



# Graduate Seminar

## Muhammad Mubashar, PhD

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Chinese Academy of Sciences, Wuhan, China*

**March 3, 2025 (4:00 pm - 5:30 pm), Tiernan Hall - Room 106**

**[Zoom Link: Click Here](#) Meeting ID: 994 3917 6432 Passcode: 058807**

## **Sustainable Nutrient Recovery Using Mixotrophy: A Pathway to Carbon Neutrality in Wastewater Treatment Sector**

### **Abstract**

Degradation of aquatic ecosystems due to excessive nutrient release (mainly nitrogen (N) and phosphorus (P)) is a core global problem. Although traditional wastewater treatment technologies are efficient in nutrient removal; however, they transform waste nutrients into greenhouse gases and need tertiary treatments to polish the effluent and control nutrient loading into aquatic bodies. Therefore, new technologies are being developed in the fields of physical, biological and chemical treatments to address wastewater-related issues. Microalgae under mixotrophic mode could offer a sustainable alternative to traditional technologies, as it can achieve high-rate nutrient recovery under a carbon-negative budget. Such as, in primary effluent from a municipal wastewater treatment plant, the N and P recovery rates reached 4.79 and 0.84 mg·L<sup>-1</sup>·h<sup>-1</sup>, respectively with a carbon-footprints of -15.93 ± 2.66 t·CO<sub>2</sub>e·t<sup>-1</sup>N recovery. Similarly, for aquaculture systems, we developed floating permeable nutrient uptake system (FPNUS), which yielded satisfactory results under carbon-negative budget and nutrient loading and removal were matched in-situ. This seminar will introduce the audience to how mixotrophic technology could serve as a novel strategy for recovering and recycling resources from wastewater and contributing to environmental sustainability.

### **About the Speaker**

***Muhammad Mubashar** is a postdoctoral fellow at the Institute of Hydrobiology, Chinese Academy of Sciences, Wuhan China. He is mainly engaged in research on microalgae-integrated biorefinery development, carbon-neutral resource recovery and recycling; and carbon capture and utilization using microalgae. He has published several articles in *Bioresource Technology*, *Journal of Cleaner Production*, and *Journal of Environmental Management*. Currently, Mubashar is a visiting scholar at the John A. Reif, Jr. Department of Civil and Environmental Engineering, New Jersey Institute of Technology.*

