻射和重金屬在海洋魚類中的多重應激源效應：邁向實際的風險評估

Peter K. N. YU

Funding Amount : HK\$600,000

Under realistic situations, living organisms are exposed to a mixture of environmental stressors, and the resultant effects due to such exposures are referred to as “multiple stressor effects”. The resultant effects are not necessarily simple sums of the effects caused by individual stressors, i.e., showing additive characteristics. Instead, they can also show synergistic or antagonistic characteristics. However, due to a lack of information on multiple stressor effects, most biological risks on organisms (including marine organisms) can only be speculated by assuming additive characteristics among different environmental stressors.

Hong Kong will be in a region with the highest density of nuclear reactors in China in about 10 years, as 15 to 20 new nuclear reactors in Guangdong province alone will become operational. The routine or accidental fallout from these nuclear reactors will expose living organisms to ionizing radiations. Nuclear accidents at Chernobyl in Ukraine, Three Mile Island in USA, and most recently at Fukushima in Japan remind us that safety issue of nuclear power, including the associated contingency planning and risk assessment, is still a major concern. Nevertheless, the multiple stressor effects of heavy metals and ionizing radiation have not been extensively studied.

The present proposal aims to investigate the multiple stressor effect of ionizing radiation and heavy metals on marine fish using marine medaka (*Oryzias melastigma*) as a model. Apoptotic signals induced in the marine medaka will be used as the biological end point, which will be revealed through Acridine Orange staining or TUNEL assays. Realistic doses of ionizing radiation and heavy metals will first be separately applied to the fish model to obtain dose-response relationships for each individual stressor. The multiple stressor effect can then be identified by exposing the fish model to combinations of stressors, and by comparing the dose-response relationships for combined exposures to those for individual stressors. The results will significantly contribute to the goal of realistic risk assessment for combined exposure of marine fish to ionizing radiation and heavy metals.

### Research Output

*Papers with the SKLMP included as the first affiliation* 以SKLMP為第一單位的期刊論文

- Choi, V.W.Y., Cheung, A.L.Y., Cheng, S.H., Yu, K.N. (2012)  
**Hormetic effect induced by alpha-particle-induced stress communicated in vivo between zebrafish embryos.**  
*Environmental Science and Technology*, 46:11678-11683.
- Choi, V.W.Y., Ng, C.Y.P., Kobayashi, A., Konishi, T., Suya, N., Ishikawa, T., Cheng, S.H., Yu, K.N. (2013)  
**Bystander effect between zebrafish embryos in vivo induced by high-dose X-rays.**  
*Environmental Science and Technology*, 47:6368-6376.
- Choi, V.W.Y., Ng, C.Y.P., Kong, M.K.Y., Cheng, S.H., Yu, K.N. (2013)  
**Adaptive response to ionizing radiation induced by cadmium in zebrafish embryos.**  
*Journal of Radiological Protection*, 33:101-112.
- Ng, C.Y.P., Choi, V.W.Y., Lam, A.C.L., Cheng, S.H., Yu, K.N. (2013)  
**Multiple stressor effect in zebrafish embryos from simultaneous exposures to ionizing radiation and cadmium.**  
*Journal of Radiological Protection*, 33:113-121.

- 5 Choi, V.W.Y., Konishi, T., Oikawa, M., Cheng, S.H., Yu, K.N. (2013)  
**Threshold number of protons for inducing adaptive response in zebrafish embryos.**  
*Journal of Radiological Protection*, 33:91-100.
- 6 Choi, V.W.Y., Ng, C.Y.P., Kobayashi, A., Konishi, T., Oikawa, M., Cheng, S.H., Yu, P.K.N. (2014)  
**Response of 5 hpf zebrafish embryos to low-dose microbeam protons.**  
*Journal of Radiation Research*, 55:i113-i113.
- 7 Choi, V.W.Y., Ng, C.Y.P., Kobayashi, A., Konishi, T., Oikawa, M., Cheng, S.H., Yu, P.K.N. (2014)  
**Roles of nitric oxide in adaptive response induced in zebrafish embryos in vivo by microbeam protons.**  
*Journal of Radiation Research*, 55:i114-i114.
- 8 Choi, V.W.Y., Ng, C.Y.P., Kobayashi, A., Konishi, T., Oikawa, M., Cheng, S.H., Yu, P.K.N. (2014)  
**Exogenous carbon monoxide suppresses adaptive response induced in zebrafish embryos in vivo by microbeam protons.**  
*Journal of Radiation Research*, 55:i115-i115.
- 9 Kong, E.Y., Choi, V.W.Y., Cheng, S.H., Yu, K.N. (2014)  
**Some properties of the signals involved in unirradiated zebrafish embryos rescuing -particle irradiated zebrafish embryos.**  
*International Journal of Radiation Biology*, 90:1133-1142.
- 10 Ng, C.Y.P., Kong, E.Y., Konishi, T., Kobayashi, A., Suya, N., Cheng, S.H., Yu, K.N. (2015)  
**Low-dose neutron dose response of zebrafish embryos obtained from the neutron exposure accelerator system for biological effect experiments (NASBEE) facility.**  
*Radiation Physics and Chemistry*, 114: 12-17
- 11 Ng, C.Y.P., Kong, E.Y., Kobayashi, A., Suya, N., Uchihori, Y., Cheng, S.H., Konishi, T., Yu, K.N. (2015)  
**Neutron induced bystander effect among zebrafish embryos.**  
*Radiation Physics and Chemistry*, 117: 153-159
- 12 Lam, R.K.K., Fung, Y.K., Han, W., Li, L., Chiu, S.K., Cheng, S.H., Yu, K.N. (2015)  
**Modulation of NF-kB in rescued irradiated cells.**  
*Radiation Protection Dosimetry*, DOI: 10.1093/rpd/ncv217
- 13 Ng, C.Y.P., Pereira, S., Cheng, S.H., Adam-Guillermin, C., Garnier-Laplace, J., Yu, K.N. (2015)  
**Combined effects of depleted uranium and ionising radiation on zebrafish embryos.**  
*Radiation Protection Dosimetry*, 167, 311-315.

Feb 2015-Jan 2017 (Ongoing)

## BONE MIRNAS DEREGULATION AND SKELETAL IMPAIRMENT IN OFFSPRING INDUCED BY PARENTAL EXPOSURE TO BENZO[A]PYRENE

鯖鱒魚苯並(A)芘暴露導致後代骨細胞小RNA表達異常以及骨質損害/損傷的研究

Doris W. T. AU, Christoph WINKLER, Z. GE

Funding Amount : HK\$150,000

High incidences of skeletal defects have been reported in feral fish from waters polluted by polycyclic aromatic hydrocarbons (PAHs) and crude oils. Recent studies using medaka have shown that sublethal exposure to waterborne benzo[a]pyrene (BaP, a ubiquitous PAH in the environment) not only increased the incidence of bone deformities in the exposed parents, but also significantly induced tail deformities in their early larva that had not been prior exposed to BaP. Increasing evidence from mammalian studies indicate that many adverse cross-generational effects caused by chemicals involve the activation or silencing of genes via microRNAs. It has been shown that BaP intake and tobacco smoking (a major source of BaP/PAH intake) can deregulate the miRNAs associated with osteogenesis in the lungs or in embryos from exposed fathers. Many osteogenesis-related miRNAs were on the list of the dysregulated pulmonary miRNAs in lung cancer patients with a history of smoking.

From an ecotoxicological perspective, abnormal skeletal phenotypes (including spinal curvature, tail defects and reduced body length) will directly affect swimming as well as impair mating behavior and food captivity of the fish, which are likely to amplify into adverse outcomes associated with reduced growth and reproductive fitness. Impairments of these Darwinian's fitness traits in fish will likely impede the sustainability of the fish population, particularly when such adverse outcomes, induced by BaP, persist across generations. The ecological consequence of BaP contamination in the environment is likely to be worse than we expect. There is an urgent need to re-assess the risk of BaP/PAHs in the environment.

To be meaningful and useful for risk assessment, it is essential to understand the molecular action and the toxicity pathways of BaP in regards to cross-generational skeletal deformities, which however remains virtually unknown. Using the medaka as a model fish, the present study is set to identify the key miRNAs regulating bone homeostasis in medaka. Their involvement in BaP induced cross-generational bone deformities will be further tested. BaP is ubiquitously found in water and air. The results of this study will also be relevant and essential for human health risk assessment.

### Research Output

*Papers with the SKLMP included as the first affiliation* 以SKLMP為第一單位的期刊論文

- Seemann, F., Peterson, D.R., Witten, P.E., Guo, B.S., Shantanagouda, A.H., Ye, R., Zhang, G., Au, D.W.T. (2015) **Insight into the transgenerational effect of BaP on bone formation in a teleost fish (*Oryzias latipes*).** *Comparative Biochemistry and Physiology - Part C: Toxicology & Pharmacology*, 178:60-67.
- Peterson, D.R., Mok, H.L., Au, D.W.T. (2015) **Modulation of telomerase activity in fish muscle by biological and environmental factors.** *Comparative Biochemistry and Physiology - Part C: Toxicology & Pharmacology*, 178:51-59.

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

- Lai, K.P., Li, J.W., Wang, S.Y., Chiu, J.M.Y., Tse, A., Lau, K., Lok, S., Au, D.W.T., Tse, W.K.F., Wong, C.K.C., Chan, T.F., Kong, R.Y.C., Wu, R.S.S. (2015) **Tissue-specific transcriptome assemblies of the marine medaka *Oryzias melastigma* and comparative analysis with the freshwater medaka *Oryzias latipes*.** *BMC Genomics*, 16: 135
- Chen, L.G., Sun, J., Zhang, H.M., Au, D.W.T., Lam, P.K.S., Zhang, W.P., Bajic, V.B., Qiu, J.W., Qian, P.Y. (2015) **Hepatic proteomic responses in marine medaka (*Oryzias melastigma*) chronically exposed to antifouling compound butenolide 5-octylfuran-2(5H)-one or 4,5-dichloro-2-N-octyl-4-isothiazolin-3-one (DCOIT).** *Environmental Science & Technology*, 49(3): 1851-1859

*Feb 2015-Jan 2017 (Ongoing)*

## PILOTBASELINE STUDY OF MARINE BIODIVERSITY AND AQUACULTURE ENVIRONMENT AT O PUI TONG MARICULTURE ZONE AND ITS SURROUNDING AREA

澳背塘及其周邊地區之海洋生物多樣性及水產養殖環境的基線調查

Leo L. CHAN, J.W. QIU, James C. W. LAM, T. C. WAI, Maggie Y. L. MAK, J. J. WU, Priscilla T. Y. LEUNG, Z. Y. ZHAO, P. P. SHEN

Funding Amount : HK\$150,000

The recent establishment of SKLMP fish raft in O Pui Tong at Kat O is an experimental based mariculture platform to support in situ scientific research and facilitate development of culture fisheries with enhanced efficiency and ecological sustainability in Hong Kong. In line with this, the potentials of the development and implementation of the Integrated Multi-Trophic Aquaculture (IMTA) are of particular interest; and an experimental IMTA design will be setup at O Pui Tong SKLMP fish raft to investigate the mechanisms with regard to sustainability, system dynamics and bioremediation. Therefore, baseline information on the marine biodiversity and aquaculture environment prior to the commencement of IMTA experiment is essential for future assessment and monitoring plan of its functions. In this study, a pilot baseline survey will be performed in O Pui Tong and its surrounding area including Kat O Wan as an impacted control and Camp Cove as a control of non-mariculture zone, for both dry and wet seasons of 2015. The baseline data collected under this Before-After-Control-Impact (BACI) design will advance our understanding on the application potentials of IMTA by the fish raft, and can also provide valuable information to the future mariculture development projects.

