# 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54回年会には中国から2名，韓国から1名，マレーシアから1名を招聘し，研究発表を行っていただく予定でした。しかしながら，この度のCOVID-19の感染拡大により岩手での年会が中止になりましたので，紙面（年会講演要旨集：電子版および冊子版）で発表がなされたとの扱いになりました。そこで，受賞者に研究内容や抱負等についてご執筆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秋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, Malaysia-Japan International Institute of Technology（MJIIT）
Universiti Teknologi Malaysia
Norhayati Abdullah, Ph.D

My heartiest gratitude and thanks to the Japan Society on Water Environment（JSWE）Committees on Overseas Member Invitation Program for giving me the honor of JSWE-IDEA Water Environment International Exchange Award for the 54th JSWE Annual Conference. Despite the unfortunate circumstances of global pandemic COVID-19, I look forward to participate in the conference next year as JSWE provides a great platform for knowledge exchange and international collaborations.

I am currently the Associate Director of Universiti Teknologi Malaysia（UTM）International Kuala Lumpur and Associate Professor of Environmental Engineering at Malaysia-Japan International Institute of Technology（MJIIT）. I completed my tenure as Guest Scholar at the Graduate School of Advanced Integrated Studies in Human Survivability（Shishu-kan）, Kyoto University, Japan in January 2019 focusing on environmental psychology, translating engineering practices into public engagement. This is in line with my involvement as the ASEAN Science and Technology Fellow focusing on the strategic recommendations for water sector transformation with the Academy of Sciences Malaysia. In 2018, I received the prestigious L'Oréal-UNESCO for Women in Science Fellowship award for the aerobic granulation development research using palm oil mill effluent.

Since joining UTM in 2008, I have been involved in various wastewater treatment studies utilizing aerobic granular sludge. The first study was conducted for my PhD whereby aerobic granular sludge was developed using industrial wastewater sourced from oil mill palms which is in abundance in Malaysia. Aerobic sludge granulation is the unique transformation of microbial bio-flocs into compact aerobic granular sludge. This sludge eliminates the biomass-liquid separation problems that are commonly associated with the conventional activated sludge treatment of agro-based wastewater, such as palm oil mill effluent. Consequently, aerobic granular sludge has a high potential to overcome the poor settling properties of activated sludge. In contrast to anaerobic granular sludge, an understanding of the microbial population dynamics in aerobic granulation environments was also investigated. Aerobic granular sludge can be used to treat various types of wastewater including domestic wastewater. In my paper, I will share some findings related to the treatment of low-strength domestic wastewater using aerobic granulation technology in a sequencing batch reactor. Activated sludge was used as the seeding for granulation. The results indicated good chemical oxygen demand（COD）and ammoniacal nitrogen removals at 72% and 73%, respectively. Aerobic granular sludge was successfully developed with low sludge volume index（$SVI_{30}$）of 29 mL $g^{-1}$, which demonstrated an excellent settling properties of the granules.

This will be my first participation at the JSWE annual conference. Looking forward to share and exchange research experiences with distinguished experts, academia and students. As an International Water Association（IWA）Fellow and Fulbright US-ASEAN Visiting Scholar, I wish to also share my experiences being involved in the water sector at global level. Looking forward to contribute to the forthcoming programs and activities under the auspices of JSWE, for the benefit of mankind and society.

# JSWE-IDEA Water Environment International Exchange Award

Associate Professor, Department of Environmental Engineering,
Jeonbuk National University（全北大學校，副教授）
Hyun-Woo KIM（金絃佑）

As a nominee of the JSWE-IDEA 'Water Environment International Exchange Award', I would like to thank committee members and all the members of the Japan Society of Water Environment. Although COVID-19 prevents us to meet at the 54th annual conference (Iwate Univ, March 16–18), I feel deeply honored to have been selected as one of awardees and have a chance to make friends with many colleagues working at the same research and development field.

