

THE EDUCATION UNIVERSITY OF HONG KONG
FACULTY OF LIBERAL ARTS AND SOCIAL SCIENCES

Research Output/Impact/Knowledge Transfer Prize
for the Dean's Research Fund 2018-19

Brief Introduction of Awardee's
Research/KT Publication/Study/Output and Future Research/KT Development

Awardee (Dept):	<u>Dr. Lincoln Fok, Associate Professor (SES)</u>
Publication Title/KT project:	<u>Spatio-temporal comparison of neustonic microplastic density in Hong Kong waters under the influence of the Pearl River Estuary</u>

A. *Briefly introduce your research/KT publication/study/output for which you have received the prize.*

This article was published in a SJR top-5% journal (STOTEN) which reported the spatial abundance of small marine plastic debris (microplastic, hereafter MP) at sea surface at the Pearl River Estuary of South China. The work involved is funded by a RGC ECS grant #859413. Plastic debris pollution has been recognized by the UNEP as an emerging global environmental issue in 2014. Recently the concerns over the impacts of MP (<5mm in diameter) on the environment have exploded in the scientific community because MP are potentially harmful, physically and chemically, to a wide range of biota, including zooplanktons, fishes and bivalves. Plastic pollution has also been identified in various intertidal, marine and fluvial habitats. Not only do ingested MP cause physical damage to the organism, but also pollutants adsorbed to and additives of MP may transfer to the organism, and thereby, into the food chain. Earlier this year, MP had also been detected in human feces [2].

Home to nearly 60 million population, the Pearl River Delta is one of the most densely populated river deltas in the world. The amount of plastics produced and discarded in this region is enormous. Couple with the fact that waste collection in the rural areas of China is rudimentary to non-existent, as it rains, the mismanaged plastic waste will be washed into the drainage systems and eventually into the ocean. In fact, it is estimated that three-quarters of waste generated in China is mismanaged and would eventually ended up in the sea. In 2015, the applicant reported MP abundance on the beaches at the Pearl River Estuary being one of the highest in the world.

The current article reported the abundance of MP at the sea surface based on carefully designed sampling covering 15 sites of Hong Kong. Taking account for difference due to the seasons, the average abundance at the sea were 3.6 particles per cubic meter of sea water. Influences of geography and seasonality were also reported. Methodologically speaking, the study also applied FTIR spectroscopy to characterise the debris collected from the samples. Many studies only based their abundance upon visual identification aid by microscope,

which was found to significantly overestimate the level of pollution.

In terms of knowledge transfer, the applicant was invited to collaborate with the Greenpeace Rainbow Warrior in January 2018 to further study MP in the local waters. This education campaign had been widely reported in the news (e.g. SCMP [2]).

References:

[1] <https://www.businessinsider.com/plastic-accumulates-in-human-feces-evidence-shows-for-first-time-2018-10>

[2] <https://www.scmp.com/video/hong-kong/2130499/greenpeaces-rainbow-warrior-sails-hong-kong-message>

B. How you used/will use your prize and perhaps its usefulness to your research/KT development?

The fund will be used to push forward higher risk microplastic research in Hong Kong.

C. Expected research/KT outcomes/outputs/impacts arising from this prize.

The result can lead to another GRF proposal.