Newsletter

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IEEE Tokyo Section Life Member Affinity Group

In this issue, LMAG-Tokyo award report, LMAG-Sendai, LMAG-Tokyo co-sponsored lecture, an LMAG-Tokyo sponsored lecture (Tokyo Section TPC co-sponsored), TPC sponsored lectures (LMAG-Tokyo co-sponsored), LMAG-Sapporo establishment commemorative event report, evening salon report, future plans, etc. are posted.

1. LMAG-Tokyo won the Award

LMAG-Tokyo received the 2021 IEEE Life Members Affinity Group Achievement Award. This award is given to the Group that performed the best activity in 2020 among the more than 100 LMAGs of the whole IEEE. The award ceremony was held on December 10th at the Kikai Shinko Kaikan in a hybrid format. There were 25 participants at the venue and 20 online. Scott Atkinson Chair of the IEEE Life Members Committee gave an explanation and congratulations (participation on the Internet) about this award, and Toshio Fukuda, the past president of the IEEE, presented a plaque to the LMAG-Tokyo Chair, Imai, and congratulated him.

Fig.1 Mr. Fukuda (right) and Mr. Imai

Fig.2 Group photo after the ceremony

After the introduction of congratulatory messages and congratulatory messages from the guests, there was a thank-you greet from Chair Imai.

After the ceremony, the award celebration party was held at a different location, and the congratulatory messages from the attendees and the activities of LMAG-Tokyo in 2021 were projected on the screen, making it a pleasant party.

Fig.3 Award celebration party

Fig.4 Award celebration party

2. LMAG-Sendai, LMAG-Tokyo co-sponsored lecture "Artificial intelligence, big data processing and its applications"

A lecture meeting “Artificial Intelligence, Big Data Processing and their Applications” was held online (Zoom Webinar) at 13:00 - 16:30 on Sept. 25, 2021, sponsored by both LMAGs of Tokyo and Sendai Section. The meeting was also co-sponsored by TPC of Tokyo Section, and in cooperation with IEICE, Japan. There were three lectures on the related topics and the number of participants was 219 in number.

The first lecture was given by Dr. Kunihiko Fukushima (Fuzzy Logic Systems Institute) focusing on the idea and development of neocognitron which is recognized as the origin of deep CNNs (Convolutional Neural Networks). Its architecture was first suggested by neurophysiological findings on the visual systems of mammals. Next, a learning mechanism in multi-layer structure was devised and the model was named as neocognitron. It can recognize visual patterns robustly through learning with the C-cell layer that allows a positional displacement of the visual pattern. The latest research results of the neocognitron such as improved learning mechanisms in the middle layers were also introduced. Finally, Dr. Fukushima pointed out that researchers of artificial neural networks should closely collaborate with brain mechanism research. After the lecture, we had a few questions such as how to form a research team collaborating with neurophysiologists and psychologists, and possibility of the neural network model that can deal with language from a viewpoint of information theory.

Fig.5 Dr. Fukushima giving his lecture
(Captured from Zoom screen)

The second speaker was Dr. Akira Nakagawa (Fujitsu Artificial Intelligence Research Institute), entitled "Fujitsu's Artificial Intelligence Research Initiatives that Bring Trust to Society" to bring trust to society and make the world sustainable. He gave a lecture on artificial intelligence that Fujitsu is researching and developing as one of the most important technologies for this purpose.

Currently, it is the 3rd AI boom, and although there have been major progresses in deep learning, there are still challenges, and the following 6 initiatives to deal with them were explained.

(1) Wide Learning: Technology that combines discovery science and machine learning

(2) Deep Tensor: Technology that recognizes complex features that were difficult with conventional technology from data representing connections between people and things

(3) TDA-TSS: Waveforms that were difficult to analyze in the past Technology that enables highly accurate analysis of the characteristics of time-series data (4) Actlyzer: AI technology that recognizes various human behaviors from city images (5) Supercomputer x AI: High-resolution, real-time tsunami inundation prediction using supercomputer "Fugaku" and AI (6) AI ethics

Fig.6 Dr. Nakagawa giving his lecture
(Captured from Zoom screen)

The third lecture was given by Prof. Kengo Kinoshita with Tohoku University Information Science Institute. His talk was according to the following topics.

(1) Present state of art on Artificial Intelligence and its issues. He talked the lack of medical big data of Japanese especially. The present analysis based mainly on US&EU data.

(2) Application possibility of genome data. Genome data were slightly different between individuals. During the analysis of his genome data, it is possible to predict what kind of diseases will be developed. This forward-looking cohort study is to be the important method of medical fields. The other important factor is the environment factor. It is indispensable to survey and analyze the well matched the genome information and environmental information.

