

Technical Seminar: Green Innovation Webinar Series No.2

1. Integrated Biorefinery from Waste and Biomass Valorization

2. Tracking the Fate and Transport of the Invisible Bacteria in Indoor Environment



Organized by:

Environmental Division
環境分部

Supported by:



HONG KONG
WASTE MANAGEMENT ASSOCIATION
香港廢物管理學會



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CIWEM
Chartered Institution of
Water and Environmental
Management
Hong Kong Branch

Date, Assembly Time & Place

16 December 2020 (Wednesday) 18:00-20:00, HKIE Headquarters, James Chiu Room

Programme Highlights:

The Green Innovation Webinar Series aims to enhance the collaboration between HKIE and universities through exchanging new environmental technologies and novel research projects ideas via the interactive online platform. This is the second series consisting of 2 talks to be delivered by the professors from School of Energy and Environment of City University of Hong Kong.

For the first talk, there is a growing demand to establish biotechnology-based processes for chemicals, materials and fuels production which can decrease our dependency on dwindling oil reserves and reduce greenhouse gas emissions. These novel bioprocesses are incorporated into biorefineries, which are integral units converting different renewable-derived feedstocks into a range of useful products as diverse as those from petroleum using environmentally friendly technologies. A number of agricultural-based biorefinery processes have been developed and realised at commercial scale since the past decade. At the same time, there are growing concerns over organic waste generation and insufficient resource supply due to the ever-increasing global population and the cradle-to-grave system of material flows in the linear economy. Therefore, the research in our team aims at valorisation of organic waste materials through bioconversion processes to recover their inherent nutrients for transformation into value-added products. Waste-based biorefinery not only provides a mean for waste treatment, but also promotes the development of a circular economy by valorisation of wastes into value-added products. In this talk, we

aim to provide an overview of recent efforts from our group in leading the future of global food scientists and engineers. The first part of the talk will cover several projects which serve as examples to demonstrate the recent development of integrated biorefinery strategies for valorisation of food and textile wastes. Due to the different characteristics of the waste materials, the bio-processes were specifically designed and demonstrated in both laboratory and pilot-scales, accompanied with techno-economic assessment for evaluation of technical and economic feasibility. These independent showcases provide a novel approach to waste valorisation to replace the current concept of waste treatment and facilitate the transformation from a linear to circular economy for global industries and society.

For the second talk, The global COVID-19 pandemic has put the spotlight on the microbial life (i.e., bacteria, fungi, viruses, pollen) that is in indoor air. A healthy indoor environment has always been crucial even before COVID-19 when individuals spend ~90% of time indoors. We are constantly exposed to diverse microbial life in the indoor environment, making it important for us to understand which microbes are surrounding us. Although the microbial life is tiny and invisible, there are now advanced tools we can apply to detect and quantify them. We can track the fate, transport and source of microbial life in indoor spaces and more importantly, we can identify who they are. We can differentiate potential pathogens from those that are not and we can tell which microorganisms are potentially dead and which are active. This seminar will present findings from field studies to illustrate that we can understand the microbial life in the indoor environment so that it is possible to manipulate the indoor environmental conditions in a knowledge-driven manner to protect the well-being of occupants.

Speakers

The first talk will be presented by Dr Jason Lam, Assistant Professor, School of Energy and Environment, City University of Hong Kong. With interests in combatting climate change and environmental pollution, his research aims to mitigate global dependence on fossil resources by promoting the production of sustainable energy and chemicals. As a Postdoctoral Fellow at Yale University, he developed a protocol to convert crude glycerol, a biodiesel refinery waste product, into lactic acid, a building block for biodegradable plastics. For his doctoral work at Michigan State University, he examined electrochemical strategies to convert biomass into liquid fuels. Outside of lab work, he is an educator and an environment enthusiast. He has mentored numerous undergraduate researchers at MSU and Yale, as well as high school students in the MSU High School Honours Science Program (HSHSP). He has also been invited to design and teach an online certificate program on the practice of green chemistry to a diverse body of professional students in the University of Washington's Continuing Education Programs. His research focuses on turning industrial waste and non-edible biomass into useful liquid fuel and materials through chemical and electrochemical catalysis. He is also interested in exploring creative means to replace harmful chemicals with benign alternatives, and in promoting the use of recyclable or biodegradable materials that may be returned to nature with minimal or no post-treatment at

the end of their useful lives.

The second talk will be presented by Dr Patrick Lee, Associate Professor and the Associate Dean for Undergraduate Studies, School of Energy and Environment, City University of Hong Kong. He received his BS degree in Chemical Engineering from Queen's University in Canada in 2001, and his MS and PhD degrees in Environmental Engineering from University of California, Berkeley in 2002 and 2007, respectively. From 2008 to 2010, he carried out post-doctoral research, also at University of California, Berkeley. Dr. Lee is a member of HKIE. Dr. Lee is the recipient of awards such as the World Cultural Council Special Recognition Award and Bioenergy Society of Singapore Achievement Award. His research group applies advanced biotechnology to study different energy and environmental problems.

Language

English

Registration & Enquiries

The seminar is free of charge with maximum of participants of 100. For registration, please complete the online enrollment form in Environmental Division website (<http://www.ev.hkie.org.hk>). Successful applicants will be notified before the event. For enquiries, please contact Mr. Benjamin Lam at bencamay1119@gmail.com. Attendance certificate will be awarded after seminar.