# SISP 8001

# Smart Fish (For Real-time Detection of Microplastics)

Course Description

Microplastic contamination resulting from the disintegration of plastic waste has emerged as a public concern due to high levels of fragmentation and disturbance in marine ecosystems. The associated problems greatly affect the sustainability of aquatic animals and human beings. This course aims to introduce a prototype device that can perform real-time sampling and detection of microplastics quantitatively in Hong Kong waters using remote sensing and GPS technology. Through the introduction of its fundamental theory and potential applications, students will be inspired by the built prototype from the synergy between science and engineering to tackle emerging environmental problems in our daily lives.

Topics

1. Problems of marine plastics and microplastics
2. Smart Fish design and potential applications
3. Universal staining technique of microplastics
4. Advanced capturing system for visualization of microplastics
5. Chemical destruction of microplastics
6. Future directions of Smart Fish

Grading Scheme

- Online Quiz (30%)
- Group Presentation (50%)
- Continuous assessment (20%) (e.g. attendance, class participation, discussion)

[Topics and grading schemes are subject to change as deemed appropriate. Students will receive information and guidelines in class on how they will be assessed for the course.]

Attendance Requirement

Class attendance is expected and required. The minimum attendance required is 70%.

Teaching mode

The course will be conducted via Zoom.

Instructors

| **Dr Cindy LAM** | **Prof LAM Leung Yuk Frank** |
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| Cindy Lam has obtained her PhD in Marine Environmental Science at the University of Oldenburg, Germany in 2007. She has joined the Department of Ocean Science at HKUST as Lecturer since 2012 with extensive experience in organizing experiential learning and ocean science-related education projects to secondary and university students. She has extended her interests in incorporating innovative tools (e.g. AR, VR, gamification) to enhance students' motivation and active engagement in lectures and lab courses. With her research interests in investigating the potential impacts of microplastics to marine ecosystems, she has enthusiasm to develop autonomous device and speed up monitoring and detection of microplastics in the ocean. | Frank Leung-Yuk Lam is currently Associate Dean of Students and Assistant professor of Engineering Education at the Department of Chemical and Biological Engineering at HKUST. He received his PhD at the HKUST in 2005 and has been a Visiting Assistant Professor in the Department of Chemical Engineering in the Technion Israel Institute of Technology (TIIT) in Israel and Department of Chemistry in The University of Hong Kong, conducting research on functional materials for environment and teaching on the environmental engineering. His research is focused on separation, air pollution control and wastewater treatment through adsorption and heterogeneous catalysis. He also |

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| | concentrates on the Education via Experiential Learning approach and Visual Reality for knowledge delivery. |