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Aug. 20, 2020

Water Environment Federation Honors Industrial Wastewater Management Research

ALEXANDRIA, Va.— The Water Environment Federation (WEF) proudly announces the 2020 WEF Awards recipients for published papers. The WEF Published Papers Awards recognize WEF members for valuable research that has the potential for broad contribution to industrial wastewater management.

“Research is critical to advancing the water sector,” said Jackie Jarrell, WEF President. “The Water Environment Federation is extremely proud to honor the incredible work of these individuals who contribute to the body of knowledge regarding one of the world’s most valuable resources.”

The 2020 recipients for Published Papers are:

Eddy Wastewater Principles/Processes Medal

“Fate of antibiotic resistance genes and antibiotic-resistant bacteria in water resource recovery facilities” by Renjie Li, Jennifer A. Jay and Michael K. Stenstrom, *Water Environment Research*, Volume 91, January 2019

The authors critically researched and provided new insights into the fate of antibiotic-resistant genes and bacteria during wastewater treatment in water resource recovery facilities. This research has shown that the activated sludge process and disinfection in a water resource recovery facility are the two most important components for removal/reduction of antibiotic resistance from wastewater. The insight that the long sludge retention time as the key parameter to influence decrease or increase of antibiotic resistance in reclaimed water in the activated sludge process is inconclusive dispels the common myth otherwise. The subject matter of this research is relevant and timely for human and ecosystem health protection. The problem of antibiotic resistance in the environment is likely to become a global threat due to increased use of antibiotics and their release into the environment.

The Eddy Medal honors Harrison Prescott Eddy, a prominent engineer and a pioneer in the field of wastewater treatment. The medal is awarded for research that makes a vital contribution to the existing knowledge of the fundamental principles or process of wastewater treatment, as comprehensively described and published in a Federation periodical.

Gascoigne Wastewater Treatment Plant Operational Improvement Medal

“Expect More from Your Membranes,” Srinivas Jalla, J.C. Lan, & Jim Lozier, *Water Environment & Technology*, Volume 31, January 2019, No. 1 , pg. 44

The article describes how one water resource recovery facility developed an advanced ultrafiltration membrane cleaning procedure that improved membrane operating performance while reducing operating and replacement costs. The article details how the staff and consultants at the F. Wayne Hill Water Resources Center of the Gwinnett County (Ga.) Department of Water Resources developed an enhanced cleaning procedure for submerged, hollow-fiber ultrafiltration membrane filter cassettes. The cleaning procedure was the result of an effort by the plant staff to mitigate the replacement costs of membrane filter cassettes as their permeability and performance decreased to unacceptable levels.

Using laboratory analytics and bench scale pilot equipment, membrane fouling agents were identified, and various cleaning formulations were tested to determine membrane cleaning efficacy. Lab analysis indicated that iron oxide was the predominate fouling agent. Various cleaning chemicals specific to iron oxide were bench tested using numerous cleaning cycles to determine a best enhanced recovery cleaning candidate for full scale testing.

The candidate was then tested on two of the facility's 16 membrane trains. Full scale testing confirmed bench testing and was implemented at the plant. The new cleaning protocol has saved approximately \$950,000 annually more than the previously used cleaning procedures. Additionally, the new enhanced recovery cleaning procedure significantly increased the life of the ultrafiltration membranes over what the old cleaning procedure yielded. This allowed for the deferment of purchasing replacement ultrafiltration filter cassettes, thereby delaying the capital expense of replacing cassettes all at once. Although not eliminating membrane replacement costs, the enhanced recovery cleaning procedure delayed capital cost investment of approximately \$6.5 million. Combined, avoided capital cost and actual chemical cost savings of the new enhanced recovery cleaning process yielded a net savings to Gwinnett County exceeding \$8.5 million.

The Gascoigne Medal was established in recognition of George Bradley Gascoigne, a prominent consultant who exhibited a great deal of interest in the operation of wastewater treatment plants. The medal is awarded to the author(s) of an article that presents the solution of an important and complicated operational problem within a full-scale, operating wastewater treatment plant that is appropriately staffed.

McKee Groundwater Protection, Restoration or Sustainable Use Award

“Bone-derived biochar and magnetic biochar for effective removal of fluoride in groundwater: Effects of synthesis method and coexisting chromium” Authors: Jingyao Zhou, Yuyan Liu, Yitong Han, Fanqi Jing, Jiawei Chen, *Water Environment Research* Volume 91, 2019, pp. 588–597

The article presents a useful topic on the removal of fluoride in the presence of hexavalent chromium from groundwater. Fluoride is a chemical element that is found most frequently in

groundwater. The authors developed (using both pre- and post-pyrolysis methods) and evaluated the performance of bone-derived pristine and magnetic biochars to remove fluoride and hexavalent chromium. The study included a systematic approach to characterize and test the adsorption performance of the biochars. The authors also studied mechanisms for the advanced removal of fluoride. The biochar showed high potential to remove both fluoride and chromium with high adsorption capacity for fluoride.

The McKee Award recognizes significant contributions to groundwater science or engineering research published in a WEF or WEF Member Association periodical. The award is named in honor of Dr. Jack McKee, the 1962-63 president of the Water Environment Federation, a founder of the consulting firm of Camp, Dresser and McKee, Inc., and a longtime professor at the California Institute of Technology.

Rudolfs Industrial Waste Management Medal

“How Hot is Too Hot? Reviewing the Treatment Performance of Refinery WWTP Biological Treatment Systems Operating at High Temperatures” Jordan Schmidt, Shane Lund, Brad McIlwain, Shawn Watkins, Nicolas Hameon-Denis, Mark Knight, WEFTEC

This proceeding demonstrated large scale data related to the performance of biological treatment systems for treating high temperature wastewaters. Although this paper was focused on refinery applications, this topic is broadly applicable and helpful across many industries with high temperature wastewater.

The Rudolfs Medal was established in 1949 and is named after Willem Rudolfs, an active WEF member and primary force in industrial waste research. This award recognizes noteworthy accomplishments in any aspect of industrial waste management research published in WEF or WEF Member Association periodicals.

Collection Systems Published Contributions

“From the Trenches,” Richard Roll and Michael S. Eagler Sr., *Water Environment & Technology*, December 2018-May 2019.

This series of articles are an extension of a paper and presentation Roll and Eagler gave at WEFTEC 2018 (Session 313 – Collection System Basics), for which they were invited speakers. These awards will be presented on Wednesday, Oct. 7 at 5 p.m. at the WEF Awards ceremony during WEFTEC Connect. All WEFTEC Connect registrations include access to the WEF Awards and Presidential Ceremony and Celebration! For more information, click here.

For more information about the WEF Awards, visit <https://www.wef.org/awards>

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About WEF

The Water Environment Federation is a not-for-profit technical and educational organization of 35,000 individual members and 75 affiliated Member Associations representing water quality professionals around the world. Since 1928, WEF and its members have protected public health and the environment. As a global water sector leader, our mission is to connect water professionals, enrich the expertise of water professionals, increase the awareness of the impact

and value of water, and provide a platform for water sector innovation. To learn more, visit www.wef.org.