SEMINAR SERIES

The Engineer in Society

From Lab to Enterprise: Harnessing Microbial Electrochemical Technologies (METs) to Convert Sludge Liquors into Green Energy

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University New Campus – University Library, room LRC 014

Abstract:

Dr. Pavlina Theodosiou is the CEO and Co-Founder of METzero Technologies LTD and a Royal Academy of Engineering Enterprise Fellow. She is dedicated to translating cutting-edge technologies into real-world applications, having secured over £2.4 million in funding to enhance industry engagement, R&D and technology commercialisation. Pavlina specialises in the design, construction, and operation of Microbial Electrochemical Technologies (METs) for wastewater treatment and resource recovery. She earned her PhD in Bioenergy and Self-sustainable Systems from UWE, Bristol in 2019. During her postdoctoral research, she implemented pilot-scale METs for urine treatment and energy recovery in East Africa, funded by OXFAM and the Bill & Melinda Gates Foundation. In 2020, she joined Newcastle University to advance METs for wastewater treatment and hydrogen recovery and was promoted to Lecturer in Environmental Engineering in 2023. Currently, she leads METzero Technologies, a Newcastle University spin-out company focused on commercialising MET systems to help water companies in increasing treatment capacity, reducing operational costs and achieving net-zero targets. She is a passionate STEM ambassador for over a decade, and also serves as the Institute of Water Northern Area Secretary. Further details are available at: linkedin.com/in/pavlinatheodosiou.

Biography:

Imagine turning the costly burden of wastewater treatment into a sustainable source of green energy. This transformation is possible through Microbial Electrochemical Technologies (METs), which harness the power of electroactive microorganisms to convert organic waste into valuable resources. Modern wastewater treatment faces significant challenges due to outdated technologies, increasing urbanisation, and climate change. Traditional wastewater treatment plants consume up to 60% of their energy in aerating activated sludge, highlighting the need for more sustainable solutions. METs, including Microbial Fuel Cells (MFCs) and Microbial Electrolysis Cells (MECs), offer innovative approaches to transform current wastewater treatment facilities into resource recovery hubs, contributing to a circular economy. Transitioning METs from laboratory research to full-scale implementation involves addressing challenges such as optimising reactor designs, scaling up processes, and ensuring economic feasibility. At METzero Technologies, we collaborate with UK water utilities to commercialise MET systems, focusing on enhancing treatment capacity, reducing operational costs, and contributing to the net-zero targets of the water industry. In this presentation, I will introduce you to the principles underlying MFCs and MECs, share insights from pilot-scale implementations, and discuss the strategies employed by METzero to transition these technologies from research to practical, enterprise-level solutions. Join this talk if you want to discover how METs are redefining wastewater treatment.

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