



Department of Civil & Environmental Engineering & Earth Science

EE/ES Series

November 12, 2018
210 DeBartolo Hall 4:00 p.m.-5:00 p.m.
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Title:

Resource Recovery from Wastewater by Using Bioelectrochemical Systems:
Yesterday, Today, and Tomorrow

Abstract:

Sustainable wastewater treatment demands maximized resource recovery and minimized resource consumption. Recovery of valuable resources such as energy, nutrient, water, and other value-added products, will help offset resource consumption by wastewater treatment. Bioelectrochemical systems (BES), as an emerging treatment concept, have attracted a great deal of attention in the past decades. BES rely on the interaction between microorganisms and solid electron acceptor/donors to achieve bioelectricity generation (in microbial fuel cells – MFCs), hydrogen production (in microbial electrolysis cells – MECs), desalination (in microbial desalination cells – MDCs), and organic synthesis (in microbial electrosynthesis cells). Nutrients such as ammonia and phosphorous can also be recovered through electricity-driven processes. BES have been greatly advanced in the aspects of microbiology, chemistry, materials, electrochemistry, and reactor design/operation. However, there still lack successful pilot-scale demonstrations of BES. This presentation will provide an overview of historical development of BES, current status of representative BES technologies, and perspectives towards future research and development.

Bio:

Dr. Zhen (Jason) He is a Professor in the Department of Civil and Environmental Engineering at Virginia Tech. He received a BS from Tongji University, a MS from Technical University of Denmark, and a PhD from Washington University in St. Louis, all in Environmental Engineering. He is directing the Environmental Biotechnology & Bioenergy Laboratory with a focus on resource recovery from wastes/wastewater. The ongoing research projects in his lab include bioelectrochemical systems for wastewater treatment, forward osmosis, nutrient removal and recovery, and algal bioreactors. He established Virginia Tech Center for Applied Water Research and Innovations (CAWRI) as an inaugural director, and is the past president of Chinese-American Professors in Environmental Engineering and Science (CAPEES). He has published over 180 journal papers and received 3 granted US patents. He is the Editor in Chief of Water Environment Research, Co-Editor in Chief of Environment International, and Associate Editor of both Science of the Total Environment and Journal of Environmental Engineering. He is also on the Editorial Board of Chemical Engineering Journal.