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BWEL Certificate Ceremony of Academic Year 2023

The BWEL certificate ceremony of the academic year 2023 was held on March 25, 2024 at Nagaragawa Convention Center. President Kazuhiro Yoshida of Gifu University attended the ceremony along with BWEL General Committee members and BWEL Promotion Office staff.

The certificate of International Environmental Leadership was awarded to 2 doctoral course students, Haoning Su and Sri Anggreini, from China and Indonesia, respectively.

At the ceremony, President Yoshida granted the certificate and then delivered his congratulatory address and words of encouragements to the two graduate students. Following president's address, the two graduates delivered address in reply in English and

expressed their aspirations and determination as new environmental leaders to President Yoshida and the participants.

Going forward, Ms. Sri is going to be a teaching staff at a university in her home country, and Mr. Su will start job hunting, while continues his research in Gifu University as a specific cooperation researcher.

Total number of the program graduates: 248 (as of the end of March 2024)

	Japanese	Foreigner
Master	97	102
Doctor	3	46



吉田 和弘学長による修了証書授与
 Certificate of International Environmental Leadership
 awarded by
 Dr. Kazuhiro Yoshida, President of Gifu University



吉田 和弘学長による祝辞
 Congratulatory address by
 Dr. Kazuhiro Yoshida, President of Gifu University

令和5年度環境リーダー修了証書授与式

令和6年3月25日に長良川国際会議場第5会議室において吉田和弘岐阜大学学長、プログラム統括委員会委員、推進室メンバーの出席のもと、令和5年度岐阜大学流域水環境リーダー育成プログラム修了証書授与式が行われました。この日は本年度の博士課程修了生、Haoning Su (中国)と Sri Anggreini (インドネシア)が国際環境リーダーとして認定されました。

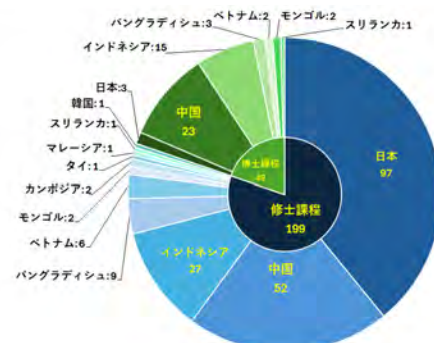
はじめに吉田学長より2人の修了生にそれぞれプロ

ラムの修了証書が授与されました。続いて吉田学長より祝辞が述べられ、力強い激励の言葉も送られました。これに対し、2人の修了生から英語による答辞を述べ、今後の抱負を語りました。

Sriさんは4月より母国大学で教鞭をとり、環境リーダーとして新たな一歩をふみ出します。Su君は岐阜大学の特別協力研究員として研究を行うと共に母国大学の教員となるため、就職活動を行います。



修了生と岐阜大学関係者の集合写真
 Group photo of the BWEL certification ceremony



Research Introduction of Graduates / 修了生の研究紹介



Haoning Su (China)

Affiliation / Graduate School of Engineering
Supervisor / Fusheng Li

My doctoral thesis research is related to the transfer and elimination of antibiotic resistance genes in decentralized wastewater treatment process treating household wastewater. The main objective of this study was to investigate the performance of decentralized household wastewater treatment facilities (DHWWTs) in controlling general pollutants, bacteria and ARGs from household wastewater, hence optimizing on-site maintenance and operation of the DHWWT to eliminate the transfer of ARGs and further improving the treatment performance. For this, this study was carried out mainly by three systematic investigations: For the first part, clarification the transfer, elimination, and accumulation of ARGs while they were undergoing decentralized household wastewater treatment processes. The fate and behavior of tetG, tetM, sul1, sul2 and int1 were quantitatively studied through real-time PCR-based quantification, mass balance evaluation and the existing state analysis based on size fractionation. Second part is determination of factors affecting the general treatment performance of small-scale DHWWTs. Wastewater samples were collected from 15 FBCRs treating individual household wastewater, each with varying waste sludge cleaning time. These samples were subjected to measurements of suspended substances (SS), biological oxygen demand (BOD), chemical oxygen demand (COD), total organic carbon (TOC), total nitrogen (TN), and total phosphorus (TP). The measurement results, along with those from principal components analysis (PCA) and agglomerative hierarchical clustering (AHC), led to the classification of the facilities into three groups (G1, G2, and G3) based on their different treatment performances. The third part relates to insights into enhanced control of transfer of genes in individual DHWWTs based on the investigation of differences in bacteria and ARGs among DHWWTs with varied treatment performances. The findings of this study have been published in *Science of the Total Environment* (Vol. 912, 2024, 169144, Cite Score: 16.8) and *Journal of Water Process Engineering* (Vol. 56, 2023, 104340, Cite Score: 9.7), and could be used as references for better controlling the performance of decentralized household wastewater treatment facilities not only in eliminating the transfer of bacteria and ARGs, but also in optimizing the operation and maintenance of treatment facilities and further improving the treatment performance: 1) Elimination of bacteria and ARGs especially ARGs in smaller particles and free ARGs can be achieved through the enhancement for settleability of slow-settling and transferable small particles; and 2) Optimization treatment performance of facilities could be achieved by improving the properties of biofilm and sludge.



