6-2020

Editorial: Water Environmental Research

Brooke Mayer

Water Environment Federation
the water quality people™

Editorial

Brooke K. Mayer

This issue of *Water Environment Research* features 12 illuminating articles describing a range of studies of immediate relevance to water/wastewater professionals. The far-reaching issue of nutrient removal was approached from several different angles, including evaluations of physicochemical adsorption using novel adsorbents comprised of naturally derived/recycled materials such as metal-amended lava (Sadeghi Afjeh, Bagheri Marandi, & Zohuriaan-Mehr, 2020) and biochar composites (Zhao et al., 2020). Naga Babu, Srinivasa Reddy, Suresh Kumar, Ravindhranath, and Krishna Mohan (2020) also employed biochar for contaminant adsorption from wastewater, with a focus on the removal of inorganic aluminum and fluoride using a combination of experimental results and factorial statistical modeling. Guo, Guan, Sun, Liu, and Zhao (2020) assessed the removal of both nutrients and heavy metals such as zinc from swine operations using microalgae-based treatments. Beyond municipal and confined animal operations as point source contributions of nutrients, crop-based agricultural contributes substantially to nutrient loading, and implementation of low-grade weirs coupled with organic carbon amendments can stimulate nitrate removal via microbial denitrification in agricultural drainage ditches (Faust et al., 2020).

Treatment of contaminants in industrial wastewater was targeted via biological, physicochemical, and combined processes. Four key genera of bacteria were identified in the effective decolorization of Disperse Blue 60 textile dye (Seyedi, Jookar Kashi, & Zahraei, 2020). Alternately, Ali and Bhakta (2020) harnessed biological processes to biosorb zinc from industrial wastewaters, while Liu et al. (2020) assessed a novel two-stage fluid-bed/fixed-bed system to catalyze the oxidation of residues from acrylic acid production.

Taking a facility-level perspective on emerging contaminants, Kucukunsal and Icgen (2020) assessed the abundance of 16S rDNA and several antibiotic resistance genes in wastewater influent and effluent for a range of treatment systems including conventional activated sludge, biological nutrient removal, sequencing batch reactor, membrane bioreactor, and coagulation/flocculation/UV disinfection. They found that membrane bioreactors offered the highest removal efficiencies (which were not gene-specific). The aggregation of silver nanoparticles in the presence of fulvic acid, sodium nitrate, or surfactants was assessed by Zhang et al. (2020), who reported the formation of nanoparticle aggregates under UV irradiation in the presence of surfactants, whereas uniform dispersion was observed in other solutions. In natural lake environments, Qin et al. (2020) found that microplastics were prevalent in sediments in Lake Ulansuhai in China, with concentration gradients in the system, and a range of sizes (majority < 2 mm), shapes, and materials present.

To select a single article from this informative collection was a particularly difficult challenge—kudos to all authors of these excellent contributions to *Water Environment Research*. However, I eventually elected to highlight Gao and Stenstrom's (2020) article *Development and applications in computational fluid dynamics modeling for secondary settling tanks over the last three decades: A review* as this issue's Editor's Choice article (as such, it will be freely available for 45 days). This review article stood out as it systematically merged "old" secondary settling tank design/performance and "new" advances in computational fluid dynamic (CFD) modeling. The authors offered the first review of CFD applications in secondary settlers over the last decade (recognizing that CFD has been utilized in various forms as an increasingly robust and cost-efficient approach for the design of secondary settlers for the last 30 years). They detailed the differences between traditional empirical surface overflow rate hydraulic criteria and observed secondary settler performance and found that these differences were largely explained through CFD modeling. Recent advances in computational resources as well as CFD software and modeling foretell important future advances in the application of CFD modeling to water/wastewater scenarios. I sincerely hope that you take advantage of the opportunity to learn more about this

Department of Civil, Construction and Environmental Engineering, Marquette University, Milwaukee, Wisconsin

Received 15 March 2020; Accepted 16 March 2020

Correspondence to: Brooke K. Mayer, Department of Civil, Construction and Environmental Engineering, Marquette University, Milwaukee, WI.
Email: Brooke.Mayer@marquette.edu

Published online 15 April 2020 in Wiley Online Library (wileyonlinelibrary.com)

DOI: 10.1002/wer.1330

featured article and all of the other topics detailed in this issue of *Water Environment Research*.

