

This issue includes reports on the Tokyo Section TPC hosted Lectures, the Technical Tour and Lecture hosted by Tokyo Section LMAG (LMAG-Tokyo), the Technical Tour hosted by Tokyo Section SIGHT (SIGHT-Tokyo), and IEEE Region10 SYWL 2024 in Tokyo.

### 1. The 2<sup>nd</sup> Lecture Meeting hosted by Tokyo Section TPC (co-hosted by LMAG-Tokyo)

The lecture organized by the IEEE Tokyo Section TPC and co-sponsored by LMAG-Tokyo was held both in-person and online on May 14, 2024 (Tuesday) at the Kikai-Shinko Kaikan. The speaker was Professor Yuji Suzuki from the Department of Mechanical Engineering, Graduate School of Engineering, The University of Tokyo. The title of the lecture was "Energy harvesting toward battery-less wearable devices". A total of 84 participants attended (19 in person and 65 online), including 51 IEEE members.

Recent advancements in energy harvesting (environmental power generation) technologies have steadily improved, increasing the power output and expanding applications from monitoring machines and infrastructure to powering battery-free wearable devices. The lecture provided an overview of the significance of environmental power generation, the principles of environmental vibration power generation, and discussed various applications. Additionally, the development of environmental power generation devices using electrets for electrostatic induction, their application to wearable devices, and international standardization efforts related to environmental power generation were clearly explained.



Fig.1 Dr. Suzuki giving his talk

### 2. Technical Tour hosted by Tokyo Section LMAG (co-hosted by TPC)

The IEEE Tokyo Section LMAG, co-sponsored by TPC, held an IOWN tour and lecture at the NTT Musashino Research and Development Center on Tuesday, June 11<sup>th</sup>, 2024. A total of 34 participants attended, including 30 IEEE members. The tour covered the history of telegraph and telephone services, epoch-making technologies and services in telecommunications since the launch of Nippon Telegraph and Telephone Public Corporation (NTT), IEEE milestones, and the vision of IOWN (Innovative Optical and Wireless Network) for the future.

At the NTT History Center of Technologies, participants experienced operating a magnetic telephone and a manual switchboard in early telephone service. They also learned about the progression of technologies, including the latest internet and mobile advancements. The IOWN vision was showcased through exhibits of an all-optical network, photonics-electronics convergence devices, and NTT's version of the LLM "tsuzumi."

Additionally, Dr. Akira Okada, the NTT Senior Vice President of R&D and Head of the Science and Core Technology Laboratory Group, delivered a talk on "Device technology for realizing the IOWN concept." He discussed IOWN technologies, focusing on low power consumption, natural photonics technologies, and prospects, aiming to achieve economic growth and sustainability. The tour provided a valuable opportunity to learn about telecommunications technology's history and future vision.

After the tour, the first social gathering and exchange of opinions since the end of the pandemic took place, fostering deeper camaraderie among participants.



Fig.2 Group Photo at NTT Musashino Research and Development Center

Following the visit to SAGAMICO FARM, the tour included a hands-on harvesting experience at a nearby natural farm, “Abio-Farm”, offering participants insights into various sustainable agriculture practices. Abio-Farm strives to create a sustainable society by "creating products that connect life to the future" and growing seasonal vegetables and fruits using cultivation methods that place a low burden on the environment, focusing on delicious food.

The tour of the farms was enjoyable and provided experiences we would not normally have. It was also a meaningful and interesting visit, with discoveries and realizations.



