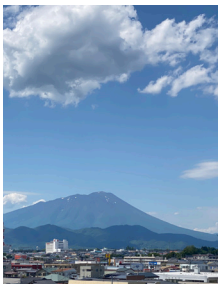
KENGURO Newsletter vol.29

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Featured!!
- KMITL and Iwate University jointly hosted ISBB2026!
- A faculty member from NCYU held a career seminar and research seminar!
- Internship programs for students from Thailand and Taiwan!



Featured !!

Promoting International Exchange with Thailand and Taiwan!!

In this issue, we highlight the 21st International Symposium on Biocontrol and Biotechnology / International Conference on Agriculture, Biology, and Medical Sciences (ISBB2026/ICABM), held at Iwate University for four days from May 29, 2026. ISBB2026 was jointly organized by Iwate University and King Mongkut's Institute of Technology Ladkrabang (KMITL), Thailand. An inter-faculty agreement for academic and student exchange (MOA) with KMITL originally began at the Faculty of Science and Engineering, Iwate University, and subsequently developed into a university-wide agreement, leading to ISBB2026 being hosted by the Faculty of Agriculture this year. In conjunction with ISBB2026, many faculty members and students from National Chiayi University (NCYU), Taiwan, which has MOA with the Faculty of Science and Engineering, also visited Iwate University. In collaboration with KENGURO, NCYU faculty members gave a career seminar for women researchers and a lecture at a group research meeting of SPERC, the interdisciplinary research platform in Faculty of Science and Engineering. In addition, students from KMITL and NCYU participated in one- to two-month internship programs at the Faculty of Science and Engineering, Iwate University.

ISBB2026 Held at Iwate University!!

Executive Committee Chair: Isato Araki
(Faculty of Agriculture / Grad. Sch of Science and Engineering)



We began preparing for this international conference in October 2024. For financial support, we applied for a subsidy from Morioka City; however, the result of the application was not announced until just two months before the conference. During the preparation period, I therefore had to handle most of the administrative work almost entirely on my own. In addition, our co-organizer, KMITL, continued to send us new requests right up until shortly before the conference, including awards and a courtesy visit to Iwate University. I sometimes found myself thinking, "I wish they had told us all this at the beginning!" Initially, we had not expected such a large number of participants. Once registration was underway, however, the number continued to grow, eventually bringing together participants from 20 universities and research institutions across five countries. It was certainly a welcome challenge! In the end, I was relieved that we were able to complete the four-day international conference successfully without any major problems. I believe this event also provided an excellent opportunity to raise the profile of Iwate University across Asia. I hope that it will lead to an increase in the number of talented international students at Iwate University.

Executive Committee Member: Masahiro Daibo
(Faculty of Science and Engineering)



The distinctive feature of this symposium is that it is built on a long-standing relationship between the two universities. The collaboration between Iwate University and KMITL began with joint research on optical technologies by Professor Kyu Yoshimori and Professor Prathan Buranasiri, and I have since continued their efforts through collaborative research and student exchange. In 2017, we held our first joint symposium at Iwate University, covering a broad range of research fields. About two years ago, Professor Vorapat proposed another symposium, this time focusing on the biological sciences. With the cooperation of Dr. Araki, Dr. Pattama, and Dr.Yuan of the Faculty of Agriculture, I have been involved in organizing the symposium as a member of the Executive Committee. I am delighted that our connections have developed beyond the boundaries of individual faculties. Our previous exchange activities have also led students from short programs to pursue graduate studies at Iwate University, with some going on to successful careers at universities and national research institutes in Thailand. I hope that the connections made through this symposium will lead to new collaborative research and study-abroad opportunities, and that these exchanges will continue to grow and be passed on to the next generation.



Meeting between Iwate University and KMITL



Group photo after the opening ceremony at Ginga Hall (above)



Optional tour to the Iwate Biotechnology Research Center (above)



Invited lecture by Dr. Daisuke Kageyama (NARO)

Award Ceremony

Ms. Kasumi Suzuki (D3, Science and Engineering), recipient of the Excellent Student Oral Presentation Award.
Several other students from Iwate University also received awards.