REFERENCES

Ali, M. M., & Bhakta, J. N. (2020). Biosorption of zinc from aqueous solution using leaves of *Corchorus olitorius* as a low-cost biosorbent. *Water Environment Research*, 1–8. https://doi.org/10.1002/wer.1274

Faust, D. R., Kröger, R., Baker, B. H., Brooks, J. P., Cox, M. S., & Rush, S. A. (2020). Investigating the role of organic carbon amendments and microbial denitrification gene abundance in nitrogen removal from experimental agricultural drainage ditches with low-grade weirs. *Water Environment Research*, 1–12. https://doi.org/10.1002/wer.1284

Gao, H., & Stenstrom, M. K. (2020). Development and applications in computational fluid dynamics modeling for secondary settling tanks over the last three decades: A review. *Water Environment Research*, 1–25. https://doi.org/10.1002/wer.1279

Guo, G., Guan, J., Sun, S., Liu, J., & Zhao, Y. (2020). Nutrient and heavy metal removal from piggery wastewater and CH4 enrichment in biogas based on microalgae cultivation technology under different initial inoculum concentration. *Water Environment Research*, 1–12. https://doi.org/10.1002/wer.1287

Kucukunsal, S., & Icgen, B. (2020). Removal of antibiotic resistance genes in various water resources recovery facilities. *Water Environment Research*, 1–12. https://doi.org/10.1002/wer.1286

Liu, B., Liu, Z., Xu, Y., Sun, Y., Yu, Y., & Zheng, H. (2020). Effective treatment of residue of acrylic acid production using a fluid-bed/fixed-bed system with low energy consumption. *Water Environment Research*, 1–8. https://doi.org/10.1002/wer.1278

Naga Babu, A., Srinivasa Reddy, D., Suresh Kumar, G., Ravindhranath, K., & Krishna Mohan, G. V. (2020). Sequential synergetic sorption analysis of Gracilaria Rhodophyta biochar toward aluminum and fluoride: A statistical optimization approach. *Water Environment Research*, 1–19. https://doi.org/10.1002/wer.1283

Qin, Y., Wang, Z., Li, W., Chang, X., Yang, J., & Yang, F. (2020). Microplastics in the sediment of Lake Ulansuhai of Yellow River Basin, China. *Water Environment Research*, 1–11. https://doi.org/10.1002/wer.1275

Sadeghi Afjeh, M., Bagheri Marandi, G., & Zohuriaan-Mehr, M. J. (2020). Nitrate removal from aqueous solutions by adsorption onto hydrogel-rice husk biochar composite. *Water Environment Research*, 1–14. https://doi.org/10.1002/wer.1288

Seyedi, Z. S., Jookar Kashi, F., & Zahraei, Z. (2020). Isolation, characterization, and decolorization of Disperse Blue 60 by newly isolated bacterial strains from Kashan textile wastewater. *Water Environment Research*, 1–7. https://doi.org/10.1002/wer.1282

Zhang, Z. G., Wu, Q. T., Shang, E., Wang, X., Wang, K., Zhao, J., … Li, Y. (2020). Aggregation kinetics and mechanisms of silver nanoparticles in simulated pollution water under UV light irradiation. *Water Environment Research*, 1–10. https://doi.org/10.1002/wer.1276

Zhao, Z., He, S., Li, F., Jin, Y., Khan, S., Liu, F., & Liang, X. (2020). Synthesis of a novel Fe–Mn binary oxide-modified lava adsorbent and its effect on ammonium removal from aqueous solutions. *Water Environment Research*, 1–15. https://doi.org/10.1002/wer.1277