Fig.3 NTT History Center of Technologies



Fig.5 Blueberries and solar panels

### 3. Technical Tour hosted by Tokyo Section SIGHT (co-hosted by LMAG-Tokyo)

On June 22, 2024, the Special Interest Group on Humanitarian Technology (SIGHT) of the IEEE Tokyo Section organized, LMAG-Tokyo, Tokyo Section TPC, and the Education Activity Group jointly organized, a technical tour to visit “SAGAMICO FARM Inc.”, a solar power generation facility in Kanagawa Prefecture. The event was attended by 24 people of various generations, including LMAG members and their families. This farm provided participants with practical learning and firsthand experience in “agrivoltaics”, the dual use of land for solar energy production and agriculture. The farm is a pioneer of futuristic agriculture, simultaneously producing food and energy through solar sharing and automating irrigation and fertilization. It is also involved in various forms of collaboration and coexistence with the local community, having received the Mayor's Award at the Sagamihara SDGs Award 2023. In addition, we attended a lecture titled "How to solve social issues through business? Renewable Energy x Agriculture x Local Community."



Fig.6 Group Photo at the SAGAMICO FARM (Blueberry Garden)

### 4. The 5th Lecture Meeting hosted by Tokyo Section TPC (co-hosted LMAG-Tokyo)

An online lecture hosted by the TPC, IEEE Tokyo Section, and co-sponsored by LMAG-Tokyo, took

place on August 2, 2024, from 15:00 to 16:30. The lecture, titled "Cost-Effective and Secure Cryptography," was presented by Dr. Shinichi Kawamura (National Institute of Advanced Industrial Science and Technology / 2023 IEEE Fellow).

In this lecture, Dr. Kawamura shared his extensive experience in advancing cryptographic technology, particularly from the perspective of achieving cost-effective and secure cryptography. He highlighted his contributions to the practical application of cryptographic systems, which led to his elevation to IEEE Fellow. Dr. Kawamura also provided valuable insights and advice for engineers aspiring to attain IEEE Fellow status, sharing the procedural steps and personal experiences that guided his journey. Dr. Kawamura's first significant contribution is the practical application of cryptographic systems that ensure high security even in mass-produced products. For example, he developed a lightweight structure for the C2 encryption standard, which is used in DVD encryption systems.

Additionally, he pioneered the Serve-aided Computation method, which reduces the computational load of encryption on small clients, such as IC cards, by leveraging the processing power of servers. His second major contribution, which led to his IEEE Fellow recognition, is his pioneering work in a new field involving the efficient implementation of public key cryptography based on the Residue Number System (RNS). Specifically, he discovered an efficient method for performing modular arithmetic in RNS-based public key cryptography. Currently, Dr. Kawamura is focused on developing technologies to prevent the insertion of unauthorized functions into semiconductors and electronic devices. In simpler terms, he is working on methods to protect against "hardware Trojans." The lecture attracted 109 participants, of whom 70 were IEEE members.

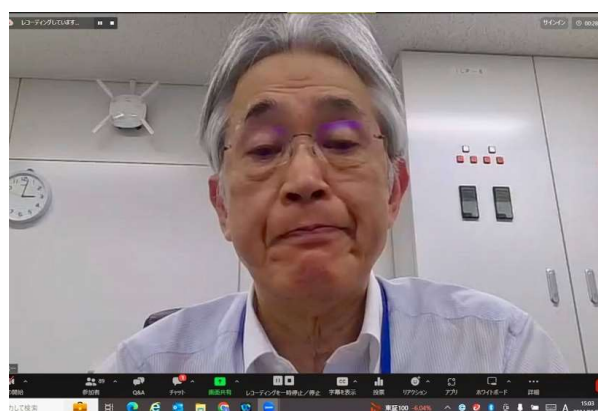


Fig.7 Dr. Kawamura giving his talk (Zoom screenshot)

## 5. Lecture Meeting hosted by Tokyo Section LMAG (co-hosted by TPC)

The lecture was organized by LMAG-Tokyo and co-sponsored by Tokyo Section TPC, with support from the Institute of Electronics, Information and Communication Engineers. It was held on August 21, 2024 (Wednesday) at 15:00 via Zoom Webinar. The speaker was Dr. Takemasa Miyoshi (Team Leader and Chief Scientist, RIKEN), and the lecture title was "Big Data Assimilation Revolutionizing Numerical Weather Prediction Using Fugaku." The event had a total of 178 participants (including 109 IEEE members).

