PURDUE UNIVERSITY | Environmental and Ecological Engineering

EEE Research Seminar

Date: January 10, 2023 at 10:30 AM
Location: POTR 234 (Fu Room)

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Towards resource-efficient and net-zero water resource recovery facilities

Abstract

The nationwide demand for wastewater treatment is expected to grow by 25% in the next decade alone. Current (over 16,000) resource-demanding wastewater treatment systems are already responsible for direct or indirect greenhouse gas emissions of over 44 million metric tons each year. There is over $271B investment need for maintaining the nation's wastewater and stormwater infrastructure over the next 20 years. It is also important to ensure that this level of investment is inherently profitable and a major contributor to the evolving economies. On the other hand, major issues with the current wastewater infrastructure are the infrastructure age, inefficient treatment configurations, and increasing environmental footprint. New investment opportunities can be tailored towards adopting more energy-yielding, resource-efficient, net-zero and productive treatment schemes, which will potentially replace the existing resource-demanding treatment systems.

This seminar will highlight two major routes for developing more sustainable and circular economy-based water resource recovery facilities. These are based on the well-known principles of anaerobic digestion and the bioelectrochemical synergy of wastewater microorganisms. In particular, we will examine the potential of enhanced carbon capture, codigestion of various organic waste streams and integrated anaerobic and bioelectrochemical treatment systems towards developing these net-zero water resource recovery facilities. The presentation will also discuss other applications of bioelectrochemical systems in energy recovery and emerging contaminant removal (advanced water treatment).

Bio

Dr. Veera Gnaneswar Gude is NiSource-Meyer Charitable Foundation Professor of energy and the environment in the department of mechanical and civil engineering at Purdue University Northwest. Dr. Gude is also the director of Purdue University Northwest Water Institute (PWI). Prior to this, he was a tenured full Professor and Kelly Gene Cook, Sr. Endowed Chair in the School of Civil and Environmental Engineering at Mississippi State University. Dr. Gude obtained his Ph.D. in Environmental Engineering from New Mexico State University. His research interests include energy, water and environment nexus, resource recovery from waste streams, and sustainable energy systems development. His research efforts received funding from federal agencies such as NSF, USEPA, USGS and USDA and other industry and international agencies. Prof. Gude published over 150 scientific research articles and 8 books on desalination, wastewater treatment and bioenergy research.