I earned my Doctoral degree in August 2006 at the Department of Civil and Environmental Engineering, Korea Advanced Institute of Science and Technology (KAIST). I have been focusing on the development of leading-edge environmental engineering system to solve major environmental concerns and energy problems simultaneously using creative, sustainable, and cost-effective engineering concepts. My prior and current research backgrounds have inspired me with several research areas such as photobioreactor system, high-rate anaerobic digestion system, novel microbial engineering systems for wastewater treatments. Most of the possible topics are strongly related to my doctoral and post-doctoral researches at KAIST and Arizona State University. Since I joined Jeonbuk National University, I also participate in researches on advanced oxidation processes using non-thermal plasma technology to reduce emerging/persistent organic pollutants in the various secondary effluents.

My greatest challenge is to find means to estimate right kinetic and stoichiometric constants in mathematical expressions to predict the behavior of microbial or physico-chemical reaction mechanisms precisely. Successful characterization of advanced systems can allow me to conduct a simulation benchmark for treatment performance improvement. I expect to provide overall big pictures and core features of such technologies that will work for human society as a treatment system.

For the conference, I prepared a talk regarding the feasibility of the non-thermal plasma (NTP), one of advanced oxidation processes (AOPs), for the simultaneous removal of microalgae and their toxins using a mathematical approach to explain their decomposition or release numerically. This topic is important because some of the bloom-forming microalgae are producing microalgal toxins, for example, microcystins (MC). Thus, we harvested microalgal biomass in a reservoir suffering from a severe algal bloom and applied the NTP generator producing reactive chemicals with glow discharge. By suggesting a mathematical model, we could predict how the varying concentrations of MCs are associated with the microalgal degradation kinetics during the NTP application. Our findings verify that NTP might have a better performance than other AOPs for microalgal biomass and toxin control in surface water.

Now I deeply understand JSWE's contribution to our society and would like to share key ideas and learn novel approaches for better water environment at the future conferences of JSWE. Again, I really appreciate this opportunity and would continuously contribute to exchanging academic activities between the Korean Society of Environmental Engineers and JSWE.

# JSWE-IDEA Water Environment International Exchange Award

Professor, School of Environmental Science and Engineering,
Sun Yat-sen University（中山大学，教授）
Guangli Liu（劉広立）

First of all, I would like to thank Japan Society on Water Environment (JSWE) committee for awarding me the JSWE-IDEA International Exchange Award. With the recommendation from the Chinese Society for Environmental Sciences and the support of the JSWE-IDEA International Exchange Award, I was invited to attend the 54th Annual Conference of JSWE held in Iwate from March 16 – 18, 2020. It is my great honor to be awarded and I thanks for all the support and help from both China and Japan sides.

I got my doctoral degree in the Environmental Engineering, Tsinghua University in March, 2002. I continued the study on water reuse at Peking University as a postdoctor. Since I joined in Sun Yat-sen University, I have been working on the field of the bioelectrochemical system (BES) and water reuse. My research mainly focuses on the wastewater treatment and reclamation using the BESs. I have tried to develop microbial electrolysis desalination and chemical-production cell (MEDCC) for desalination and refractory organic compounds removal and proved the MEDCC consuming low energy in the desalination. My recent research topics are industrial wastewater treatment including pharmaceutical and textile wastewaters, hydrogen peroxide production and seawater desalination using BES, other environmental applications of BES.

In this conference, I submitted my research work about pesticide wastewater treatment, entitled by "Pesticide wastewater treatment using the combination of the microbial electrolysis desalination and chemical-production cell and Fenton process". Real wastewater with several toxic pesticides, 1633 mg $L^{-1}$ COD, and 200 in chromaticity was used for the investigation. We showed that desalination in the desalination chamber of MEDCC reached 78%. Organics with low molecular weights in the desalination chamber could be removed from the desalination chamber, resulting in 28% and 23% of the total COD in the acid-production and cathode chambers, respectively. The desalination in the desalination chamber and organic transfer contributed to removal of pesticides (e.g., triadimefon), which could not be removed with other methods, and of the organics with low molecular weights. The COD in the effluent of the MEDCC combined the Fenton process was much lower than that in the perixo-coagulaiton process (< 150 vs. 555 mg $L^{-1}$). Overall, the combined method consumed much less energy and acid for the pH adjustment than that the Fenton. I will try to scale up our combined system for the real pesticide wastewater treatment in next step.