Data assimilation is crucial for synchronizing simulations with the real world for prediction and control. Although it has advanced significantly in weather forecasting, its applications are expanding into various fields as a method for realizing digital twins. At RIKEN, new-generation technologies such as the supercomputers "K" and "Fugaku," phased array weather radar, and satellite data are combined to pioneer innovations in predicting guerrilla rainstorms, typhoons, and heavy rainfall. During the 2021 Tokyo Olympics and Paralympics, a real-time demonstration experiment of the world's leading guerrilla rainstorm prediction, updated every 30 seconds, was successfully achieved using the power of the "Fugaku" supercomputer. Furthermore, prediction and control are closely related, with data assimilation being based on optimal control methods. In the context of advancements in predictability research and improved weather forecast accuracy, efforts towards weather control have also begun, with the speaker taking a leading role in the Moonshot Goal 8 project led by the Cabinet Office. Looking ahead, a new perspective known as "predictive science," which aims to tackle challenges beyond weather forecasting, is emerging.

The lecture on weather prediction and control was very engaging. After the lecture, there were many questions, making the event lively and successful.



Fig.8 Dr. Miyoshi giving his talk (Zoom screenshot)

## 6. 2024 R10 SYWL Congress and IEEE Industry Engagement Workshop in Tokyo 2024

One of the flagship conferences of IEEE Region 10, the R10 SYWL Congress 2024, was hosted by the IEEE Japan Council (jointly with all sections in Japan) from Thursday, August 29 to Sunday, September 1, at the National Olympics Memorial Youth Center. The Tokyo Section LMAG participated actively, focusing on the Plenary Session, Life Member Track Session, and SYWL Joint Sessions, where they reported on LMAG-Tokyo's activities, engaged with other R10 LMAG members, and exchanged ideas with members of other Affinity Groups (SYW).

During the Award Night Session, LMAG-Tokyo was recognized for hosting over six events in the previous year. On the third day, the Cultural Night saw the event come alive with dances led by members dressed in traditional attire from various regions of R10. The overall participation in the Congress, including events like the CLAP hosted by R10 YP, was about 330 attendees.

Additionally, the IEEE Industry Engagement Workshop (IEW) in Tokyo 2024, hosted by the Tokyo Section, was held at the same venue on August 31. After an opening address by IEEE Tokyo Section Chair, Kiyoharu Aizawa, the workshop began with a keynote by IEEE President Thomas M. Coughlin. The event featured talks from industry leaders and a poster session aimed at fostering collaboration between the industry and IEEE.



Fig.9 LMAG Session participants



Fig.10 Group photo from the Cultural Night at the R10 SYWL Congress

## 7. IEEE MGA Geographic Unit Election Process Updates

The election process for the IEEE MGA Geographic Unit was revised in February 2024. The main changes are that the Nominations Committee and the Tellers Committee will be unified into the Elections Committee and that the election period will be shortened from six to four months. As each Geographic Unit, including Councils, Sections, Chapters, and Affinity Groups, responds in sequence, the election of the next LMAG officers will also be conducted according to the new process. (IEEE MGA Operation Manual, Section 9.13)

## 8. Future Events

LMAG-Tokyo is planning to hold the following events. Details will be announced at a later date.

- September 24, 2024, Tuesday, 15:00-16:30, Robot Audition: Construction of robot ear functions and new developments in the multifaceted fields of robot audition, (Prof. Kazuhiro Nakadai, Tokyo Institute of Technology), Online

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Kikai-Shinko-Kaikan Bldg., 517 3-5-8 Shibakoen, Minato-ku, Tokyo 105-0011 JAPAN

E-Mail: [tokyosec@ieee-jp.org](mailto:tokyosec@ieee-jp.org)