Voices from ISBB2026 participants ！！

ISBB2026 brought together participants from many countries, as well as numerous students from KMITL, NCYU and Iwate university.

Yu Hsin-Chieh, B4, NCYU



At ISBB2026, I presented a poster entitled “Development of a Novel Synbiotic Formulation Using Bacillus subtilis and Persimmon Peel Waste for the Biocontrol of Xanthomonas Species.” Xanthomonas campestris pv. campestris (Xcc) is a plant pathogenic bacterium that causes black rot in cruciferous crops such as cabbage. In recent years, the emergence of antimicrobial-resistant strains has become a serious threat to agricultural production. Conventional chemical control methods also carry the risk of promoting multidrug resistance. In this study, we screened several antagonistic bacterial strains that showed strong inhibitory activity against Xanthomonas. Genome sequencing identified one of the candidate strains as Bacillus subtilis, and further experiments demonstrated that this strain promoted the growth of cruciferous vegetables. We also found that peel from the Niuxin persimmon, an agricultural by-product from the Chiayi region, enhanced the growth, antimicrobial activity, and viability of this B. subtilis strain. In the future, we aim to develop a next-generation synbiotic system by combining agricultural waste with this beneficial bacterial strain.

Nazir Ahmed, D3, Science and Engineering



I am a Japanese Government (MEXT) Scholarship student from Pakistan, conducting my research under the supervision of Dr. Koichiro Kobayashi. At ISBB2026, I gave an oral presentation entitled “Deep Learning-Based Noise Reduction for Magnetocardiography Using Independent Component Analysis (ICA).” Early detection is important for cardiovascular diseases, and the 12-lead electrocardiogram (ECG) is widely used to examine the electrical activity of the heart. However, ECG may not provide sufficient information when cardiac signals are weak or complex. We are developing magnetocardiography (MCG), which detects the extremely weak magnetic fields generated by the heart activity. MCG can provide information complementary to ECG and can be used to detect cardiac abnormalities such as ischemia and arrhythmias. However, conventional MCG systems require magnetically shielded rooms, which is a major obstacle for its practical use. We have developed an unshielded MCG together with a system with machine learning to automatically suppress electromagnetic noise present in urban environments and extract cardiac signals. Through this research, I have gained practical expertise and technical skills in cardiac signal detection and analysis. I hope to advance cardiac signal detection technologies and contribute to the development of next-generation sensing technologies in Japan.

Kazuki Oikawa, D1, Science and Engineering





At ISBB2026, I presented a poster entitled “Magnetically Induced Endosomal Escape Quantified by HaloTag® Ligand-Functionalized Fluorescent Superparamagnetic Silica Nanoparticles.” In my presentation, I introduced the challenge of low endosomal escape efficiency in current drug delivery technologies and explained how our research aims to overcome this limitation. This attracted the interest of many participants and led to valuable discussions. I received insightful suggestions from researchers in a variety of fields, including ideas for optimizing the ligand density on the nanoparticles and the protein domains used for targeting. These discussions provided valuable perspectives for the future development of my research. I was also honored to receive the Best Student Poster Award, and I was very pleased that my research and the efforts I have made so far were recognized. As the next step, I plan to target specific organelles with the nanoparticles we have developed and manipulate them magnetically to investigate how such manipulation affects living cells. At present, much remains unknown about the potential impact of technologies that enable magnetic manipulation of intracellular organelles. However, I believe that the ability to selectively manipulate specific organelles could pave the way for a new approach to cellular manipulation—what might ultimately be described as organelle-level “nanosurgery” in living cells.