The coronavirus outbreak all over the world made this prestigious conference postponed, but gave us a lesson that we should communicate and share our findings so as to make the world a better place. The conference provides such a very good chance to have interesting ideas, make new fried and meet old friends who have known each other through the symposium between environmental societies from China and Japan in recent years. I believe that the conference would be very successful and high valuable for any researchers in the water environment after we overcome the coronavirus outbreak. I will contribute myself to advance the cooperation between China and Japan. Thank professors and students of JSWE again for their dedication on this prestigious conference.

# JSWE-IDEA Water Environment International Exchange Award

Professor, College of Engineering, China Agricultural University
（中国农业大学工学院，教授）
Wei QIAO（乔玮）

First of all, I would like to express my thanks to JSWE-IDEA committee for awarding me this great honor in the 54th Annual Conference which was planned to be held in Iwate on March 16–18, 2020.

I completed my Ph.D. at Tsinghua University in the School of Environment. After that, I continued my research on anaerobic treatment of organic waste at Tohoku University Japan as a post-doctor supported by the JSPS program. In 2014, I joined China Agricultural University and work on the treatment and recycling of agricultural waste. My research focus on overcoming economic and technological barriers of current anaerobic digestion technologies through innovation on biological, physical and chemical process. I have also committed to the fundamental research which supports the creation of innovative anaerobic process and reactors. The main objectives of my research are to upgrade the anaerobic digestion performance to enhance the bioenergy production, produce matured and pathogen free digestate, and the high quality treated wastewater. Anaerobic digestion (AD) can thus play a more important role in agriculture treatment and recycling.

For attending the 54th JSWE conference, I submitted a paper which proposed a novel two stage AD process for nitrogen rich waste. It was well known that the slow hydrolysis rate and ammonia inhibition effects significantly limited the performance of anaerobic digestion. Innovative two stage AD was therefore investigated for chicken manure, a typical nitrogen rich waste, by combining hyper-thermophilic (70 °C) pretreatment and a subsequent submerged flat sheet anaerobic membrane bioreactor (AnMBR). In addition, an in-situ stripping was assembled into the AnMBR to remove the ammonium-N being intended to alleviate the inhibition effects.

Through the 120-day continuously fed experiment, the hydraulic retention time was optimized at 4 and 15 days for the pretreatment and AnMBR, respectively. The hyper-thermophilic pretreatment reactor effectively hydrolyzed the substrate and produced total VFA as high as 22.4 g $L^{-1}$. The methanogenic activity was not completely inhibited in the hyperthermophilic reactor. Methane was thus also produced at 78 mL $gVS^{-1}$ with a content of 24% $CH_4$. In the AnMBR reactor, the biogas yield (85% $CH_4$) reached 333 mL $gVS^{-1}$ at HRT 15d. Compared the control AnMBR, the biogas production was noticeably enhanced by 71 % through ammonia stripping, reached 392 mL $gVS^{-1}$. The ammonium-N concentration was reduced from around 5750 mg $L^{-1}$ to 3060 mg $L^{-1}$ under HRT 15d. The ammonia inhibition effects were therefore mitigated. During the whole experiment, microfiltration performance of the membrane kept stable. Conclusively, the two stage AD process may provide an alternative approach for the treatment of nitrogen rich organic waste. The optimization of ammonia stripping and long term membrane operation maintenance is still worthy of further study.

Once again, I am grateful for the organization of the JSWE activities. The 55$^{th}$ annual conference is highly expected. The communication through the conference may provide more opportunities for fostering innovation in anaerobic treatment of water.