

**Areas of Excellence Scheme – Highlights of Achievements**  
**Centre for Marine Environmental Research and Innovative Technology**

The Centre for Marine Environmental Research and Innovative Technology (**MERIT**) comprises a team of biologists, chemists, physicists, engineers and a statistician from six universities in Hong Kong. From 2004 to 2013, MERIT conducted a wide range of multidisciplinary research under four interlinked programs: Novel technologies for environmental diagnosis; Ecosystem responses and recovery; Impact and risk assessments; and Bioremediation technologies. Much of our pioneering research has had global impacts, clinched many international awards and also has made Hong Kong highly visible in the international arena. Examples include the following:

- (a) We discovered, for the first time, that hypoxia can disturb selected genes regulating sex hormones and apoptosis, leading to reproductive and developmental impairments and a male biased new generation in fish. This finding has not only a significant impact on environmental sciences but also important biomedical implications.
- (b) Our novel invention, the “*Artificial Mussel*”, has developed into a global metal monitoring program in 20 countries spanning across North and South America, Europe, Australia, Africa and Asia, and has further received support from the United Nations and the International Atomic Energy Agency.
- (c) We have developed the first transgenic marine medaka fish for *in situ* detection of endocrine disrupting chemicals, a medaka microarray and ISH/IHC techniques for *in vivo* studies of relevant gene and protein expression in fish.
- (d) The novel field-based species sensitivity distribution method that we developed has been adopted by the European Water Framework Directive and the US Environmental Protection Agency for impact assessment of metals.
- (e) The PC-based virtual reality environmental impact assessment system developed by MERIT has been used by over 200 different users in 32 countries.
- (f) Our “*PathoChip*”, the first of its kind in the world, enables simultaneous semi-quantitative detection of six waterborne pathogens. It is superior to existing techniques in terms of both cost and time.
- (g) The *in vitro* bioassay using the H295R cell line the MERIT team developed has been adopted by the USEPA and the Organisation for Economic Co-operation and Development as the official test for detecting endocrine disrupting chemicals.

Since its inception, MERIT has been commissioned by various international and United Nations agencies to conduct 10 regional/international training courses for scientists from Hong Kong, China, Asia and Africa. MERIT’s outstanding achievements are clearly exemplified by the award of (a) the “*Partner State Key Laboratory of Marine Pollution*”, from the China Ministry of Science and Technology in 2009; and (b) the “*Regional Centre of Excellence in Marine Pollution*”, from the *Partnerships in Environmental Management for the Seas of East Asia* of the United Nations, with the mandate to provide expert views and advices to government bodies in the region on marine environmental issues. This Centre was officially endorsed by the eleven partner countries in the region.

*\*The above summary is written by the project team. The views expressed in the summary do not necessarily represent those of the University Grants Committee / Research Grants Council.*