Feb 2015 – Jan 2017 (Ongoing)

## FUNCTIONAL MONITORING THE TOXICITY OF WATER BORNE CHEMICAL POLLUTANTS ON NEURONAL ACTIVITIES USING WHOLE-BRAIN-WIDE IMAGING

基於全腦成像技術的水性化學污染物對神經活動的毒性檢測

S.H. CHENG, P. SHI, Michael H. W. LAM

Funding Amount : HK\$150,000

In the proposed project we intend to utilize our platform to study four major categories of toxic chemicals commonly found in the aquatic environment, (polybrominated diphenyl ethers, endocrine disrupting chemicals, organic solvents and metals) which might have an effect on the neural development of brain and the brain-wide neuronal dynamics linking the processing of senses and the motor movements. Until date there has been no systematic study that provides direct insight into the instantaneous effects of these pollutants on the brain activity patterns of developing vertebrate. The reconstruction of neural activity across complete neural circuits, or brain activity mapping, has great potential in both fundamental and translational neuroscience research. Larval zebrafish, a vertebrate model, has recently been validated to be amenable to whole brain activity mapping. We recently demonstrated a microfluidic array system (“Fish-Trap”) that enables high-throughput mapping of brain-wide activity in awake larval zebrafish. Unlike the commonly practiced larva-processing methods using a rigid gel or a capillary tube, which are laborious and time-consuming, the hydrodynamic design of our microfluidic chip allows automatic, gel-free, and anesthetic-free processing of tens of larvae for microscopic imaging with single-cell resolution. Notably, this system provides the capability to directly couple chemical stimuli with real-time recording of neural activity in a large number of animals, and the local and global effects of pharmacologically active drugs or neurotoxic chemicals on the nervous system can be directly visualized and evaluated by analyzing the toxic molecule induced functional perturbation within or across different brain regions. Using this technology, we recently tested a set of neurotoxin peptides and obtained new insights into how to exploit neurotoxin derivatives as therapeutic agents. This novel and versatile “Fish-Trap” technology coupled with similar experimental strategy can be readily utilized to study the effect of toxic waterborne chemical pollutants on functional brain circuits. In the proposed project we intend to utilize our platform to study an array of toxic chemicals that have been identified to be found commonly in the aquatic environment. Until date there has been no systematic study that provides direct insight into the instantaneous effects of these pollutants on the brain activity patterns of developing vertebrate.

Feb 2015 – Jan 2017 (Ongoing)

## TROPHIC INTERACTIONS OF THE ROCKY SHORE COMMUNITY UNDER OCEAN ACIDIFICATION

岩岸群落在海洋酸化下的營養互動

S. G. CHEUNG, Paul K. S. SHIN

Funding Amount : HK\$150,000

In addition to global warming, an increase in anthropogenic CO<sub>2</sub> production reduces pH of the ocean, termed “ocean acidification” (OA), as the ocean is the sink of CO<sub>2</sub>. According to the Intergovernmental Panel on Climate Change (IPCC), it is predicted that by the year 2100, the pH of the surface ocean will decrease by 0.3–0.5 units.

A decrease in pH has a great impact on marine organisms particularly the shelled animals as dissolution of shell may be faster than shell formation under low pH. OA also disturbs physiology of marine organisms and results in reduction in survival and growth. Although studies on the effect of OA on individual species and life stages increase dramatically in the past few years, the results provide little clues to predict long-term consequences of OA at population and community levels. This is because population abundance and community structure are determined not only by individual species tolerance to OA, but also through biological interactions such as predation and inter-specific competition. For example, when the prey is more sensitive to OA than the predator, the predator will enjoy a weakened prey. In contrast, if the predator is more affected by OA, the prey will enjoy a lower predation risk. The situation is even more complicated when more than one prey species is preferred by a predator as the two prey species may have different tolerance to OA. Very few studies, however, have addressed these problems and most of them were on fish ecology.

The rocky shore community is one of the most biologically diverse and productive communities throughout the world with dominant rocky shore occupiers including barnacles and mussels. Most of the animals on the rocky shore possess an external hard shell as an adaptation against wave action and water lost. Therefore, they are highly susceptible to OA. The proposed study will investigate the effect of OA on predator–prey interactions between a predatory muricid gastropod and its preferred prey which are barnacles and mussels. The results will help us predict possible consequences of OA on the population structures of the prey species and the structure and functioning of the rocky shore community.



Feb 2015 – Jan 2017 (Ongoing)

## EFFECT OF ALTERNATING AEROBIC-ANAEROBIC CONDITIONS ON MICROBIAL TRANSFORMATION OF POLYBROMINATED DIPHENYLEETHERS (PBDEs) IN MANGROVE SEDIMENTS

紅樹林沉積物好氧-厭氧交替環境下多溴聯苯醚 (PBDEs) 的微生物轉化作用及機理研究

Nora F. Y. TAM, T. G. LUAN

Funding Amount : HK\$150,000

Polybrominated biphenylethers (PBDEs), the widely used flame-retardant additives, are ubiquitous, persistent and toxic contaminants. They have a structure in which 1-10 bromines are substituted on two benzene rings connected by an ether bond. The three major commercial PBDEs mixtures are penta-, octa- and deca-BDEs, having 5, 8 and 10 bromines, respectively. Due to their hydrophobicity, PBDEs released to environments accumulate in sediments, particularly in estuaries, the special coastal zones strongly influenced by human impacts. Extremely high concentrations of PBDEs have been recorded in estuarine sediments in South China. Although penta- and octa-BDEs have been banned since 2000s due to their toxicities, deca-BDEs are still produced and applied around the world. Some researchers suggested that under anaerobic conditions, deca- and octa-BDEs in bioreactors and sludge treatment processes could be reduced to lower brominated PBDEs, such as hexa- and penta-BDEs, which are more stable and toxic. Previous studies on polychlorinated biphenyls (PCBs), having similar chemical structures as PBDEs, reported that PCBs were dechlorinated in sediments under anaerobic conditions and the lower chlorinated PCBs were completely metabolized with ring cleavage under aerobic conditions. Whether the highly brominated PBDEs could be debrominated by microorganisms in anaerobic estuarine sediments is still debatable, and knowledge on the aerobic degradation is even scarcer. The effects of alternating aerobic and anaerobic conditions on the microbial transformation of PBDEs in sediments have never been reported. Mangrove wetlands representing an important intertidal ecosystem in tropical and subtropical regions occupy 75% of the coastal areas worldwide with a global area of around 160,000 km<sup>2</sup>. Mangroves are significant ecological interfaces between land and sea, and are subject to frequent tidal flushing with alternating aerobic and anaerobic environments. The proposed study therefore aims to investigate the debromination and metabolism of PBDEs by indigenous microorganisms in mangrove sediments subject to different aerobic and anaerobic conditions. The metabolic products will be identified and the relationships between PBDE biotransformation and microbial abundance in sediments will also be evaluated. The results from the proposed work will not only fill the knowledge gap on the fate of PBDEs and the roles of microorganisms in estuarine sediments, it will also provide very useful scientific information for developing bioremediation strategies to clean-up contaminated sediments.

### Research Output

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

- Chen, J., Zhou, H.C., Wang, C., Zhu, C.Q., Tam, N.F.Y. (2015)  
**Short-term enhancement effect of nitrogen addition on microbial degradation and plant uptake of polybrominated diphenyl ethers (PBDEs) in contaminated mangrove soil.**  
*Journal of Hazardous Materials*, 300: 84-92
- Wang, X.W., Yuan, K., Yang, L.H., Lin, L., Tam, N.F.Y., Chen, B.W., Luan, T.G. (2015)  
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*Marine Pollution Bulletin*, 98(1-2):335-340
- Wang, X., Tam, N.F.Y., He, H.D., Ye, Z.H. (2015)  
**The role of root anatomy, organic acids and iron plaque on mercury accumulation in rice.**  
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**Genotypic responses of bacterial community structure to a mixture of wastewater-borne PAHs and PBDEs in constructed mangrove microcosms.**  
*Journal of Hazardous Materials*, 298: 91-101
- Li, C.H., Wong, Y.S., Wang, H.Y., Tam, N.F.Y. (2015)  
**Anaerobic biodegradation of PAHs in mangrove sediment with amendment of NaHCO<sub>3</sub>.**  
*Journal of Environmental Sciences-China*, 30: 148-156

Feb 2015 – Jan 2017 (Ongoing)

## DESIGN AND DEVELOPMENT OF MICROBEAD-BASED BIOSENSORS FOR MULTIPLEXED DETECTION OF WATERBORNE PATHOGENS IN MARICULTURE ZONE

設計開發新型微球生物傳感器及微流體陣列檢測平臺用於海水養殖區中病原體的多重檢測

Michael M. S. YANG, Richard Y. C. KONG, Leo L. CHAN, Priscilla T. Y. LEUNG, J. J. WU, Maggie Y. L. MAK, L. F. HUANG, X. YAO, W. Q. YUE

Funding Amount : HK\$150,000

Waterborne pathogens (bacteria, viruses and protozoa) that pose a significant threat to mariculture and human health may cause big economic losses due to water pollution. Because much emphasis is put on the prevention of aquatic animal diseases, there is an urgent need to develop rapid and accurate methods to identify/detect the level of specific waterborne pathogens in order to ensure the microbial safety of mariculture produce. Biosensors using a variety of biorecognition methodologies have the ability to facilitate detection of a variety of microbial pathogens of interests with high sensitivity. However, the presence of low concentrations of waterborne pathogens and the complex environmental matrices where they occur pose major obstacles for pathogen detection technologies.

The SKLMP fish raft in O Pui Tong at Kat O is operated under the requirements of accredited fish farm scheme of the Agriculture, Fisheries and Conservation Department and is also an experimental based mariculture platform to support in situ scientific research for the improvement of culture fisheries in Hong Kong. Therefore, the development of novel biosensors for early and accurate detection of pathogens in environmental matrices on a routine basis will be highly beneficial in helping to prevent the transmission of waterborne diseases to consumers, thereby protecting public health and lowering the financial burden on the health care system. In this project, we propose to develop a microbead-based biosensor for multiplexed detection of waterborne pathogens, using enzyme-labeled Au nanoparticles and fluorescence quantum dots for signal amplification and microfluidics-based microbead arrays for parallel processing of multiple samples. The platform may potentially be used for developing multiplexed assays for detection and differentiation of other pathogens.

## Summary of the Director Discretionary Fund (DDF) Projects

### DDF項目概要

May 2016 – Apr 2017 (Ongoing)

#### STUDIES ON COPEPOD FEEDING ON MICROPHYTOBENTHO IN CORAL REEF ECOSYSTEM

珊瑚礁區橈足類對底棲微藻的攝食研究

S. LIU, Leo L. CHAN, C.L. XU

Funding Amount : HK\$100,000

Coral reef ecosystem provides an excellent habitat for more than 25% of marine species which make the complex food web structure. The primary productivity is estimated to be 1500~5000gC/(m<sup>2</sup>·a), thereinto, microphytobenthos are the important contributors which significantly affect the level of productivity of coral reef ecosystem. Copepods, the key group of zooplankton to link between primary producer and high-trophic-level organisms, are also abundant. They often harbor in coral reefs during the daytime, therefore, their selective feeding could affect the fate of microphytobenthos and other particle organic matters at the bottom of this ecosystem. Furthermore, copepods are high-quality biological bait for high-trophic-level organisms, such as, coral reef fishes. Studies on their feeding ecology will help to understand the transfer efficiency of substance and energy along the food chain in coral reef ecosystem, even to evaluate the health status of coral reef ecosystem. Although microphytobenthos and copepods play such important roles in coral reef ecosystem, there are still unclear about their biodiversity, abundance, copepod feeding selectivity and rhythm and so on because of the limitation of research methods. In this study, diving sampling and laboratory experiments combined with a molecular technique will be employed to detect the diversity of microphytobenthos and copepods, copepod feeding and the effects of the microphytobenthos on growth and reproduction copepods. The basal production process will be analyzed to further demonstrate their ecological functions in coral ecosystem.

Jan 2015 – Dec 2015 (Completed)

#### DESIGN AND EVALUATION OF A FWM-LED LIGHT ENGINE WITH VISIBLE SPECTRUMS MODULATED FOR PHOTOBIOREACTOR (PBRs)

設計及評估具有可調控可見光波長的LED光學引擎的光生物反應器

S.C. SHEN, Y.M. CHEN

Funding Amount: HK\$80,000

The thesis present a novel full wavelength modulation LED (FWM-LED) light engine to improve traditional photobioreactors (PBRs) of single wavelength. The FWM-LED light engine consists of RGBW LED light sources, coupling lens, and optical fibers. The coupling lens is designed using symmetrical luminous intensity distribution curves, LIDC Mapping, which computing light distribution curve and light energy mapping. This LIDC mapping method can simplify our design into correspondent with the LIDC angles of light sources and target. It is for fiber coupling lens, which is increasing the efficiency of coupling between entrance of fiber and RGBW light sources. In general, temperature could affect alga's growth either, so providing air condition system to helping heat-dissipating is needed. Therefore, this study design and fabricate the FWM-LED light engine in outdoors then light would pass throughout the coupling lens. The bendable fiber could guide the light into the PBRs providing luminance. Experimentally observed the biomass of case using FWM-LED light engine are 166% higher than the case only providing white light. Therefore, the FWM-LED light engine can provide spectrums near to the ideal for microalgae to enhance the biomass increasing remarkably in a unit period cultivation.

