水環境国際招聘賞（いであ招聘賞）（JSWE-IDEA Water Environment International Exchange Award）授賞に関して

本会では，水環境分野の国際交流・国際協力の促進を目的として，いであ株式会社からのご出捐により，水環境国際招聘賞と水環境国際活動賞を設けております。水環境国際招聘賞は本会年会で研究発表を行う海外在住外国人会員に対して，来日費用等の助成を行う制度です。第 52 回年会には中国から 2 名，韓国から 1 名を招聘し，研究発表を行っていただきました。発表を終えて帰国された受賞者に参加報告を書いていただきましたので，ご紹介します。

なお，今年度の水環境国際招聘賞の募集案内は夏頃に本誌会告に掲載する予定です。

（水環境国際活動賞・招聘賞選考委員会）

JSWE-IDEA Water Environment International Exchange Award

Associate Professor,
Department of Environmental Engineering, Inha University（仁荷大学，副教授）
Jeonghwan KIM（金正桓）

First of all, I would like to thank to Japan Society on Water Environment (JSWE) for giving me this great honor in 52nd Annual Conference of JSWE held in Hokkaido University from March 15-17, 2018. Although this was my first experience in attending JSEW annual conference, the impact was so high for me to develop future collaborations by sharing my research results and discussion with many colleagues during conference period.

In this conference, I gave a presentation focusing anaerobic membrane bioreactor treating domestic wastewater. Wastewater is not the target materials any more to be treated but is a valuable resource that we can recover from it. At present, wastewater consumes a lot of energy through conventional wastewater treatment because it is treated aerobically. Under aerobic condition, more than 50 % of total energy needs to be consumed by providing oxygen to the microorganisms for their biochemical reactions and biomass growth. In this presentation, anaerobic fluidized bed membrane bioreactor (AFMBR) was introduced as a promising technology alternative to aerobic MBR for domestic sewage treatment. Anaerobic technology has several advantages of (1) no requirement of oxygen supply, (2) biogas production in the form of methane which can be used as a renewable energy and low biomass production. However, anaerobic treatment itself should not be enough to satisfy stringent effluent qualities. Anaerobic membrane bioreactor is to combine anaerobic bioreactor with membrane filtration. Membrane can retain anaerobes with slow-growth rate completely and produce high effluent qualities. However, membrane fouling caused by deposition of foulant materials on membrane surface and/or within membrane pores is an inevitable phenomenon as a main hurdle to be overcome.

Anaerobic fluidized bed membrane bioreactor (AFMBR) is to combine anaerobic fluidized bed membrane bioreactor with submerged membrane filtration. Granular activated carbon (GAC) particles are fluidized by recirculating bulk suspension only through the reactor. Since there is no biogas sparging, energy consumption can be reduced significantly (less than 0.1 kWh m^{-3}) to control membrane fouling. Comparative study was performed by applying adsorbing (GAC) and non-adsorbing (PET beads) fluidized media in the AFMBR system treating synthetic wastewater. The GAC particles as fluidized media outperformed PET beads in terms of fouling control. Overall COD removal efficiency was 95 % with effluent SCOD of about 18 mg L^{-1} under GAC fluidization, which is about10 % higher than that with PET beads. Electrical energy required to operate AFMBR using GAC was 0.028 kWh m^{-3}, and this was 50 % lower than required by PET beads due to larger media size than GAC.

JSWE-IDEA Water Environment International Exchange Award

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Guangyin Zhen（甄广印）

I am very pleased to be invited to attend the 52nd Annual Conference of Japan Society on Water Environment (JSWE) held from March 15 - 17, 2018 in Hokkaido, Japan. I would like to thank JSWE committee for providing me this great opportunity to attend this wonderful conference, to visit such beautiful and picturesque city, Sapporo, and to meet so many distinguished researchers in different research areas, from different countries. I also want to say thank you to the award committee to award me the JSWE-IDEA Water Environment International Exchange Award, and it is indeed a great honor to win this Award.

I got my Ph.D. in Tongji University. During my doctoral course, I was sent to Tohoku University as a Joint Ph.D. student by Chinese government in Sept. 2012 for one-year study. Then, I was invited by Prof. Yu-You Li to this university as a visiting research fellow for another half year. In Jul. 2014, I was awarded "JSPS Postdoctoral Fellowship for Foreign Researchers" by the Japan Society for the Promotion of Sciences (JSPS), and worked as the Postdoctoral research fellow in the National Institute for Environmental Studies (NIES), Japan till Aug. 2016. After a short visiting to Tohoku University, I joined in East China Normal University in 2017.