Ibuki Katakura, M2, Science and Engineering



At ISBB2026, I presented a poster entitled “Effects of Non-Contact AC Electric Field Stimulation on CO2 Release and Biophoton Emission during Yeast Fermentation.” During the poster session, experts in the biological sciences provided valuable insights into different cell types and their characteristic responses. Their comments gave me new perspectives that I would not have considered from my own field of expertise, making this a highly valuable experience. At the same time, I realized how challenging it can be to communicate specialized concepts in electrical engineering to researchers from other fields. I learned that intuitive explanations alone are not always sufficient and that it is important to explain the underlying theories in a clear and accessible way. This was an especially valuable lesson for me. Drawing on the diverse feedback and experience in interdisciplinary communication that I gained at ISBB2026, I hope to deepen the discussion and interpretation of my research while continuing to improve my ability to communicate it clearly to a broad audience.

Nara Juassawabanjong, B4, KMITL





At ISBB2026, I presented a poster entitled “Development of Cu-Doped ZnO via Microwave-Assisted Green Synthesis for Enhanced Wastewater Treatment.” Using leaf extract from Dolichandrone serrulata as a natural source of phytochemicals, we synthesized copper-doped zinc oxide (Cu-doped ZnO) nanoparticles. The nanoparticles were characterized using X-ray diffraction (XRD), UV–visible spectroscopy (UV–Vis), field-emission scanning electron microscopy (FE-SEM), and energy-dispersive X-ray spectroscopy (EDX). The results showed that the hexagonal wurtzite structure of ZnO was retained after Cu doping, while the optical band gap decreased from 3.22 to 3.00 eV, enhancing visible-light absorption. Under natural sunlight, the ZnO–5%Cu photocatalyst degraded approximately 84% of methylene blue within 80 minutes. These results demonstrate the potential of green-synthesized Cu-doped ZnO nanoparticles as promising photocatalytic materials for wastewater treatment. I was also honored to receive the Outstanding Student Poster Presentation Award at ISBB2026. What impressed me most was the warm and welcoming atmosphere created by the organizers, staff, and participants, which made the entire conference an enjoyable and inspiring experience. I sincerely hope to have the opportunity to participate in this wonderful conference again in the future.

Dr. Bunyarit Meksiriporn, KMITL





At ISBB2026, I gave an oral presentation entitled “Design of a Broad-Spectrum Multi-Epitope Vaccine against Mpox Virus and Its Delivery Using Bacterial Outer Membrane Vesicles (OMVs).” I was honored to receive the Best Senior Oral Presentation Award for this research. In this study, we designed a multi-epitope vaccine against Mpox. Epitopes capable of inducing immune responses in different types of immune cells were selected based on their predicted antigenicity, allergenicity, and toxicity. The epitopes were joined using peptide linkers and fused to the C-terminus of an adjuvant to enhance antigenicity. The resulting vaccine construct was computationally evaluated for its physicochemical properties, antigenicity, allergenicity, toxicity, solubility, and structural stability. Molecular docking and dynamics simulations indicated that the construct could interact strongly and stably with the immune receptor TLR4. We then incorporated the vaccine construct into engineered OMVs derived from Escherichia coli JC8031 ΔLpxM and successfully displayed it on the OMV surface. Cytotoxicity assays using mammalian cells showed no detectable cytotoxicity, supporting the potential of this OMV as a vaccine delivery system. ISBB2026 brought together a wide range of researchers from fundamental biology to bioengineering. It was a valuable opportunity to further strengthen my enthusiasm for research and creative scientific exploration, while also inspiring new ideas that may lead to future collaborations.

Lecture by Professor Yun-Wei Lin from NCYU ！！



In conjunction with ISBB2026, we invited Professor Yun-Wei Lin from NCYU, Taiwan, to Iwate University. In collaboration with KENGURO, Professor Lin gave a Career Seminar for Female Researchers on May 25, and a lecture at a meeting of the SPERC Medical Materials Engineering Research Group, On May 29.

Career Seminar for Female Researcher

Early in my career, I faced pressure to secure research funding, intense competition, and doubts about myself. However, by persevering in my research and developing collaborations with clinical researchers, I received a national research award and eventually became a professor. I later took on various leadership and administrative roles, including serving as department chair and secretary general, becoming increasingly involved in university administration. During the COVID-19 pandemic, I was responsible for safeguarding more than 11,000 students. I also secured substantial funding for the renovation of student dormitories. Through these experiences, I came to see success not simply in terms of individual achievement, but to view the university as an interconnected system in which its members support and influence one another. I do not believe that leadership necessarily requires forcefulness or a dominant personality. Empathy and respect for others have become important strengths in my work.