## Summary of the Shenzhen Key Laboratory for the Sustainable Use of Marine Biodiversity (SUMB) Internal Grant SUMB内部基金概要

May 2015 – Apr 2016 (Ongoing)

### TRANS-GENERATIONAL EFFECTS OF ESTROGENIC EDCs IN FISH SURVIVAL AND FECUNDITY

雌激素活性物質對魚類生存和繁殖的隔代影響

Doris W.T. AU

Funding Amount: CNY 80,000 and HKD 35,000

Endocrine disrupting chemicals (EDCs) are compounds that can interfere with endocrine functions in animals. Unequivocal experimental and epidemiological evidence in the last two decades has shown that EDCs in the environment has caused reproductive impairments including abnormal sexual development, alternation of sex and infertility, developmental disorders and birth defects in wildlife and human populations worldwide. The Pearl River Delta (PRD) is amongst the world's fastest developing urban and industrial region. Ample data showed that many EDCs (e.g. perfluorooctane sulfonate (PFOS), polybrominated diethyl ether (PBDEs) and dioxins) widely occurred in aquatic habitats of HK, SZ and the PRD, and elevated concentrations in some locations have raised environmental concerns. In human, consumption of contaminated seafood is a major source of intake of EDCs and has been consistently related to fetal developmental defects. Notably, seafood consumption per capita in HK and the South China region is amongst the highest in the world (HK alone ranked No. 4). Indeed, polychlorinated dibenzo-para-dioxins (PCDDs), polychlorinated dibenzofurans (PCDFs), and polychlorinated biphenyls (PCBs) in breast milk of HK population were also found to be amongst the highest, and were attributed to seafood consumption. Our recent studies showed that fish harvested from the PRD is a significant intake source of perfluorinated compounds (PFCs) and dioxin like compounds, and levels of which are sufficient to pose a public health concern. Levels and intakes of many emerging EDCs (e.g. bisphenol A and phthalates) in the local environment remain completely unknown, albeit they can be accumulated in human through seafood consumption.

Recent mammalian studies revealed that some EDCs have trans-generational effects and adversely affect future generations (e.g., offspring with deformities, decreased reproductive capacity and infertility), even if the offspring are never exposed to EDCs. Studies in mammals further revealed that some of these trans-generational effects are not caused by alternations in the underlying DNA sequence, but through epigenetic changes including activation or silencing of genes (e.g. by DNA methylation, covalent modification of histone, or chromatin folding). For instance, environmental contamination by EDCs (vinclozolin and methoxychlor) could induce epigenetic effects (by DNA methylation) on the germ line and promote disease across subsequent generations in rats. In vitro studies using human cell lines further suggested that epigenetic programming of certain genes can be altered by EDCs. On the other hand, increasing evidence from mammalian studies indicate that many adverse transgenerational effects caused by chemicals involve the activation or silencing of genes via microRNAs (miRNAs). Perinatal exposure of ewe to bisphenol A (BPA, an estrogenic EDC) disrupted steroidogenesis specific miRNA expressions in the developing ovary and decreased fertility in adulthood, suggesting that miRNA alteration may be a potential mechanism of EDC action during development.

A recent study in fathead minnows *Pimephales promelas* reported that F2 larval survival, exposed only as germ cells in their parents exposed to 3 ng/L of 17 $\alpha$ -ethynylestradiol (EE2), was reduced over 50% compared to controls. The indirect effect of EE2 on F2 survival suggests the possibility of transgenerational effects of EE2 on fish survival and fecundity. This lends support to our hypothesis that estrogenic EDCs cause transgenerational effects in fish, which can be mediated through epigenetic/genetic alterations. Such effects would potentially result in serious long-term impact on natural aquatic populations. Overall, it is hypothesized that estrogenic EDC can alter global RNA profiles and cause trans-generational effects in fish survival and fecundity. If EDCs can cause trans-generational effects in fish as in mammals, implying that the risks of EDCs on aquatic organisms and human health might have been grossly underestimated, and a proper reassessment is therefore urgently required.

Sept 2015 – Aug 2016 (Ongoing)

## EFFECT OF OCEAN ACIDIFICATION ON MULTIPLE GENERATIONS OF MARINE BENTHIC COPEPOD, *TIGRIOPUS JAPONICAS*

### 海洋酸化對多世代海洋底棲橈足動物日本虎斑猛水蚤 (*TIGRIOPUS JAPONICAS*) 的影響

S.G. CHEUNG, Paul K. S. SHIN, F.H. MU, X.S. LIU

Funding Amount: CNY 80,000 and HKD 35,000

Ocean acidification is a result of an increase in the dissolution rate of CO<sub>2</sub> in the ocean. The current average pH value of the ocean is 8.1, 0.1 unit lower than that before the industrial revolution. According to the prediction of the Intergovernmental Panel on Climate Change (IPCC), the pH of the ocean will decrease to 7.7 in the year 2100 and to 7.3 in 2300.

Studies on ocean acidification have been increasing dramatically in recent years with most of them involving single species and single generation. However, recent studies have demonstrated the significance of transgenerational effect in alleviating environmental stresses such as ocean acidification. A calanoid copepod *Pseudocalanus acuspes* was exposed to three CO<sub>2</sub> partial pressures (400, 900 and 1550 µatm) and grown for two generations at these conditions (Thor and Dupont 2015). The results showed evidence of alleviation of ocean acidification effects on fecundity and metabolic stress as a result of transgenerational effects at 1550 µatm. In contrast, various life stages of the copepod *Acartia tsuensis* were exposed to the control (380 µatm) and high CO<sub>2</sub> exposure (2380 µatm) for two generations. Compared to the control, high CO<sub>2</sub> exposure did not significantly affect survival, body size or developmental speed. Results were similar for the second generation (Kurihara and Ishimatsu 2008), indicating high tolerance of *A. tsuensis* to ocean acidification. Studies on such transgenerational effect over two or more generations, however, are very limited, and it is of interest to ascertain if adaptation to ocean acidification by marine species can be enhanced in further generations.

Copepods belong to Phylum Arthropoda, Class Crustacea, Subclass Copepoda. They are biologically diverse and occur in huge numbers in both freshwater and marine ecosystems with different modes of life: pelagic, benthic and parasitic. Harpacticoid copepods are benthic copepods which form the major diet of fishes, molluscs and shrimps. Benthic copepods are living in a relatively stable environment, so they are more sensitive to environmental disturbance. That is why they are commonly used as biomonitors of environmental stresses. The copepod *Tigriopus japonicus* is a benthic harpacticoid species distributed widely along the west coast of Pacific Ocean including China, Korea and Japan, and has high tolerance to temperature and salinity. In Qingdao, China, *T. japonicus* is commonly found in rock pools at higher intertidals where pH varies between 8 and 10 in summer and 7 and 8 in winter. It is omnivorous and can be reared using diatoms, yeast, fish meal, bacteria or macroalgae. The usual conditions for rearing *T. japonicus* are: temperature 20-25°C; salinity 30-35 psu; light dark cycle 16:8. The time to complete the whole life cycle at 23-25°C is 8 days. There are six naupliar stages and six copepodid stages before metamorphosing to adult which has a life span of 50 days.

Previous studies have shown that after prolonged exposure to ocean acidification, *T. japonicus* has a capacity to adapt to the stress and we suspect that such capacity is mediated through increasing metabolism which can be indicated by an increase in ATPase activity. Heat shock protein is a group of proteins commonly induced in living organisms for preventing coagulation of protein and cell death upon exposure to stress. The expression level of these genes has provided a sensitive molecular biomarker for aquatic monitoring of environmental contaminants (Rhee et al. 2009) and probably ocean acidification.

## Summary of the Seed Collaborative Research Fund (SCRF) Projects SCRF

### 項目概要

Apr 2014 – Mar 2017 (Ongoing)

## IDENTIFICATION AND ASSESSMENT OF EMERGING PERSISTENT ORGANIC POLLUTANTS (POPs) IN HONG KONG CORAL COMMUNITIES

香港的珊瑚群落中新興持久性有機污染物 (POPs) 的評估

P.O. ANG, James C.W. LAM

Funding Amount : HK\$900,000

Over the past decades, coral communities have become some of the most threatened ecosystems in the world. Degradation of coral communities can be associated with a wide range of environmental stressors such as global climate change, pollution, increased sedimentation, overfishing, eutrophication and coral disease. Studies have indicated the adverse effects of environmental contaminants to the coral species. These contaminants may significantly cause the decline of coral communities worldwide. While the presence of major contaminants like heavy metals in corals has been well studied, the presence of persistent organic pollutants (POPs) and their possible effects on corals are less understood. Hong Kong is located at the mouth of the Pearl River Delta (PRD) which has experienced a rapid rate of development over the past decades. Fast economic development, along with the large number of manufacturing industries in the area, makes the PRD a potentially significant source of various new and emerging toxic chemicals such as halogenated flame retardants (HFRs) perfluoralkyl substances (PFASs) and organic UV filters. Recently, several groups of POPs including polybrominated diphenyl ethers (PBDEs) and perfluorooctanesulfonate (PFOS) have been identified in various environmental matrices and even detected in the local wildlife. Most importantly, increasing trends of these persistent pollutants were found in the blubber of local cetaceans and coastal waters. In addition to PBDEs and PFOS, some of their replacements have also been detected in the local environmental samples such as sediment and seawater. However, there is no such information on the current status of these toxic and recalcitrant contaminants in the local coral communities. In view of the importance of Hong Kong as a possible refuge for corals and coral communities under the projected increase in sea surface water temperature as a consequence of global warming, it is important to elucidate the distribution pattern of these emerging contaminants and the newly identified HFRs, PFASs and organic UV filters in the local coastal environment, especially among the corals across a possible pollution gradient from west to east of Hong Kong. The present study therefore examines the occurrence and spatial variations of these traditional and new HFRs, PFASs and organic UV filters in the local coral communities as well as the different life history stages of selected coral species along this gradient. To the best of our knowledge, there are no studies, to date, that consider the exposure sources of emerging HFRs, PFASs and organic UV filters associated with coral communities.

Apr 2014-Mar 2017 (Ongoing)

## TRANSGENERATIONAL EFFECTS OF HYPOXIA IN FISH AND UNDERLYING MECHANISMS

### 缺氧對魚類的跨代影響及其內在機制

Richard Y.C. KONG, Chris K.C. WONG, Jill M.Y. CHIU, Doris W.T. AU, Rudolf S.S. WU

Funding Amount : HK\$2,200,000

Globally, hypoxia is one of the most widespread and pressing problem in aquatic environments. More than 400 "Dead Zones" have been identified by the United Nations around the world, including two out of the three major estuaries in China (the Pearl River and Yangtze River estuaries). Extensive studies have shown that hypoxia causes major changes in community structure as well as declines in species diversity and fishery production over large areas. These changes have led to severe economic and habitat losses, both in Hong Kong and worldwide. Our earlier studies revealed, for the first time, that hypoxia is an endocrine disruptor as well as a teratogen, causing reproductive dysfunction, deformities and a male-biased Fl generation in fish. In mammals, recent studies have revealed that some endocrine-disrupting chemicals (EDCs) can cause adverse effects in offspring (including decreased reproductive capacity, deformities and infertility) through epigenetic alterations (including DNA methylation, histone modification and microRNA regulation) without any change in the DNA sequence, despite the offspring never being exposed to EDCs. A recent mammalian study further provided evidence that the exposure of parents to hypoxia can result in sexual retardation, mortality, abnormal development and behavioural changes in the second generation. Whether hypoxia alters epigenetic regulation and causes adverse transgenerational effects in fish remains unknown. Also, whether or not the altered epigenome may be restored to the original state, and how long this takes remain unknown. This novel proposal aims to provide answers to these two important questions. Clearly, the risk posed by hypoxia on the sustainability of natural populations might have been grossly underestimated should transgenerational effects occur and persist.