Sri Anggreini (Indonesia)

Affiliation / Graduate School of Engineering
Supervisor / Fusheng Li

The overuse of antibiotics in healthcare and animal husbandry has led to the spread of antibiotic resistance genes (ARGs) in the aquatic environment, posing a significant threat to public health. Understanding ARG behavior during drinking water treatment is crucial for developing control strategies. Regarding advanced drinking water treatment by activated carbon (AC), biological AC adsorbers increase ARG abundance due to biofilm formation. In addition, powdered AC may promote horizontal gene transfer (HGT) during the recycling process of water from drinking water treatment sludge (DWTS) as raw water. Pore size distribution (PSD) of AC is one of the most important property parameters affecting the adsorption process. Different molecules have different sizes, and their ability to be adsorbed depends on whether they can access into the pores of AC. In this study, the uptake of ARGs into the pores of AC was investigated, and the influence of the PSD of AC on the uptake capacity was evaluated through adsorption experiments with different types of ACs. Plasmid-encoded genes and fragmented genes were used as a model of ARGs. In addition, the effect of coexisting dissolved organic matter (DOM) on the uptake of ARGs was also examined since DOM can be a potential competitor to ARGs for the active sites of AC. Results showed that the uptake kinetic of ARGs followed a pseudo-second-order kinetics reaction, and the uptake rate constant varied depending on the type of AC. Moreover, analysis of the uptake capacity of ARGs based on the Freundlich isotherm model determined that the adsorption strength (KF) for plasmid-encoded genes and fragmented genes were $1.28 \times 10^{-2} - 9.00 \times 10^8$ (copies mg⁻¹)^{1-1/n} and $1.71 \times 10^3 - 3.00 \times 10^{10}$ (copies mg⁻¹)^{1-1/n}, respectively. Correlation analysis of the relation of the uptake capacity with pore volume and pore surface area in different pore size regions of all ACs showed that the largest correlation coefficient was found with the pores of 50–240 Å for plasmid-encoded gene and 20–30 Å for fragmented gene. For the adsorbability of DOM, the KF values of fluorescence excitation-emission matrix (EEM)-based fulvic acid-like and humic acid-like substances were higher than those of tyrosine-like and tryptophan-like substances. This study has been published in various scientific journals such as *Chemosphere* (Vol. 339, 2023, 139679) and *Journal of Water Resources and Protection* (Vol. 16, 2024, 1-16). The findings of this study can be used as an important reference for optimizing the adsorption process (including AC selection) to mitigate the risks from ARGs in water. For risk management of drinking water production, the selection of ACs should be made by considering the positive effect of AC in admitting the genes into their pores and also any likely negative effect if admitted genes could release from the pores to the water and hence cause horizontal transfer. For the latter effect, a systematic study is also necessary, which will be conducted.

Voice from New Student / 新入生の声



Wenqing Li (China)

Affiliation /
Graduate School of Engineering

Time flies like an arrow in a blink of an eye. My master's degree was conducted under the BWEL program. It seems like just yesterday that I wrote my introduction as a new student in the master's course, but 3 years have passed. During my time here, I not only gained a lot of knowledge and experience, but more importantly, I also learned a lot of different but wonderful cultures, and have made many friends and seniors with similar interests. All of these make me look at things from a broader and deeper perspective.