Career Sminar for Female Researcher (Center Cafeteria, 2nd floor, TOVLAB)



Discussion after Career Seminar

SPERC Biomedical Materials Engineering Group

Lung adenocarcinoma is frequently driven by activating mutations in the epidermal growth factor receptor (EGFR). Osimertinib specifically targets mutant forms of activated EGFR and has shown excellent therapeutic efficacy. However, the emergence of drug-resistant cancer cells is inevitable, and the mechanisms underlying this resistance remain incompletely understood. In this study, we focused on RAD51, a key protein involved in homologous recombination. We found that osimertinib reduced RAD51 expression along with cancer cell viability. Depletion of RAD51 enhanced osimertinib-induced cytotoxicity, whereas overexpression of RAD51 suppressed it. In osimertinib-resistant cells, high RAD51 expression was maintained even during continued osimertinib treatment. Clinical data further showed that high RAD51 expression was associated with poor treatment outcomes in patients with non-small cell lung cancer. These findings suggest that targeting RAD51 may represent a potential strategy for enhancing the therapeutic efficacy of osimertinib in non-small cell lung cancer.



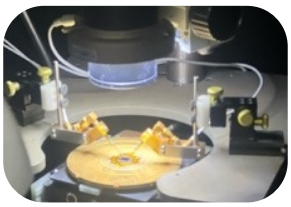
Lecture in SPERC Biomedical Materials Engineering Group (Ichiyu Kaikan Large room)

Internship in Faculty of Science and Engineering, Iwate University ！！

Thitima Naeopaya, B2, KMITL



From April 7 to June 7, I conducted research in Dr. Abe's lab. My research focused on the development of a photoconductive UV sensor using ZnO thin films, as well as hardware related to the UV sensing system. I also worked on the development of a chemical monitoring system and a graphical system for visualizing experimental data. One of the electronic circuits I designed did not initially work properly, even though the circuit design was correct. After investigating the problem, I discovered that the integrated circuit (IC) needed to be reprogrammed. I wrote the code myself and designed the logic required to operate the device successfully. This was both an enjoyable and challenging experience, and my work was highly appreciated by my supervisor. It was especially valuable to have the opportunity to apply the IC programming knowledge I had learned during my first year at university to a real research project.



The successfully operating circuit

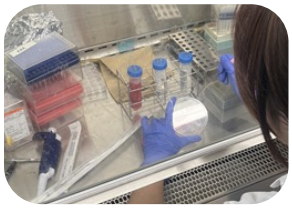


English Class

Huang Ya-Chen, M2, NCYU



I joined the Shiba Lab from May 27 to June 28. During my stay, I studied the secretion pathways of extracellular vesicles (EV) in mammalian cells, which greatly broadened my understanding of EV biology and secretion mechanisms. During the 1st week, I read a wide range of scientific papers to build a solid theoretical foundation. In the 2nd week, I observed a doctoral student carrying out the complete experimental workflow and carefully recorded the timing, procedures, and technical details. By the 3rd week, I could perform the entire complex experimental procedure independently. I was also deeply impressed by the collaborative atmosphere in the lab, where members generously shared their knowledge and ideas during scientific discussions. This international exchange not only strengthened my cross-cultural communication skills and broadened my scientific perspective, but also provided an invaluable foundation for my future development as a researcher.



Cell culture



Chagu-Chagu Umakko

Editor`s Note

In this issue, we introduced highlights from ISBB2026 held at Iwate University, as well as internship experiences from our partner universities. We would like to sincerely thank everyone who contributed articles and shared their experiences with us. Although we were unable to feature all of them in this issue, many Iwate students are studying abroad, and our university also welcomes many international students. If you know any study-abroad experiences or international exchange activities, please feel free to contact us! (Edited by *Shiba*)

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