### Research Output

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

- 1 Lai, K.P., Li, J.W., Wang, S.Y., Chiu, J.M.Y., Tse, A., Lau, K., Lok, S., Au, D.W.T., Tse, W.K.F., Wong, C.K.C., Chan, T.F., Kong, R.Y.C., Wu, R.S.S. (2015)  
**Tissue-specific transcriptome assemblies of the marine medaka *Oryzias melastigma* and comparative analysis with the freshwater medaka *Oryzias latipes*.**  
*BMC Genomics*, 16: 135

*Apr 2014 – Mar 2017 (Ongoing)*

## FUNCTIONAL RESPONSES OF MARINE ECOSYSTEM TO HYPOXIA

海洋生態系統對缺氧的功能性響應

Rudolf S.S. WU, Nora N.F. TAM, Paul K.S. SHIN, S.G. CHEUNG, Doris W.T. AU,  
P.O. ANG, Jill M.Y. CHIU, Y. LIANG

Funding Amount: HK\$2,000,000

The primary objective of environmental management is to maintain the sustainability of ecosystem services. Traditional approach widely adopted is to maintain biodiversity, based on the assumption that different species in the ecosystem perform different roles and functions, and decrease in biodiversity would impair ecosystem function and hence ecosystem services. Emerging evidence shows that this assumption may not necessarily be true, since the function of the species eliminated may be covered by other species performing the same function. Indeed, it has been shown that ecosystem function does not necessarily have a strong and direct dependence on species diversity. Thus, from an environmental management perspective, protecting ecosystem function would be much more important than protecting ecosystem structure, since the former is directly related, while the latter is only indirectly related, to ecosystem services. Nevertheless, the effects of pollution on ecological function of marine ecosystem remain virtually unknown. Hypoxia poses a significant threat to marine ecosystem over very large areas worldwide. The problem of hypoxia is particularly pronounced in China, and two out of the three major estuaries have been designated as “Dead Zones” by the United Nations. In this proposal, both laboratory and field experiments are proposed to test the hypothesis that hypoxia will alter important ecological functions of microbial community (i.e. nutrient recycling, decomposition and aerobic/anaerobic activities) and benthic community (trophodynamics, functional groups, metabolism, secondary productivity, carbon sequestration and energy status), thereby affecting ecosystem services. This pioneer study will enable us to understand the functional roles of microbial and benthic species in marine ecosystem, and how these important functions may be affected by hypoxia. This completely novel research will also provide extremely useful information for marine environmental management, and enable us to build our core capability in this new area and capitalize the enormous funding opportunities presented to us in the coming years.



Apr 2014 – Mar 2017 (Ongoing)

## DEVELOPMENT OF ELECTROCHEMICAL SENSING PLATFORM BASED ON AUNPS MODIFIED TiO<sub>2</sub> NANOTUBES FOR DETECTION OF EMERGING CHEMICALS OF CONCERN AND PHARMACEUTICAL RESIDUES

開發基於金納米粒子修飾的二氧化鈦納米管的電化學傳感平台用於環境污染物的檢測

Michael M.S. YANG, R.S.S. WU, Paul K.S. LAM, Michael H.W. LAM, Leo L. CHAN

Funding Amount : HK\$900,000

The current methods for the determination of environment pollution involve time-consuming detection processes and complex pre-treatment steps, which are not suitable for in-situ monitoring of samples and rapid processing of multiple samples.

Electrochemical sensors are expected to play an increasing role in environmental monitoring. Significant technological advances facilitate the environmental applications of electrochemical devices. They are inherently sensitive and selective towards electroactive species, fast and accurate, compact, portable and inexpensive. However, many current used electrodes are prone to surface fouling and passivation by radical intermediates or polymerization products generated by the electrochemical reactions between the analytes and electrode surface, which can lead to significant signal attenuation as well as reduced sensitivity and selectivity over time.

Recently, a refreshable electrode composed of AuNPs modified carbon-doped TiO<sub>2</sub> nanotube arrays (C-doped TiO<sub>2</sub>-NTAs) was proposed and fabricated in our lab by quick annealing of the as-anodized TiO<sub>2</sub>-NTAs in argon and electrodeposition. The electrode not only has excellent electrochemical activity, but also can be easily photocatalytically refreshed to maintain the high selectivity and sensitivity because they combine the merits of high electrocatalytic properties of AuNPs and photochemical properties of C-doped TiO<sub>2</sub>-NTAs.

By taking these advantages, we plan to develop high-sensitivity and recyclable electrochemical sensing platforms for environment pollutants monitoring, e.g. emerging chemicals of concern (ECCs) (Alkylphenol, phenol, bisphenol A, Benzo(a)pyrene, etc.), pharmaceutical residues (PRs) (sulfonamides, erythromycin, azithromycin, etc.) and microcystin. The outstanding and promising electrochemical analysis may have immense potential in high-sensitivity and high-selectivity sensor devices for environmental pollutants monitoring.

Apr 2014-Mar 2017 (Ongoing)

## INVESTIGATION OF COUPLED CIRCULATION AND ECOSYSTEM PROCESS IN MIRS BAY-TOLO HARBOUR (HONG KONG) DURING SUMMER TIME

香港大鵬灣-吐露港夏天海流-生態耦合系統過程的研究

J.P. GAN, Paul K.S. LAM, Leo L. CHAN, H.B. LIU, Robert K.Y. CHAN, P.O. ANG

Funding Amount : HK\$1,500,000

In 1998, Hong Kong suffered a devastating red tide attack that resulted in the worst loss of fish culture zone and damage of marine environment. The red tide was neither originated from the nutrient rich but likely light-limited Pearl River waters in the western part of Hong Kong waters, nor from offshore surface waters. The origin of the red tide was from Mirs Bay, which is located in the eastern part of Hong Kong Island and occupies about 50% of total sea area of Hong Kong. More than 10 year after the episode, the source of available nutrient that formed the red tide remains unclear. Lack of understanding about the role of the eastern part of Hong Kong waters has hindered us from obtaining holistic understanding on marine environment of the entire Hong Kong as well as solving the 1998 puzzle. With a deep central channel, unique shelf and coastline topography in the adjacent coastal waters, Mirs Bay is closely linked with the intrusions of nutrient rich deep waters from adjacent shelf, as a result of amplified cross-isobath shoreward transport at the lee of Hong Kong Island during southwesterly monsoon and from the Tolo Harbor to the north. Based on evidences derived from HKW and from the other parts of the world's oceans, it is hypothesized that: (H1) circulation and biogeochemical substance transports are largely controlled by the shelf-bay circulation associated with wind and tidally forced hydrodynamic response to the unique topography in Mirs Bay and (H2) the nutrient enrichments from adjacent shelf and from the inland harbor lead to an enhanced biological production in the bay. Study of this coupled harbor-bay-shelf circulation is crucial to scientifically understand the interactive dynamics in a harbor-bay-shelf system, and to complete the picture for the oceanic circulation and associated biogeochemical condition in Hong Kong waters. We propose to conduct field measurements, laboratory analysis and coupled physical-ecosystem numerical modeling to investigate hypotheses H1 and H2. Ultimate goal of the project is to identify the process and mechanism that the eastern part of Hong Kong waters play on the water ecosystem in the entire Hong Kong waters.

### Research Output

*Papers with the SKLMP grant or support acknowledged* 致謝SKLMP支持的期刊論文

- 1 Liu, Z., Gan, J.P. (2015)  
**Upwelling induced by the frictional stress curl and vertical squeezing of the vortex tube over a submerged valley in the East China Sea.**  
*Journal of Geophysical Research-Oceans*, 120 (4), 2571-2587

## Academic Meetings/Conferences 學術會議/講座

### SKLMP 2014 Annual and Academic Committee Meeting was successfully held at City University of Hong Kong 海洋污染國家重點實驗室第一屆學術委員會第四次會議

The State Key Laboratory in Marine Pollution 2014 Annual and Academic Committee Meeting was held on the 28<sup>th</sup> and 29<sup>th</sup> March, 2015 in the City University of Hong Kong. The Meeting has three main parts – Presentation of the SKLMP’s research project reports, Director’s Report, and the Academic Committee Review. There were more than 30 specialized scholars from China and Overseas examining and reviewing our annual work progress, and also providing planning strategies and guidance towards our next years’ goals. Emeritus Professor Takeshi Yasumoto from Tohoku University of Japan and Professor George Iwama from Okinawa Institute of Science and Technology Graduate University were specially invited to present ‘A Brief Review on Selected Topics of Microalgal Toxins’ and ‘A Bold New Initiative in a Research intensive Graduate University’ respectively, to further strengthen the relationships between worldwide recognized scientists and our laboratory, and to allow substantive academic exchanges.

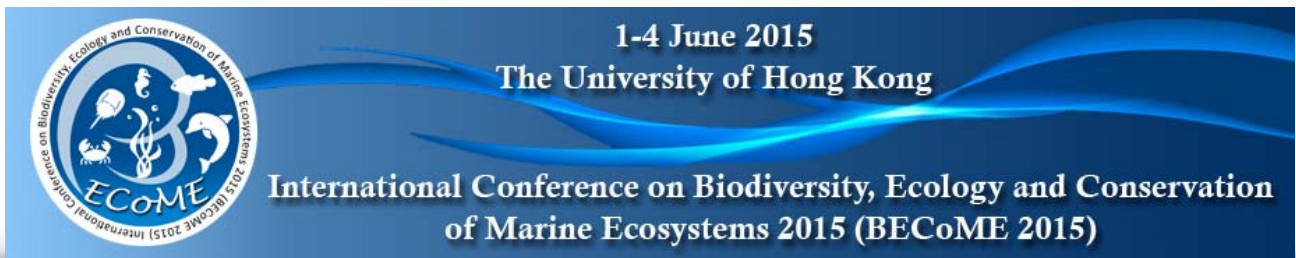
After listening to Professor Paul Lam Kwan Sing’s Director’s Report, many experts and scholars confirmed the SKLMP’s past year’s achievements, and were impressed with the progress of each research project, whilst simultaneously providing guidance towards the planning of the upcoming Assessment conducted by the Ministry of Science and Technology of the People’s Republic of China.

海洋污染國家重點實驗室2014年度會議於2015年3月28至29日在香港城市大學舉行。會議主要由SKLMP項目工作報告，主任工作報告及學術委員會評議三部分組成。來自海內外的30多名專家學者對實驗室上年度的工作進行考核和評估，並對下一年度的工作進行規劃和指導。會議還特邀了日本東北大學的名譽教授Prof. Takeshi Yasumoto和沖繩科學技術大學學院大學教授Prof. George Iwama，分別以 A Brief Review on Selected Topics of Microalgal Toxins和 Okinawa Institute of Science and Technology Graduate University A Bold New Initiative in a Research-intensive Graduate University為題進行了報告，進一步加強了實驗室與世界各地的優秀科學家的學術交流。

在聽取實驗室主任林群聲教授關於SKLMP的工作報告後，多位專家學者及參會人員充分肯定了實驗室過去一年取得的成績，對實驗室成員各項研究工作進展順利留下深刻印象。同時為實驗室預備來年國家科技部評估的籌備工作中作出了寶貴意見。



## Conserving Global Marine Biodiversity in a Changing World 全球海洋生物多樣性保育



Over 280 delegates from 26 different countries participated in the International Conference on Biodiversity, Ecology and Conservation of Marine Ecosystems (BECoME 2015), held from 1st to 4th June at The University of Hong Kong (HKU). The conference was jointly organized by the Swire Institute of Marine Science (SWIMS) and School of Biological Sciences, HKU Faculty of Science. At the conference, participants shared their views and discussed the latest scientific discoveries in biodiversity, ecology, and conservation of marine ecosystems worldwide, and explored ways to better conserve our marine biodiversity and fisheries resources.

In order to share experiences and seek potential solutions about how we can conserve marine biodiversity while balancing development and conservation, a team of over 25 local marine scientists conjointly established the Joint University Consortium for Biodiversity, Ecology and Conservation of Marine Ecosystems (BECoME) in January 2013. Members of BECoME have already contributed to Hong Kong's Biodiversity Strategy and Action Plan (BSAP) as part of the Hong Kong Special Administrative Region (HKSAR) Government's response to the international Convention on Biological Diversity. The BECoME team has recently been awarded a HK\$4.23 million Environment and Conservation Fund grant to study the marine biodiversity and ecology of Tolo Harbour and Channel. Through this project, the team will establish a comprehensive species database of the area, and develop standards for future ecological surveys in coastal habitats to ensure the quality of marine

ecological surveys as stipulated by the Environmental Impact Assessment Ordinance (EIAO).

