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ANNOUNCEMENT

FESE's Best Papers of 2023

Frontiers of Environmental Science & Engineering is pleased to announce the best paper awards for 2023. In 2023, we published 140 research and review papers in Volume 17 of *FESE*. In order to acknowledge the past contributions and encourage more submissions, the *FESE* editorial board selected three distinguished research papers for their profound insights into current serious environmental issues and contributions to practical treatment technology. We hope these papers will inspire and promote innovation in the environmental science and engineering research field.

We summarized the main achievements of the three best papers of 2023 as follows:

Yirong Hu, Wenjie Du, Cheng Yang, Yang Wang, Tianyin Huang, Xiaoyi Xu, Wenwei Li. Source identification and prediction of nitrogen and phosphorus pollution of Lake Taihu by an ensemble machine learning technique. *Front. Environ. Sci. Eng.*, 2023, 17(5): 55 https://doi.org/10.1007/s11783-023-1655-7

Understanding the sources, migration, and transformation of nutrients is crucial for managing lake eutrophication. This study employed machine learning models to identify the primary nitrogen and phosphorus sources in Lake Taihu, utilizing a comprehensive 13-year historical dataset. The optimal model revealed that endogenous sources predominantly influenced the levels of total nitrogen and total phosphorus, as opposed to exogenous factors. Additionally, the model successfully predicted the nutrient concentrations one month in advance. This research underscores the potential of machine learning techniques in tracking and forecasting pollution, thereby enhancing the efficacy of early warning systems and rational management of lake eutrophication.

Guannan Mao, Donglin Wang, Yaohui Bai, Jiuhui Qu. Mitigating microbiological risks of potential pathogens carrying antibiotic resistance genes and virulence factors in receiving rivers: Benefits of wastewater treatment plant upgrade. *Front. Environ. Sci. Eng.*, 2023, 17(7): 82 https://doi.org/10.1007/s11783-023-1682-4

In order to fill in the gaps in water-safety of rivers replenished by wastewater treatment plant upgrade (WWTP-UP), this study conducted a comprehensive five-year sampling campaign covering before and after the WWTP-UP in order to identify the changes in dispersal and co-occurrence patterns of antibiotic resistance genes (ARGs) and virulence factors (VFs) in the receiving rivers. Prevalence of most VF and ARG types carried by potential pathogens was reduced after WWTP-UP, and so was the diversity of pathogenic genera. WWTP-UP narrowed the pathogenic host ranges of ARGs and VFs and mitigated the co-occurrence of ARGs and VFs in receiving rivers. This study emphasizes the effectiveness of WWTP-UP in controlling potential pathogens and mitigating microbiological risks in receiving rivers.

Yabing Meng, Depeng Wang, Zhong Yu, Qingyun Yan, Zhili He, Fangang Meng. Genome-resolved metagenomic analysis reveals different functional potentials of multiple *Candidatus* Brocadia species in a full-scale swine wastewater treatment system. *Front. Environ. Sci. Eng.*, 2023, 17(1): 2 https://doi.org/10.1007/s11783-023-1602-7

Anaerobic ammonium oxidation (annammox) attracts wide attention for biological nitrogen removal, and understanding the phylogeny and function of spontaneously enriched annammox bacteria in engineered system is urgent and of great significance. This study presented a genome-resolved metagenomic analysis of multiple *Ca.* Brocadia species in a full-scale swine wastewater treatment system. The dominant species were identified to be two novel species. Functional reconstruction indicated that both of the novel species can use diverse organic nitrogen compounds in addition to ammonia and nitrite as substrates. This study provides valuable insights into the diversity and interactions of anammox bacteria in a complex environment, contributing to the advancement of microbial ecology and biotechnology.

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