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Department of Civil and Environmental Engineering

Environmental Footprints of Bioenergy Production/Waste Management and Application of Machine Learning Methods

by

Dr. Siming You

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University of Glasgow, UK**

Host: Asst. Prof Iris Yu

Date: 3 July 2023, Monday
Time: 11 am – 12 pm
Venue: E1-06-05
National University of Singapore
College of Design and Engineering
3 Engineering Drive 2
Singapore 117578

Scan code to register

Seats are limited. Please register early. All are welcome and admission is free

Abstract

Sustainable bioenergy production and waste management play important roles in achieving Climate Action and Sustainable Cities and Communities as part of the United Nations Sustainable Development Goals. Environmental footprints of associated energy and environmental systems and developments are one of the key criteria that have been commonly incorporated for their optimal design.

This talk will cover some of our recent environmental impact assessment studies on bioenergy production and waste management in the UK. Some of considered technologies include gasification, anaerobic digestion (or co-digestion), and transesterification, and related feedstocks include municipal solid waste, food waste, cow slurry, and rapeseed oil [1-4]. The aim of the research is to initiate mapping the range of possibilities of bioenergy production/waste management in facilitating UK's action in achieving clean and low-carbon production.

Environmental footprint assessment is often plagued by lack of reliable data input. Machine learning methods can be used to mitigate the issue/challenge e.g., by supplying reliable process production prediction [5]. This talk will also cover some of our recent effort of developing machine learning-based models for more accurate, flexible environmental impact assessment. Our models for predicting gasification, pyrolysis and anaerobic digestion production will be introduced [6-8]. The application of machine learning modelling for the life cycle assessment of an integrated anaerobic digestion-heat pump development will be presented [9].

[1] Ascher, S., Watson, I., Wang, X., & You, S. (2019). Energy, 181, 455-467. [2] Ascher, S., Li, W., & You, S. (2020). Bioresource Technology, 305, 123076. [3] Gupta, R., Miller, R., Sloan, W., & You, S. (2022). 345, 126500. [4] Gupta, R., McRoberts, R., Yu, Z., Smith, C., Sloan, W., & You, S. (2022). Bioresource Technology, 360, 127532. [5] Ascher, S., Watson, I., & You, S. (2021). Renewable and Sustainable Energy Reviews, 111902. [6] Ascher, S., Sloan, W., Watson, I., & You, S. (2022). Applied Energy, 320, 119289. [7] Ascher, S., Wang, X., Watson, I., Sloan, W., & You, S. (2022) Bioresource Technology, 364, 128062. [8] Li, Y., Gupta, R., & You, S. (2022). Bioresource Technology, 359, 127511. [9] Ouderji, Z. H., Gupta, R., Mckeown, A., Yu, Z., Smith, C., Sloan, W., & You, S. (2023). Bioresource Technology, 369, 128485.

Speaker's Biography

Dr. Siming You, Senior Lecturer in the James Watt School of Engineering at the University of Glasgow, UK, specialises in the design and analysis of environmental and energy systems with a focus on water treatment and waste management. Before joining the School, he worked as a Research Fellow at NUS (National University of Singapore) Environmental Research Institute. He also served as a Postdoctoral Fellow at Nanyang Technological University and the Massachusetts Institute of Technology in 2014 and 2015, respectively. Dr. You received his Ph.D. in Thermo-fluids from Nanyang Technological University in 2014. Dr. You was awarded the Outstanding Young Researcher Award by the American Institute of Chemical Engineers (AIChE), SLS in 2018, and the 2022 Young Scientist Award by the International Bioprocessing Association – An International Forum on Industrial Bioprocesses. Dr. You leads the life cycle assessment and optimisation of waste management and water infrastructure in various research (~£6.5M) funded by UKRI and BEIS. This includes a recent EPSRC Programme Grant (EP/V030515/1), two BEIS projects (TRN 1674/10/2018 and GLA-313-1-M) and two grants funded by UK Supergen Bioenergy Hub. He has an exemplary publication record with >100 journal papers and h-index=32.

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Map of Seminar Room E1-06-05, 3 Engineering Drive 2, Singapore 117578