香港大學理學院生物科學學院和太古海洋科學研究所 (SWIMS) 聯合舉辦的「2015年海洋生物多樣性、生態及生態系統保育國際會議」(BECoME 2015)，於2015年6月1至4日於香港大學黃麗松講堂進行。來自26個國家約280多名與會代表，一起討論目前國際上海洋生物多樣性、生態及生態系統的最新發現，並探討如何更好的保護海洋生物多樣性和漁業資源。

為了探討如何保護海洋生物多樣性及尋求可持續發展和保護的方案，超過25名本地海洋科學家於2013年1月成立了海洋生物多樣性、生態與生態系統保育 (BECoME) 專家團隊。BECoME成員已協助香港特別行政區政府制定「生物多樣性策略及行動計劃」(BSAP)，以回應國際「生物多樣性公約」的要求。BECoME團隊亦獲得423萬港元的項目基金用作研究吐露港及赤門海洋生物多樣性和海洋生態的保護。通過該項目，團隊將建立區域物種的綜合數據庫，並制定沿海海洋生物棲息地的生態調查基準，以確保環境影響評估條例中海洋生態調查的質量。

Given the implementation of Hong Kong's BSAP and proposed establishment of more marine protected areas by our Government, this BECoME 2015 Conference was very timely, and brought together international and local experts to share their views and help develop effective responses to protect marine biodiversity in Hong Kong, the South China region, and indeed globally. With the generous financial support from the Environment and Conservation Fund of the Hong Kong SAR Government and The Croucher Foundation, 22 renowned marine scientists from overseas and Mainland China shared their knowledge, experience and the latest developments in their respective fields with participants from academia, government, and the private sector at the BECoME 2015 Conference. Conference themes covered a wide range of topics, including environmental education; human and climate change impacts; ecosystem functioning; evolution and biogeography; biodiversity data sharing and management; regional and global biodiversity patterns; strategies for biodiversity conservation; and fisheries and marine resources management.

這次國際會議配合了香港政府推展「生物多樣性策略及行動計劃」及倡議成立多個海洋保護區，匯集了國際和本地專家分享他們的意見，幫助制定有效的應對措施，以保護香港、南中國地區、以至全球的海域生物多樣性。這次會議得到香港特區政府環境及自然保育基金和裘槎基金會的慷慨資助，邀請到22名海外及中國內地的海洋科學家向與會人士（包括學術界、政府及私人機構）分享他們的知識、經驗和最新海洋生物多樣性研究的發展。這次會議涵蓋廣泛的主題，包括環境教育、人類與氣候變化的影響、生態系統的功能、進化及生物地理學、生物多樣性數據共享及管理、區域和全球生物多樣性的模式、生物多樣性保護策略以及漁業和海洋資源管理等。



## The International Conference on Underwater Science, Technology and Education (ICUSTE)

### 水下科學、技術與教育國際會議

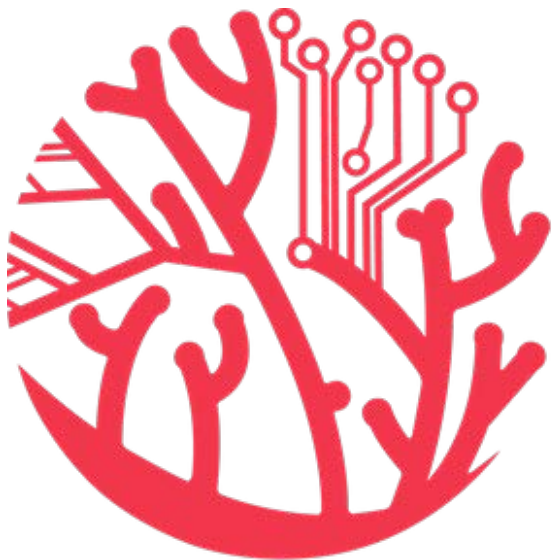
The International Conference on Underwater Science, Technology and Education (ICUSTE) was held from 19<sup>th</sup> to 22<sup>nd</sup> August at the City University of Hong Kong. The conference was successfully organized by the Division of Earth Sciences of the National Natural Science Foundation of China, the State Key Laboratory in Marine Pollution and the School of Veterinary Medicine, City University of Hong Kong (CityU). The aims of the ICUSTE were to promote academic exchange and collaboration in marine environmental science; enhance the awareness of marine environmental protection; facilitate the sustainable use of marine resources; elevate underwater research and exploration capabilities; develop marine innovative research; and educate industry in the greater China region.

2015水下科學、技術與教育國際會議暨香港海洋創新科技及未來產業發展研討會於2015年8月19-22日在香港城市大學順利召開。會議由國家自然科學基金委員會地球科學部、香港城市大學海洋污染國家重點實驗室和香港城市大學動物醫學院主辦，京港學術交流中心協辦，目的是促進海洋環境科學與技術的學術交流與合作，加強海洋環境保護意識，推進海洋資源的可持續利用，提升水下科學研究，海洋調查和勘探的能力以及大中華區海洋創新研究、教育和產業的健康發展。



The conference consisted of a local diving exploration day, academic meetings, two field trips, and covered interdisciplinary topics of significance with the theme "Tools for Ocean Research". Nearly 150 participants, from the USA, Mainland China, Taiwan and Hong Kong attended the conference. The opening day saw 40 participants take part in the local diving exploration. At the academic meetings, participants from universities, research institutes and industry, who are involved in underwater technology research and implementation, presented their research and achievements via talks and poster presentations. During the workshop on the Marine Innovative Technology and Industry Development in Hong Kong, researchers from various fields of marine science and technology expressed their own views and gave constructive advice for the development of Hong Kong marine research. At the closing ceremony, Professor Way Kuo, the President of the City University of Hong Kong, made a concluding remark and gave high praise to the conference. About 70 participants joined the field trip on the last day and the conference was brought to a successful end.

本次會議由潛水考察、學術會議和野外實地考察組成，主題為「海洋研究工具」這一交叉學科議題。共有來自美國、中國大陸、臺灣、香港本地的近150名學者註冊參加了會議。其中，近40名參會者在西貢進行了潛水考察，體驗科學潛水的樂趣。學術會議上，來自各高校、科研機構和水下科技公司的參會者以口頭和展板報告的形式向大家展示了他們在水下科技領域的研究思路和成果。在香港海洋創新科技及未來產業發展研討會上，海洋科技各領域的學者們各抒己見、熱烈討論，共同為香港海洋創新科技及未來產業的發展出謀劃策。閉幕式上，香港城市大學校長郭位教授對會議進行了總結，並對會議給予了高度評價。最後約70名參會者參加了香港地質公園和科研漁排的實地考察，該次會議圓滿落幕。



# IOUSTE 2015

## Awards and Recognitions 獎項與讚譽



Dr Doris W.T. Au won the Brain Pool Fellowship (Grade A), awarded by the Korean Federation of Science and Technology Societies (KOFST) for outstanding overseas scientists  
區慧婷教授獲韓國科學技術學會聯合會頒發的“優秀人才科研者獎 (A等) ”



Research on “Linkage and dynamics between South China Sea and adjacent tropical oceans” by Prof. Jianping Gan et al won National Natural Science Award (2<sup>nd</sup> class) 2014  
甘劍平教授等參與的“南海與鄰近熱帶區域的海洋聯繫及動力機制”研究獲2014年度國家自然科學獎二等獎



Research on “Formation, Characterization and Control of Microbial Granules for Biological Wastewater Treatment ” by Prof. Li Xiaoyan et al won National Natural Science Award (2<sup>nd</sup> class) 2014  
李曉岩教授等參與的“廢水處理系統中微生物聚集體的形成過程、作用機制及調控原理”研究獲2014年度國家自然科學獎二等獎



Prof. Shuk-han Cheng won Grand Prix and Gold Medal as a co-inventor for the invention “in vivo testing without animal experimentation” (Switzerland)  
鄭淑嫻教授等參與發明的“不含動物實驗過程的活體測試”獲第43屆日內瓦國際發明展最高榮譽大獎 (瑞士)



Prof. Shuk-han Cheng won Outstanding Research Award 2015 of City University of Hong Kong  
鄭淑嫻教授獲香港城市大學2015年傑出研究獎



Research on “Cell communication research and biological molecular detecting platform based on micro-fluidic chip technology” won the Outstanding Achievement Award of Scientific Research of Colleges and Universities (2<sup>nd</sup> class)  
楊夢蘇教授等參與的“基於微流控晶片技術的細胞通信研究及生物分子檢測平臺”獲2015年度高等學校科學研究優秀成果獎 (科學技術) 自然科學獎二等獎



Research on “Removal Efficiency and Mechanism of Water Pollutants by Algae and Bacteria” by Prof. Nora F.Y. Tam et al won 3<sup>rd</sup> Prize of Guangdong Province Science and Technology Award  
譚鳳儀教授等參與的“藻菌對水環境污染物的去除效應與機制”獲廣東省科學技術獎三等獎



Prof. Kenneth M.Y. Leung won top 1% most cited scientist based on Thomson Reuters' Essential Science Indicators in the field of Environment and Ecology  
梁美儀教授在Thomson Reuters基礎科學指標中為引用率前1%的科學家



Research on “Environmental and chemical behavior of emerging pollutant” by Dr. Lixi Zeng was awarded the National Natural Science Funds for Excellent Young Scientists  
曾力希博士的「新型污染物環境化學行為」研究獲批國家自然科學基金優秀青年基金



## Spotlights 研究亮點

# Biotechnology developed by Prof. Shuk Han CHENG and her research team win top international awards

## 鄭淑嫻教授及其團隊研發的生物技術獲國際頂尖獎項

On knowledge transfer, their work has generated economic and international impact. They developed the first transgenic marine medaka fish in the world for the biomonitoring of endocrine disruptors. This technology has been awarded prizes in international invention exhibitions and business competitions. Two CityU graduates formed a start-up company and licensed this biotechnology from CityU. Their current clients include a multinational company ranked in the top 200 Global Companies by Forbes, testifying to the translational values of this research. In addition, their work on the developmental toxicity of the carbon nanotubes has had an impact on policy making. The US EPA issued significant new user rules (SNURs) under the Toxic Substances Control Act (TSCA) for multiwalled carbon nanotubes (MWCNT) and single-walled carbon nanotubes (SWCNT) in 2010. The new rule requires a 90 days prior notification to EPA for evaluation before manufacturing, importing or processing these two chemicals. The EPA believes that this new rule was necessary because these two types of carbon nanotubes may be hazardous to human and the environment.

Amongst the list of 27 documents being used to prepare the preamble of this final rule, the EPA listed their publication in 2007 on the developmental toxicity of carbon nanotubes on zebrafish embryos. Other NGOs, such as the European Environmental Bureau and Der Bund für Umwelt und Naturschutz Deutschland (Friends of the Earth, Germany) also cited their publications in submissions to the European Parliament during the Scientific Hearing on Nanotechnology.