In the conference, I gave a presentation regarding "In-situ Electrochemical Stimulation to Upgrade Co-digestion Behaviors of Sewage Sludge and Food Waste". As we know, the continuous consumption of fossil fuels has caused energy crisis. And this issues thus promotes research into the development of new technologies for renewable energy recovery from different kinds of bio-wastes, like sewage sludge and food waste. Anaerobic digestion (AD) is a well-developed technology for such purpose but still with some technical issues. One alternative option to AD can be microbial electrolysis cell (MEC), a recent emerging technique for methane production via electromethanogenesis, relying on the special electroactive microbes colonizing on both electrodes with a small electric stimulation. Based on this concept, we introduced MEC system into the traditional AD process, i.e. so-called MEC-AD system, to investigate whether and how the combination of MEC with AD process can improve biowastes degradation as well as methane productivity. The in-situ electrochemical stimulation effectively promoted methane production and process stability, and the combined system produced higher methane than the single AD process when the external voltage was increased to ≥ 0.4 V, with up to 50% increase at food waste: sludge ratio 0.2: 0.8 and 0.4 V. The MEC-AD system relies upon the syntrophic interactions between exoelectrogens and fermentative partners. Fermenters can convert the complex substrates to metabolites accessible to electroactive microorganisms on anode, making the overall fermentation thermodynamically favorable thus increasing the methane recovery. Also, the electroactive bacteria on the cathode can reduce carbon dioxide to methane, thus further increasing methane content in biogas. The preliminary results demonstrated that the MEC-AD system holds the great potentials for biowastes treatment, and green and renewable energy recovery, and we hope this technology can contribute to dealing with energy crisis, supporting the realization of the energy-sustainable and carbon-less society in the near future. Of course, MEC-AD system, at the present stage, is far from practical applications. Numerous challenges need to be tackled before considering its real implementations.

Finally, I want to thank JSWE committee once again for offering me this chance to introduce my new research results, and to communicate with Japanese experts. I am very sure that the amazing experience will make great contributions to the future research collaboration and building more solid friendship between Japan and China. I am looking forward to attend JSWE's future conferences.

Reinforced Communication and Collaboration in Water Environment Field between Japan and China through JSWE

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Zhuo Chen（陳卓）

With the recommendation of the Chinese Society for Environmental Sciences, I was delighted to attend the 52nd Annual Conference of JSWE that was held in Sapporo from March 15–17, 2018. I greatly appreciate the kind support of JSWE and be great honored to receive the JSWE-IDEA Water Environment International Exchange Award.

I obtained the doctoral degree in the field of Environmental Engineering from the University of Technology, Sydney, Australia in June 2014 and conducted post-doctoral research at the graduate school at Shenzhen, Tsinghua University, China afterwards. I am currently the research associate at the School of Environment, Tsinghua University. My research mainly focus on water reuse system evaluation and control, with special emphases on reclaimed water quality target determination, system holistic ensurance, evaluation method and model and risk prevention and warning. In the past four years, I also participated in the international guideline development under ISO TC282/SC2（Water Reuse in Urban Areas）and worked as the convenor of ISO/TC282/SC2/WG4.

During the 52nd Annual Conference of JSWE, I heard many good presentations from different universities, institutes and companies of Japan which cover topics of advanced water treatment and analytical technologies, soil and water quality investigations and analyses, energy and valuable resource recovery technologies, risk management and toxicity-based safety evaluation, etc. This is a valuable platform to share knowledge and build networks to better understand and manage the water environment challenges and opportunities. Presently, water reclamation and reuse is one of the most important approaches to alleviate water shortage and water environment contamination problems. Ensuring the safe, efficient and stable operation of water reuse system is a key component to reclaimed water utilization and development. Therefore, I gave a presentation entitled “Centralized and decentralized water reuse system in urban areas of China: current needs and future perspectives”. Because of continuing urbanization and water consumption, approximately two thirds of China’s 661 cities encountered water shortage problems. Water reuse is among the fastest growing utility sectors in China. The promotion of water reuse activities was strongly correlated with provincial water resource availability and regional economic levels. The water reuse system models were further discussed. Based on analyses of key components of centralized water reuse systems, our study proposed four different utilization models and addressed the strategies of multiple barrier approach and minimum technological requirement for management. It is also identified that decentralized system can be a supplement to centralized system which can raise flexibility and convenience in special circumstances. Our results also support the development of two international guidelines, namely ISO 20760-1 and ISO 20760-2. The optimization of these models can be beneficial for densely populated urban areas, not only in China but also in other regions that encounter similar situations.

Our research team have collaborations with several Japanese universities, institutes and companies, including Kyoto University, National Institute of Advanced Industrial Science and Technology（AIST）and Kurita Water Industries, etc. I was impressed by the rigorous attitude and dedication of Japanese scholars and students on their work and research studies. This is my first time to attend the JSWE annual conference. During the conference, I met many distinguished professors, scholars, engineers, professionals and research students. We had good communication on specific research studies as well as cultural exchanges. I think this kind of activities is significant and valuable. I would like to sincerely appreciate the conference organizing committee and want to contribute to future activities and communications between Chinese and Japanese societies.