However, I realized that my knowledge base and communication skills are still insufficient to support my dream of becoming a lecturer, so I decided to continue my study as doctoral course student with the support of the BWEL program. From April, I am going to start the second year of my PhD study. My research topic is about evaluation and control of membrane fouling by microorganisms in surface water for drinking water production. New ideas and inspirations generated during discussions and communication with my supervisor and program members are helping me a lot to promote my PhD research. After graduation, I would like to be a lecturer or engage in environmental-related work. I will do my best to become an excellent environmental leader like seniors.

Seminar-style Lectures and Special Practices / セミナー形式講義と特別演習科目

セミナー形式の講義と特別演習は、参加学生が環境問題に関する幅広い視野を養い、英語によるコミュニケーション、ディスカッション、発表などの能力を向上することを目的として設計されています。今年度のセミナー形式の講義は修士課程の学生に対しては地域環境文化特論（前期）、地球環境文化特論（後期）の2科目、博士課程の学生に対しては地球環境セミナーⅡ（通年）としてそれぞれ開講し、環境問題の文化的側面に焦点を当てました。これらの講義は学生による発表とグループディスカッション、まとめより構成され、10個のカテゴリからなる多様な話題を扱いました（1. 生態系と生物多様性、2. 水資源・水環境、3. エネルギー資源、4. 災害と防災、5. 地球環境問題、6. 廃棄物処理・再利用、7. 農業環境と技術、8. グローバル化、9. 社会環境問題、10. 文化と環境問題）。講義は教室で対面で行うことを基本としたが、教室に來れない学生にはオンライン参加できるハイブリッドの形式をとりました。前学期に開講した環境ソリューション特別演習Ⅱ（PhD学生対象）は、専門的な講義を行う能力を身につけるため、学生が講義内容を準備し、多数の聴講者を得て模擬講義を実施する形式としました。後期に開講した環境ソリューション特別演習Ⅰ（PhD学生対象）では、レベルの高い学術誌に掲載されている環境問題とその解決策に深く影響する政治・経済・文化に関する文献の調査を通して、過去・現在・未来にわたる動向を知り、それらが実社会とどのようななかかわりがあるかを調査し、その結果をまとめ英語で発表するものでした。学生による環境問題の発表は以下の表の通りです。

Seminar-style lectures and Special Practices are designed for students to acquire broad knowledge on environmental problems and to develop necessary skills as environmental leaders in English communication, discussion, and presentation. In this fiscal year, the lectures of Regional Environment Cultural Studies and Global Environment Cultural Studies were provided to master's course students in the first and second semester respectively. For doctoral course students, the lecture of Global Environmental Seminar II was provided. Focusing on the cultural aspect of environmental problems, the lectures were conducted by including presentations, group discussions and short summary on a variety of topics in 10 different categories: 1. Ecosystems and biodiversity; 2. Water resources and environment; 3. Energy resources; 4. Disaster and its prevention and mitigation; 5. Global environmental problems; 6. Waste management and recycle; 7. Agricultural environments and technology; 8. Globalization; 9. Socio-environmental problems; 10. Cultural aspects of environmental problems. Environmental Solution Special Practice II was provided in first semester, aiming to train and foster teaching capability, and improve scientific and communication competence through open lectures by PhD students on themes in their specialized fields. Environmental Solution Special Practice I was provided in second semester, and PhD students learned about the past, present and future trends of politics, economy, and culture, which greatly affect environmental problems and their solution strategies, through literature review; and then analyzed their connections with the actual world. Finally, students summarized their learnings and findings via presentation in English. The titles of presentations by students in this fiscal year are shown in the following tables.