## Success in RGC Collaborative Research Fund (CRF)

2015-16

## Benthic and Epiphytic Toxic Algae (BETA):

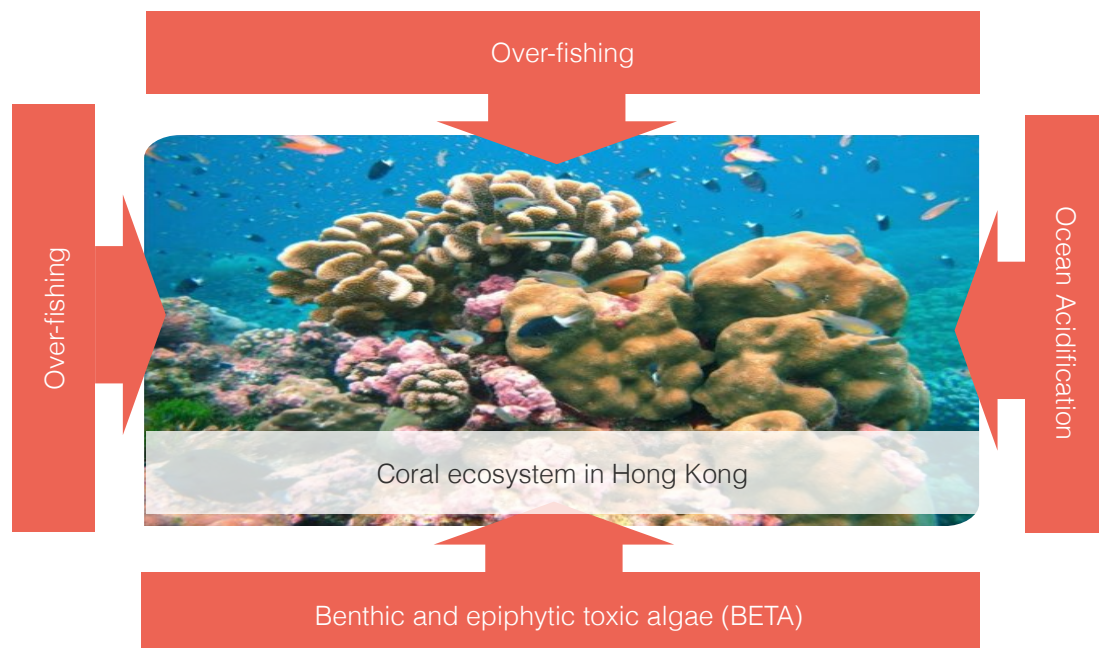
An emerging threat to coral ecosystems in Hong Kong waters

底棲及附生有毒藻類 (BETA) : 香港水域珊瑚生態系統的新興威脅

PC: Prof Paul K.S. LAM (CityU)

Co-PIs: Dr Leo L. CHAN (CityU), Prof Shuk Han CHENG (CityU), Dr Priscilla T.Y. LEUNG (CityU), Dr Yim Ling MAK (CityU), Dr Tak-Cheung WAI (CityU), Prof Put O. ANG Jr. (CUHK), Dr Jinping CHENG (HKUST), Prof Douding LU (SIO, SOA, China), Dr Yi Min CHEN (NCKU, Taiwan), Dr Chung Kuang LU (NRICM, Taiwan)

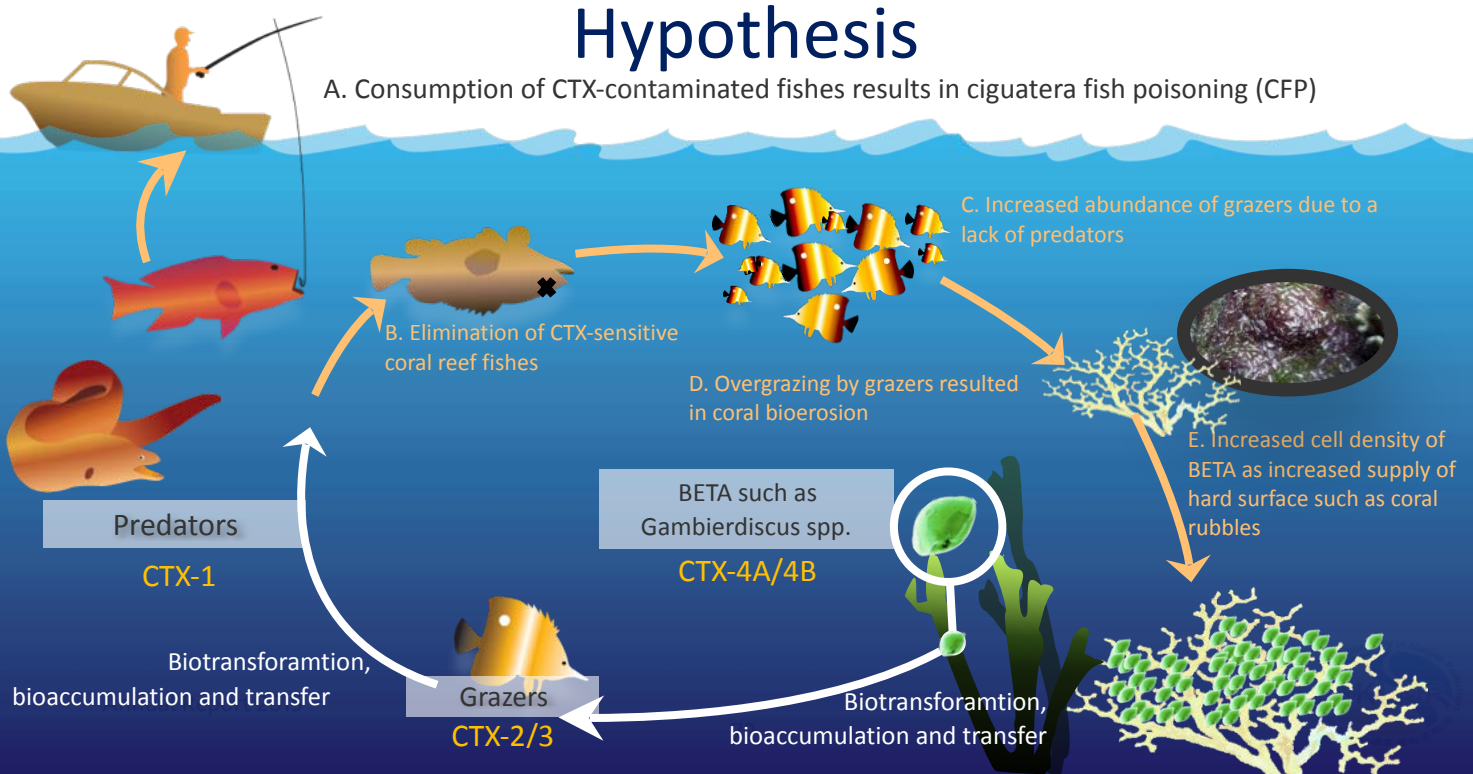
Benthic and epiphytic toxic algae (BETA), which can be found on hard substrata such as coral rubble, macroalgae or sand in coral ecosystems, include species in the genera *Gambierdiscus*, *Ostreopsis*, *Prorocentrum*, *Coolia* and *Amphidinium*. BETA have been observed in subtropical Asia-Pacific regions such as Thailand, Malaysia, Korea, Japan, Taiwan and Hainan and Hong Kong in China. Their worldwide distribution appears to be expanding, and increasing numbers of new BETA species have been reported worldwide, including from Southeast Asia [e.g. *G. scabrosus* was recently described from Japan]. There is, however, a lack of systematic information on the occurrence of BETA in Chinese (including Hong Kong) waters. Recently, researchers from the team initiated regular field surveys to document the presence of BETA in Hong Kong waters. At least 60 strains of these five BETA genera were collected from coral and rocky habitats in local waters in 2014. Preliminary results indicate that some species are new and toxic. Notwithstanding this, little is known regarding their spatio-temporal variations, or about the primary factors governing the prevalence, composition and toxicity of local BETA.



Many BETA taxa are known for producing potent phycotoxins [e.g. ciguatoxins (CTXs), palytoxin (PLTx), okadaic acid (OA) and dinophysistoxins (DTXs)]. These phycotoxins can cause ciguatera fish poisoning (CFP) and diarrhetic shellfish poisoning (DSP), which are among the most common human poisoning syndromes related to harmful algal blooms (HAB). One group of phycotoxins, CTXs, has been detected in coral reef fishes collected along the coast of south China, but the potential impacts on marine food webs and human health in the region are unknown. Our research group has found that Pacific-CTX-1 (P-CTX-1) can remain in the brain and peripheral nerve of mice for two months after first exposure. We have also demonstrated that chronic sub-clinical exposure of P-CTX-1 can induce maladaptive decision making and impairment of spatial memory of rats in a Morris water maze. More recently, attention has been paid to the ecological impacts of BETA. A number of laboratory and field studies have shown that CTXs, PLTx, OA and their derivatives may induce mortality of invertebrates, fishes and marine mammals. Our recent laboratory studies have shown that the locomotion, appetite and survival of marine medaka and orange-spotted grouper can be adversely affected by P-CTX-1 exposure. However, the overall ecological impacts of BETA-related phycotoxins in coral ecosystems are unclear.

Coral ecosystems are known for their high biodiversity and productivity. They provide food and shelter for marine organisms, services to tourism and fisheries, and coastline protection. Given the global trend of reef ecosystem degradation, a better understanding is needed regarding the potential impact of BETA and their associated phycotoxins on our remaining coral communities. The outbreak of benthic dinoflagellates in coral ecosystems is a global issue, and can occur in tropical, temperate and also sub-tropical regions including Hong Kong and southern China. In the proposed study, a unique dataset on the biodiversity and toxicity of BETA, along with environmental parameters and the health status of coral ecosystems, will be established in Hong Kong waters based on regular, systematic, field-based surveys. By measuring the environmental concentrations and determining threshold levels of BETA-related phycotoxins for the developmental, physiological and behavioral endpoints of fishes, a holistic assessment of the ecological health risks that BETA pose to coral ecosystems in Hong Kong can be conducted. This project also provides an opportunity for young scientists from multiple disciplines including taxonomy, marine ecology, molecular biology, toxicology, analytical chemistry, and statistics to collaborate in addressing an important environmental issue.

## Hypothesis



Two pieces of scientific news were published in the Society of Experimental Biology (SEB) Newsletter Oct 2015

兩則科技新聞於2015年10月在實驗生物學協會 (SEB) 秋季期刊上發表

// **BAD CHEMISTRY** by PhD student Drew Peterson //

&

// **GASPING FOR BREATH** by Doris W.T. Au //



CHANGING OUR SPOTS  
Newsletter Autumn 2015  
Society for Experimental Biology



to 25% in the juvenile fish. It remains unknown what mechanisms caused these effects or whether epigenetic modifications were involved but this could dramatically impact fish populations. 'We would hypothesize that juveniles with a higher aerobic scope would have a higher survival as they are better able to meet the demands of migration, foraging, and escaping predators,' concluded Amanda.

**PHISHING FOR CLUES**

As Jodie Rummer alluded during the 'Science with Impact' session (see pages 48 – 49), a critical challenge facing marine life is rapid ocean acidification. 'Current projections suggest we can expect to see a pH drop of 0.3 – 0.4 by the year 2100,' she said. To put this in context, a 0.1 pH drop in a human being's blood system could cause potentially lethal acidosis. Although fish have well-developed short-term acid-base compensation mechanisms, the effects of chronic exposure to high CO<sub>2</sub> are unknown, as reported by Dr Amélie Crespel (IFREMER Laboratoire Adaptation Reproduction et Nutrition des poissons, France), using European Sea Bass as a model.

Two-day-old fish were reared for over a year under one of three CO<sub>2</sub> conditions: current levels (500 µatm) and two of the more severe IPCC predictions for 2100 (1,000 and 1,500 µatm). The researchers then tested two different fitness parameters – maximum swimming performance and hypoxia tolerance. 'We used a flow chamber to measure swimming performance,' said Amélie. 'We gradually increased the velocity until the fish could no longer swim against the flow.' This was

combined with other measurements, such as blood haemoglobin concentration and aerobic scope, to build a comprehensive picture of energetic capacity. The results demonstrated that chronic acidification had a negative impact on swimming performance, but tolerance to hypoxia was improved.

But are these effects of early acidification exposure due to genetic imprinting or compensation mechanisms? To investigate this, fish from the different treatments were pooled together under common current CO<sub>2</sub> level conditions for three months before being tested. Intriguingly, this removed the effects of acidification exposure on swimming performance, but the fish still showed greater tolerance to hypoxia. This suggests that ocean acidity alters different traits through separate mechanisms. 'The processes underlying hypoxia tolerance seem to have been imprinted (probably through epigenetic changes) but not the processes underlying swimming performance,' said Amélie. 'We will need further investigations to understand this result.'

**BAD CHEMISTRY**

Besides acidification, marine life has to cope with the cocktail of chemicals we release into the oceans. Of particular concern are estrogenic endocrine disruptive chemicals (EEDCs) which are present in a wide array of products such as plastics, pesticides and hormone-based medicines, and can disrupt sexual differentiation and reproduction in wildlife. Most treatment plants lack equipment capable of removing these contaminants and

Above  
Female stickleback  
Photo credit:  
Dario Fiorentino



Left  
Copyright  
Sandersfeld

worrying new research suggests that EEDCs can have impacts beyond direct exposure, even affecting future generations that do not have contact with them.