Seminar-style Lectures (Regional Environment Cultural Studies・Global Environment Cultural Studies / Global Environmental Seminar II) セミナー形式の講義（地域環境文化特論・地球環境文化特論 / 地球環境セミナーⅡ）

Date	Presenter	Category	Title
May 19 5月19日	Wenqing Li, Alma Rizky Aurelly, Jordan Chan Tan	6	Garbage and industrial waste problems and the impacts on the life of Asian countries (ゴミ問題・産業廃棄物処分問題とアジアの国々の生活への影響)
Jun. 2 6月2日	Ummi Marfuah, Naoya Shinoda, Abram Anggit Mahadi	1	Overexploitation of tuna and the conservation strategies (マグロの枯渇と保全はどのようにすべきか)
Jun. 16 6月16日	Mbah Sylverline Ogechi, Hayato Shirota, Sossou Arness Prince Gynth	7	Agricultural activity with water pollution and water safety (農業と水汚染・水安全)
Jun. 30 6月30日	Naing Lin Htun, Mao Iida, Leonardo	3	What is the best strategy of energy supply for our future? (エネルギー供給戦略はどのようにすべきか)
Jul. 14 7月14日	Bornwell Siakanomba, Kizuku Mori	3	Electricity vs Gas : Which one is more environmentally friendly? (電気 VS ガス : 地球環境に優しいのはどっち)
Oct. 27 10月27日	Wenqing Li, Kizuku Mori, Pham Dang Khuong	4	Environmental impacts of release of radioactive materials (放射性物質の流出が環境に与える影響)
Nov. 10 11月10日	Jordan Chan Tan, Hayato Shirota, Shiwei Tang	5	Global warming and the impacts on life of Asian countries (地球温暖化とアジアの国々の生活への影響)
Nov. 24 11月24日	Leonardo, Satoshi Yoshimine, Dai Chen	4	Lessons to learn from the Northern Sumatra earthquake and the Great East Japan Earthquake (スマトラ島沖地震と東日本大震災から学ぶもの)
Dec. 8 12月8日	Alma Rizky Aurelly, Naoya Shinoda, Bosco de Sousa Auxilio	8	Roles of youth to protect our environment (環境保全における若者の役割)
Dec. 22 12月22日	Naing Lin Htun, Zihao Zhao, Sengsamonesay Tounouth	10	Impacts of food production, processing, and consumption on environmental sustainability (食品の生産・加工・消費が環境持続可能性に与える影響)
Jan. 19 1月19日	Bornwell Siakanomba, Shan Jiang, Da Graca Amaral Flavio Maria	9	Overpopulation of Asian countries (アジア国々における過剰人口問題)



学生による発表及びグループディスカッション（左、中：地域環境文化特論 / 地球環境セミナーⅠ；右：環境ソリューション特別演習Ⅰ）

Presentation by students (Left, Center: Regional Environment Cultural Studies / Global Environmental Seminar I; Right: Environmental Solution Special Practice I)

Environmental Solution Special Practice I, II / 環境ソリューション特別演習Ⅰ,Ⅱ

Date	Speaker	Title
Jul. 28 7月28日	Khadiza Akter Mousumi	Evaluation of the Impact of Climate Change on River Temperature
Jan. 26 1月26日	Abdi, Suarez Thiara Celine Estavillo, Kieu Thi Hoang Yen	Economic Forces, Political Decisions, Cultural Shifts: Navigating their Environmental Footprints

Overseas Field Study / 海外現場研修

学生の国際性と流域水環境への理解深化を促進するために、8月8日から8月14日の7日間、海外現場研修を中国の山西省呂梁市、北京市、天津市で実施しました。プログラム学生4名に加え、プログラムの開講科目を履修した日本人学生3名も参加し、水環境、およびエネルギー関連施設などを訪問し中国における環境への取り組みや現状について研修を行いました。呂梁市では、呂梁市環境局、柳林県環境文化局の担当者から柳林の環境・社会・経済状況の説明を受けるとともに、自然と人文歴史景観と有機的に融合した柳林県を流れる清河と、柳林県から40キロ離れている三交鎮黄河古渡口（昔渡しの船の発着場）をそれぞれ見学し、中国の中で発展が比較的遅れている地域の現状と水環境、黄河文化などを理解する良い機会となりました。北京市においては、古い住居区における給排水・衛生環境の現状と、都市発展の最前線にある大興区におけるグリーン排水システム、省エネと環境保全の取り組みの見学調査を行いました。また、北京市の地理的環境の特徴に順応し、600年前に作られ今でもしっかり機能している紫禁城内の排水システムも見学し、中国の古代文化と歴史のみでなく、先人の知恵や創意工夫についても肌で感じることができました。天津市では、都市河川である海河と海河沿いで形成された古い街と街の給排水を調査し、同時に海河の地域経済の発展への貢献ならびに天津の経済成長が水環境への影響、その対策方法等について理解を深めました。