‘EEDCs have direct effects on developing fish embryos but there is also evidence that they can impact the epigenome through DNA methylation and histone modification,’ said Drew Peterson (City University of Hong Kong). ‘If this happens in sperm or egg cells, these effects could be passed on to the next generation.’ To investigate this, Drew and his colleagues tested the multigenerational effect of EEDCs on Marine Medaka (*Oryzias melastigma*). They chose the compound 17a-Ethinylestradiol (EE2), a component of many oral contraceptive medicines. ‘The human body can only absorb a fraction of this hormone with the rest excreted through the urine,’ explained Drew. ‘Consequently, EE2 can reach high concentrations in waste water.’ Adult fish were directly exposed to either high or low EE2 concentrations, for either a short (7-day) or long (21-day) period. The eggs were collected daily and reared in clean seawater.

The results demonstrated that, for all treatments, parental exposure to EE2 had cross-generational effects. Hatching was significantly delayed in the offspring and fewer fish survived this process. In addition, offspring of parents exposed to high EE2 concentrations were more vulnerable to infections caused by pathogenic bacteria – an effect which even persisted to the following generation.

According to Drew, these studies should prompt national governments to clean up their waste water discharges. ‘It is critical that toxicological risk assessments consider the effects on

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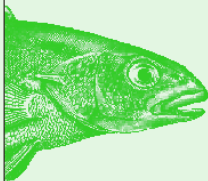
multiple generations to assess the full impacts on marine populations,’ said Drew.

## GASPING FOR BREATH

Carbon dioxide may be one matter, but in some areas it is oxygen – or rather a lack of it – that is the critical problem. ‘Globally, hypoxia is one of the most pressing problems in aquatic environments, with more than 400 so-called “dead zones” worldwide,’ said Doris Au (City University of Hong Kong). ‘It is equally problematic for oceans and freshwater systems with over 77% of the freshwater ecosystems in China now considered under serious threat by hypoxia.’ These dead zones are typically caused by excess nutrients (often released by human activities) that lead to cyanobacteria and algae blooms. When they decompose, the process uses up considerable oxygen, suffocating other marine life. ‘This has already been shown to have severe repercussions, such as decreasing biodiversity, altering ecosystem and population structures and eradicating more sensitive species from certain areas,’ added her collaborator, Rudolf Wu (The University of Hong Kong, HKU).

It is largely unknown how early exposure to hypoxia affects the lifelong health of individual fish. Doris’s team investigated this by exposing Medaka fish to hypoxic conditions during embryonic development. The results demonstrated that early exposure to hypoxia significantly reduced growth and immunity to the bacterial pathogen *Edwardsiella tarda*. To see if a genetic mechanism was responsible, epigenetic analysis was carried out. ‘In the “pre-hypoxia” adults, there was a good correlation between repressive epigenetic marks, such as DNA methylation and histone modification, and genes involved in growth hormone regulation and anti-microbial peptide production in the liver,’ Doris explained.

Worryingly, Doris and her collaborators (Rudolf Wu and Simon Wang, HKU) also showed that these epigenetic repressions are also passed on to the future generation, particularly in genes relevant for reproductive function. This could explain why the offspring of hypoxia-exposed adults showed reduced sperm counts and disrupted gonad development. ‘Our results suggest that current assessments on the risk of hypoxia on aquatic environments might have been grossly under-estimated and that hypoxia will pose a much more serious and long-lasting threat to fish populations than previously thought,’ Doris concluded. ■



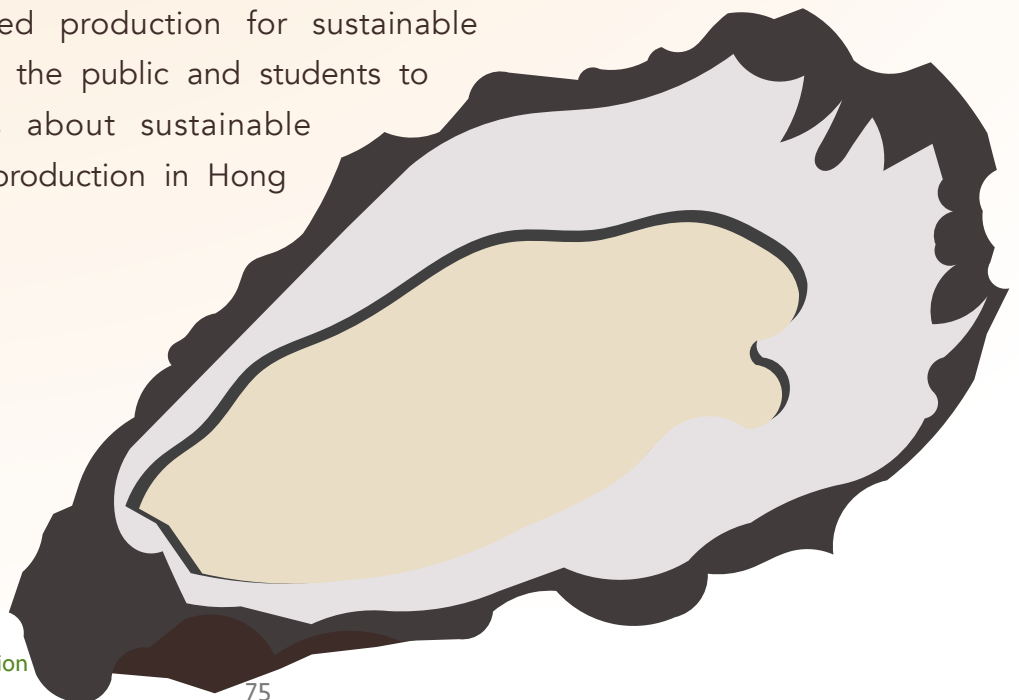
## Knowledge Exchange: Economically Viable Technologies for Hong Kong Oyster Growers

### 知識交流：香港牡蠣養殖者的經濟可持續技術



As human population is rapidly growing, our dependence on protein from oyster meat is expected to rise dramatically within this century. However, global warming and ocean acidification are threatening oysters, and so the sustainable production of oysters through aquaculture is a pressing issue for indigenous oyster growers, local government and politicians, especially in China and Hong Kong. One of our members (Dr V Thiyagarajan) in close collaboration with Hong Kong's Deep Bay Oyster Association has secured grants from the AFCD's Sustainable Fisheries Development Fund to examine the feasibility of a variety of technologies to assist local oyster growers in producing resilient oyster seeds in a cost

effective and sustainable way. This multidisciplinary knowledge exchange project is also providing hands-on training and practical knowledge to Hong Kong's oyster growers about oyster seed production for sustainable aquaculture, and engaging the public and students to promote their awareness about sustainable methods for oyster meat production in Hong Kong.



## Academic Exchange and Collaborations

### 學術交流與合作

May

#### A visit to Xiamen University 訪問廈門大學

From 15-17 May, Dr. Chan Lai, Dr. Lam Chung Wah, Dr. Wu Jiajun and Dr. Leung To Yan visited Xiamen University. There was a discussion on an instrument online booking system between the SKLMP of CityU and the State Key Laboratory of Marine Environmental Science (MEL) of Xiamen University.

5月15-17日，海洋污染國家重點實驗室副主任陳荔博士、林忠華博士、吳佳俊博士和梁度因博士前往廈門訪問廈門大學。他們就香港城市大學SKLMP和廈門大學的近海海洋科學國家重點實驗室之間的儀器線上預約系統進行了討論交流。

#### A visit to artificial house reef of Mabul, Malaysia 前往馬來西亞馬布考察人工珊瑚礁

From 25-29 May, Dr. Chan Lai, Dr. Mak Yim Ling and Dr. Wu Jiajun went to Sipadan-Mabul Resort, Malaysia to visit and observe the development of an artificial house reef. They also performed SCUBA diving there and observed the underwater environment.

5月25-29日，陳荔博士、麥艷玲博士和吳佳俊博士赴馬來西亞的馬布，訪問並觀察人工環島珊瑚礁的發展，同時在當地進行了水肺潛水，親身觀測水下環境。

Jun

#### A visit to the State Key Laboratory of Marine Environment Science (MEL) 訪問近海海洋環境科學國家重點實驗室

From 10-12 June, Dr. Chan Lai visited Xiamen University. The State Key Laboratory of Marine Environmental Science (MEL) had an on-site assessment conducted by the Ministry of Science and Technology of the People's Republic of China (MOST) on 11 June, 2015. Since the SKLMP will be having its first review by MOST in 2016, in order to get well prepared for this review, Dr. Chan Lai was invited to attend the visit of MOST, so that he could study and learn about the assessment process.

6月10-12日，陳荔博士赴廈門大學進行了訪問。近海海洋環境科學國家重點實驗室（MEL）在2015年6月11日進行了中華人民共和國科學技術部（MOST）的現場評估。而SKLMP將在2016年接受MOST的第一次評估，為了準備評估，陳荔博士被邀請參加這次訪問，從中學習關於評估的經驗。

Aug

## A visit to Tainan, Taiwan 前往臺灣台南市採樣和參觀

From 31 Aug to 4 September, Dr. Chan Lai and Miss Liu Chih Ning visited Tainan, Taiwan. They performed benthic dinoflagellate sampling and visited Taiwan local aquaculture fish farms. They also discussed ecological aquaculture with local researchers and fishermen.

8月31日至9月4日，陳荔博士與劉致寧女士前往臺灣台南市，進行了底棲鞭毛藻類採樣，並參觀了臺灣本地的水產養殖漁場，與當地學者和漁民探討了生態水產養殖的相關問題。

Sep

## A visit to Bachok Marine Research Station, Kelantan, Malaysia 前往馬來西亞萬捷縣海洋研究所進行學術交流

From 28 September to 1 October, Dr. Chan Lai, Dr. Mak Yim Ling and Dr. Wu Jiajun visited Bachok Marine Research Station, Kelantan, Malaysia. They further discussed potential research collaboration and exchanged research ideas on Benthic Harmful Algal Blooms (BHABs) research and gave a lecture on BHABs research.

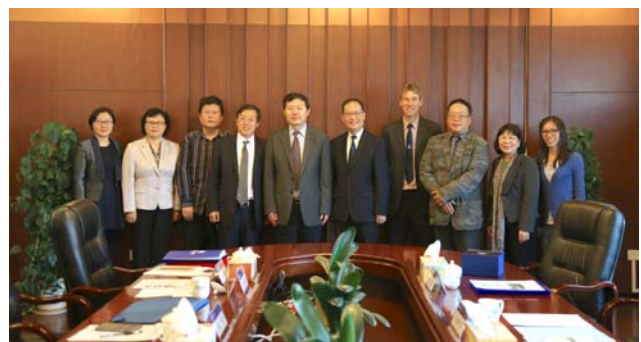
9月28日至10月1日，陳荔博士、麥艷玲博士和吳佳俊博士前往馬來西亞吉蘭丹州萬捷縣海洋研究所。雙方就各自的研究工作做了報告，討論了有關底棲有害藻華的研究思路並進行深入合作。

Oct

## The strengthen of collaboration with the Ocean University of China 加強與中國海洋大學的研究合作

From 19 to 21 October, Prof. Paul K.S. Lam ( Chief of staff, CityU), Prof. Gray Williams (Director, SWIMS), Dr. Leo Chan (Associate Director, SKLMP) and Dr. Jiajun Wu (SKLMP) went to Qingdao and visited the Ocean University of China, The First Institute of Oceanography, SOA and Institute of Oceanology, Chinese Academy of Sciences. They discussed cooperation between the City University of Hong Kong and the Ocean University of China on "Underwater Science, Technology and Education" and also on the enhancement of both the SKLMP and the Shandong Key Laboratory in Marine Environmental Geology Engineering. After the discussion, the agreement between CityU and OUC on "Underwater Science, Technology and Education" was signed by Professor Paul Kwan Sing Lam and Vice President of OUC Professor Huajun Li. Also, the agreement between the SKLMP and the Shandong Key Laboratory in Marine Environmental Geology Engineering on "Observation and Regulation of Submarine Environment" was signed by Dr. Leo L. Chan and Professor Yonggang Jia from OUC.