To promote students' internationality and deepen their understanding of watershed environmental issues, a seven-day overseas field study was conducted from August 8 to 14 in Lvliang City in Shanxi Province, Beijing, and Tianjin, China. In addition to four students from the program, three Japanese students who had taken courses offered by the program also participated. In Lvliang City, after receiving explanations on the environmental, social, and economic conditions of Liulin from officials of the Lvliang City Environmental Bureau and the Liulin County Environmental Culture Bureau, students visited the Qing River, which flows through Liulin County and is organically integrated with natural and cultural-historical landscapes, and the Yellow River old port in Sanjiao town, 40 kilometers from Liulin County. This visit provided a good opportunity to understand the current situation of relatively underdeveloped areas in China, water environment issues, and Yellow River culture. In Beijing, students conducted a survey on the current status of water supply and sanitation in old residential areas and visited Daxing District's green drainage system, energy-saving, and environmental conservation efforts at the forefront of urban development. They also visited the 600-year-old drainage system within the Forbidden City, which is still functioning well, providing a firsthand experience of China's ancient culture and history, as well as the wisdom and creativity of the predecessors. In Tianjin, students investigated Haihe River, an urban river, and the old town formed along the Haihe, as well as the town's water supply and drainage. They also deepened their understanding of the Haihe's contribution to regional economic development, and the impact of Tianjin's economic growth on the water environment, and strategies to address these issues.



Group photo at the Yellow River old port, Sanjiao town, Liulin County, Shanxi Province



Yellow River water intake facility monitoring room in Sanjiao town



Photo after field survey at Tianjin Haihe

Online Seminar by BWEL Graduates / 修了生によるオンラインセミナー

流域水環境リーダーの修了生の活動状況を把握し、修了生と現在本プログラムで学んでいる学生との交流を深めるため、2024年2月28日に本プログラム修了生2名、Cui Guangyu博士（北京大学・深圳研究生院）とShao Huijuan博士（山東農業大学）によるオンラインセミナーを実施しました。

セミナーでは固形廃棄物処理や土壌汚染に関する専門的な内容だけでなく、所属大学の紹介、大学からの期待、キャリアパスに関する話もあり、メモを取りながら真剣に聞き入る学生も多数見受けられ、大変有意義なセミナーとなりました。

In order to grasp the activity situation of the graduates of BWEL and to deepen the exchange between the graduates and the students currently learning under the program and in our university, an online seminar was conducted on February 28, 2024, featuring two graduates of the program, Dr. Guangyu Cui from Peking University Shenzhen Graduate School and Dr. Huijuan Shao from Shandong Agricultural University.

The seminar not only covered specialized topics related to solid waste treatment and soil contamination but also included introductions to their respective universities, expectations from these institutions, and discussions on career paths. Many students were seen taking notes attentively, making it a highly meaningful seminar.



オンラインセミナーの様子
The scene of the online seminar

UGSAS-GU & BWEL Joint Poster Session

11月8日に岐阜大学連合農学研究所と合同で「UGSAS-GU & BWEL Joint Poster Session on Agricultural and Basin Water Environmental Sciences 2023」を連合農学研究所 6階合同ゼミナール室にて開催しました。本セッションには21名の学生が参加し、研究成果のポスター発表を行いました。流域水環境リーダー育成プログラムの学生で工学研究科博士課程3年生のHaoning Suさんが優秀発表賞を受賞しました（発表タイトル：Reduction of antibiotic resistance genes in large-scale Johkasou treating residential area wastewater）。

On November 8th, the United Graduate School of Agricultural Science, Gifu University (UGSAS-GU), jointly held the "UGSAS-GU & BWEL Joint Poster Session on Agricultural and Basin Water Environmental Sciences 2023" in the 6th-floor seminar room of UGSAS-GU. In this session, 21 students from UGSAS-GU and BWEL presented posters showcasing their research achievements. BWEL program student Haoning Su, D3 of the Graduate School of Engineering, won the prize of "Best Presentation Award" (Presentation title: Reduction of antibiotic resistance genes in large-scale Johkasou treating residential area wastewater).