2015年10月19至21日期間，香港城市大學秘書長林群聲教授、香港大學太古海洋科學研究所 Gray Williams教授、海洋污染國家重點實驗室副主任陳荔博士與吳佳俊博士赴青島訪問中國海洋大學、國家海洋局第一海洋研究所及中國科學院海洋研究所。他們與中國海洋大學的學者共同討論了城大與海大關於水下科技的合作，以及海洋污染國家重點實驗室和山東省海洋環境地質工程重點實驗室的交流與發展。經過雙方會晤，陳荔博士與山東省海洋環境地質工程的賈永剛主任簽署了關於「海底環境觀測與調控研究」合作協定書，並代表林群聲副校長與海大副校長李華軍共同簽署了兩校關於「水下科學、技術與教育」合作協定書。



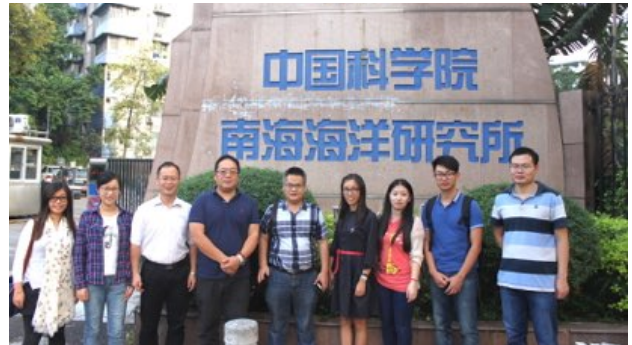


Nov

## A visit to South China Sea Institute of Oceanology, CAS 訪問中科院南海海洋所

On 18 November, Associate Director Dr. Chan Lai, Dr. Wu Jiajun, Dr. Maggie Mak and Mr. Zhang Feng went to Guangzhou to visit the South China Sea Institute of Oceanology, Chinese Academy of Sciences. They discussed with researchers collaboration in microalgae mass culture technology, microalgae resource development and optimizing flue gas capture technology using microalgae.

2015年11月18日，海洋污染國家重點實驗室副主任陳荔博士、吳佳俊博士、麥艷玲博士和張峰先生赴廣州對中國科學院南海海洋研究所進行訪問，與研究所的專家學者共同探討了微藻大量培養技術、藻類資源開發和優化微藻捕集廢氣技術的合作。



Dec

## A visit to Beijing Normal University Zhuhai International Center and attending a conference 訪問北京大學生態文明珠海研究院並出席會議

From 1-3 December, Dr. Chan Lai went to Beijing Normal University Zhuhai International Center. He was invited to attend the Second Annual Conference of Zhuhai Ecological Civilization Construction. The theme of the conference was "Ecological Civilization, Reform and Innovation". Dr. Chan Lai gave an oral report on ocean ecology and during the conference discussed with other participants ecological development for the Pearl River Delta.

12月1-3日，陳荔博士前往北京大學生態文明珠海研究院，受到邀請出席第二屆珠海生態文明建設學術年會。該次會議的主題為“生態文明，改革創新”。陳荔博士作了關於海洋生態的口頭報告，並與參會者討論了關於珠江三角洲的生態文明建設問題。

# The 17th China High-Tech Fair in Shenzhen 第十七屆深圳高交會

On 16th November, 2015, the State Key Laboratory in Marine Pollution (SKLMP) attended the 17th China High-Tech Fair (CHTF) in Shenzhen. With the theme of "Innovative Entrepreneurship, Cross-border Integration" CHTF 2015 focused on next generation IT, energy conservation and environment protection, electronics, biology, high-end equipment manufacturing, new energy, smart cities, etc. It involved 128 delegations from 28 countries and regions, and 3,686 exhibitors and 16,825 projects were involved in the fair.

The City University of Hong Kong Shenzhen Research Institute selected nine key projects to display in its booth, and the SKLMP exhibited Yo-yo USV, Underwater Habitat, scientific diving program, Scientific Fish Raft, and benthic microalgae photo-bioreactor with adjustable wavelength LED illuminator. Many visitors were interested in our scientific diving program. Through providing high quality, interactive teaching and learning experiences to the participants, we aimed to elevate underwater research and ocean survey and exploration capabilities for marine science research, innovative technological development and underwater diving safety. Our other four research projects also exhibited similar scientific research and technology developments.

We hope to boost our research capacity and collaborate with other State Key Laboratories to further develop innovative instruments and systems for underwater monitoring and continuous exploration in order to contribute a better understanding of China's seas.

2015年11月16日，海洋污染國家重點實驗室參加了在深圳舉辦的素有「中國科技第一展」之稱的中國國際高新技術成果交易會（簡稱「高交會」），這是我室繼2014年後第二次參加高交會。

本屆高交會主題為「創新創業、跨界融合」，共設有主題展區、會議論壇、專題活動、高新技術人才與智力交流會、不落幕的交易會五大板塊，有28個國家和地區的128個代表團、3686家參展商、16825個項目參加展示、交易和洽談。

在本屆高交會上，香港城市大學展團共選報了9個科研項目參展。其中海洋污染國家重點實驗室共展出5個科研項目，分別為：Yo-yo水面無人船、水下棲息地、科學潛水計畫、科研漁排、可調波長光學引擎的底棲甲藻光生物反應器。其中的「科學潛水計畫」板塊引發了現場眾多參觀者的濃厚興趣，他們紛紛駐足觀看展板並積極諮詢。此計畫旨在為參與者提供高品質的、互動式的科研潛水教學和新型潛水體驗，從而提高水下研究、海洋調查和勘探的能力，以更好的服務於海洋環境科學的研究、創新技術開發及潛水安全。而其他四個科研項目也從不同角度詮釋了我實驗室先進的科研技術及成果。

我們將承載著本屆高交會「創新創業、跨界融合」的主題，緊跟中國國際高新技術發展的步伐，結合海洋污染國家重點實驗室的科研目標，創造出更高水準的科研成果，為中國的海洋事業貢獻力量。

**海洋与人类健康研究中心**  
(海洋污染国家重点实验室)  
Research Centre for the Oceans and Human Health

**科学潜水计划**

海洋产业是科学、技术、人才密集型产业，需要直观和全面地进行海洋科学研究，水下作业极其重要，因此海洋人才培养少不了潜水技能的掌握。潜水是科学家宝贵的研究工具，潜水能使学生和科学家们直接观察海洋生物及生态系统在自然界中真实的状态。与休闲潜水与商业潜水不同，科学安全潜水是以科研任务为导向，以潜水为手段。我们将通过讲座、潜水技能培训、实地考察、水下海洋生物课堂、学生演讲和开放科学论坛等活动，贯彻为参与者提供高质量的、交互式的教学和新型的学习体验的宗旨。通过科学安全潜水的教育，我们可以提高水下研究、海洋调查和勘探的能力，以更好地服务于海洋环境科学的研究，创新技术开发及潜水安全。同时加强大中华区水下科学的发展，促进全球合作，提高保护海洋的公众意识。通过“哪吒计划”以及“海洋+”计划，培训了来自香港、内地和海外近百位潜水员，并开展了潜水分享会以及水下科学技术及教育研讨会。为了最大程度保障水下作业人员以及水下自然环境的安全，在科学安全潜水体系中必须强调如下几个方面：逆境处理技能，团队合作训练，动物行为学基础知识，生态学基本知识，水下设备设计与操作技能，提高水下科研工作效率，救援和急救，潜水装备管理与保养规范，潜水员体质训练及严格的体检等。科学安全潜水体系的目标人群为：科研工作者、水下考古工作者、海洋工程从业人员、商业潜水员、消防员、应急救援员、救生员、船员和渔民等。

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## Social Education & Community Service

### 公眾教育與社會服務

# Seminar on Diving Safety and Hints on Clean-up of Abandoned Fish Nets

## 清除棄置魚網的潛水安全及注意事項講座

On 28<sup>th</sup> Nov 2015, Seminar on Diving Safety and Hints on Clean-up of Abandoned Fish Nets was held at City University of Hong Kong, aiming to providing advice to recreational divers on issues relating to clean-up of abandoned fish nets. 30 participants attended the seminar, including representatives from Diving Adventure, Hong Kong Recreational & Technical Diving Group, Living Seas Hong Kong, The Hong Kong Institute of Education, Scout Association of Hong Kong - Kowloon Region, State Key Laboratory of Marine Pollution, City University of Hong Kong, Agriculture, Fisheries and Conservation Department (AFCD) and Hong Kong Underwater Association (HKUA). There were two presentations at the seminar: "Diving Safety on Clean-up of Abandoned Fish Nets" presented by Mr. Alex Wong of HKUA, and "Hints on Clean-up of Abandoned Fish Nets" presented by Mr. K.T. Wo of AFCD. Recreational divers were reminded to report the case of abandoned fish nets found at reef check sites, marine parks and marine reserve to 1823 or AFCD direct for follow-up action. Moreover, HKUA will organize training workshop or seminar for scuba divers in 2016 and invite experts with the help from AFCD to share knowledge and experience in local fishing operation and marine ecology.

2015年11月28日，香港城市大學舉辦了清除棄置魚網的潛水安全及注意事項講座，該講座目的是為了給清除廢置魚網的休閒潛水提供建議。共有30人參加了這次講座，他們分別來自潛水歷險會、香港休閒及技術潛水谷、勃勃海洋、香港教育學院、香港童軍總會九龍地域、香港城市大學海洋污染國家重點實驗室、香港漁農自然護理署和香港潛水總會。香港潛水總會的黃立基先生以“清除廢置魚網時的潛水安全”為題作了演講，漁農護理署的胡景泰先生則發表了關於“清除廢置魚網的相關提示”的演講。經過參加者的熱烈討論，為了後續清除行動，建議休閒潛水員報導包括礁石區域、海洋公園和海洋保護區的水下廢置魚網的相關情況。此外，香港潛水總會將在2016年組織潛水培訓研討會或講座，邀請專家學者分享漁業運營和海洋生態方面的知識及經驗。



# The International Scientific Diving Education and Application Symposium (IDEAS) was successfully held by SKLMP

## 海洋污染國家重點實驗室成功舉辦國際潛水教育與應用研討會



The International Scientific Diving Education and Application Symposium (IDEAS) 2015, which was organized and sponsored by the State Key Laboratory in Marine Pollution (SKLMP) at the City University of Hong Kong, was held from 19 to 24 July. IDEAS provided training in practical skills for scientific diving and the aim was to nurture tomorrow's marine scientists and raise awareness about marine conservation. Around 40 students and teachers from secondary schools and tertiary institutions in Hong Kong, the mainland and the US participated in IDEAS. Lectures, diving skills training, field trips in Sai Kung, underwater marine biology classes, presentations and an open scientific forum were included in the training. IDEAS, also sponsored by Diving Adventure Limited and the Agriculture and Fisheries and Conservation Department, provided participants with a valuable opportunity for personal enrichment and the development of social awareness of, and responsibility for, the environment.



2015年7月19-24日，海洋污染國家重點實驗室成功舉辦了國際潛水教育與應用研討會2015，目的在提升科研潛水技術水平，以培育未來的海洋科學家，並提高公眾的海洋生態保育意識。

約40名大專院校和中學的教師和學生參加了此次研討會，分別來自香港、內地、美國。研討會的活動包括：講課、潛水技能訓練、在西貢的實地考察、水下海洋生物學課堂教學、講座，以及一場潛水分享會。這次研討會的贊助機構，還包括香港的潛水歷險會及漁農自然護理署。研討會讓與會師生獲得一次自我充實的良機，並有助增強社會對環境保育的認識和責任感。





# 1+1 Science Tip-top Talent Scheme 科學優才計劃 2014/15

A group of students visited the State Key Laboratory in Marine Pollution on 8 April, 2015. Those students selected were from the 1+1 Science Tip-top Talent Scheme 2014/15, which is organized by the Hong Kong Federation of Youth Groups and sponsored by the Innovation and Technology Commission.

The Scheme aims to nurture talented young scientists by providing them with an opportunity to apply their skills and enrich their learning by seeking mentors' advice on their research. It is open to S.4 and S.5 students talented in science who have been nominated by schools. A total of five teams with nine students had already been selected to join the Scheme and have the chance to gain valuable experience through a mentorship with staff from local universities in a related science field.

2015年4月8日，一組學生參觀了海洋污染國家重點實驗室。在香港青年協會的組織下，由創新科技署贊助，這些學生是從1+1科學優才計劃選出的優秀學生。

這一計劃旨在培養優秀的青年科學家，向他們提供發揮實踐技能的機會，通過尋求導師的指導而豐富學識。該次參觀對學校推薦的第4和第5期的優秀學生開放，共有5組9位學生參加了該計畫，並有機會在本地高校教授的指導下在相關科學領域獲取寶貴經驗。

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