(3) According to the plan of Tohoku Medical Megabank Organization, the data collected and

their application examples to the artificial intelligence. This organization was established to pile up the medical information. Especially the people in the great East Japan Earthquake are subject for the survey to collect their genome data and healthcare data and to investigate the relation between these data and the future developing diseases. These results are more effective as compared with the backward-looking cohort where the patients were interviewed about their past behaviors. The causes of the diseases are analyzed by using the on-time information.

(4) Share of high agile data: The genome data and the health care data are extremely private secret data so that these data are treated very prudently. Considering these situations, we cooperate with 30 domestic institutions to accumulate Japanese data and to contribute to medical developments.

By editing the genome data, the examples of creating new human beings were introduced; the experiment on human body in China and the cinema entitled GATTACA. He talked that the new rules should be needed to inhibit these experiments.

Fig.7 Dr. Kinoshita giving his lecture
(Captured from Zoom screen)

3. IEEE Day 2021 ~ Let's talk about IEEE ~

IEEE Day 2021 was held online on October 5, 2021 (Tuesday), sponsored by the IEEE Japan Council EA Group. There were 61 participants, and LMAG Tokyo members also participated (See Figure 8). There were presentations and games from each Affinity Group, and it was a fun time.

4. Lecture hosted by Tokyo Section (co-sponsored by LMAG) "Hetero-integrated membrane optical device"

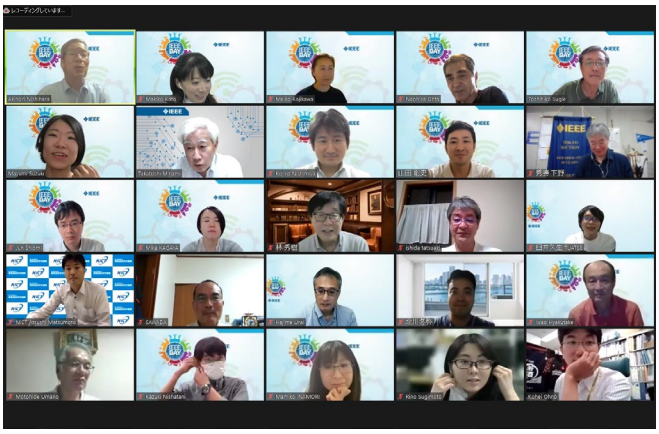

Fig.8 IEEE Day participants

This lecture was held at Zoom Webinar from 15:00 on October 6, 2021 (Wednesday), sponsored by TPC of the Tokyo Section and co-sponsored by LMAG. The speaker was Dr. Shinji Matsuo (Senior Research Fellow, Advanced Integrated Device Research Laboratory, Nippon Telegraph and Telephone Corporation), who gave a lecture focusing on research and development of InP-based membrane optical devices hetero-integrated on a silicon substrate. There were 138 participants online.

Membrane optical devices are considered to be key devices for realizing low power consumption and large capacity transmission, such as obtaining highly efficient modulation characteristics due to large optical confinement in the active layer. In the lecture, a membrane laser on silicon, a membrane laser on SiC, and an MZ modulator using a III-V phase modulator were introduced. It was pointed out that the production of large-scale integrated circuits fused with silicon photonics technology is important. The key is to solve the problems of electric circuits such as power consumption and crosstalk that occur as the scale of PIC grows, and to develop an integrated method.

Fig.9 Dr. Matsuo giving his lecture
(Captured from Zoom screen)

5. IEEE LMAG Nagoya On-Line Discussion

This On-Line Discussion was held from 14:00 on October 16, 2021, sponsored by IEEE LMAG-Nagoya, via Microsoft Teams meeting. The first topic provider is Dr. T. Ohira, Professor Emeritus of Toyohashi University of Technology and the second is Dr. Y. Ishibashi, Professor of Nagoya Institute of Technology.

Prof. Ohira proposed to solve the problem of short mileage in the spread of electric vehicles by using power lines embedded in the road and succeeded in power supply running of EV (5 kW) on the university campus.

Prof. Ishibashi paid attention to the sense of tactile force, which is one of the human senses, and explained the mechanism of working while communicating in 3D virtual space and real space using the sensor.

These topics were very interesting and there was a lively exchange of opinions.

6. Report on IEEE Metro Area Workshop 2021 in Sapporo

The IEEE Metro Area Workshop 2021 in Sapporo, sponsored by the IEEE Sapporo Section, was held on October 30, 2021, from 13:30 to 18:00 at the Graduate School of Information Science and Technology, Hokkaido University and online. From LMAG-Tokyo, Dr. Imai, Chair and Dr. Ota, Vice Chair participated on site. The total number of participants was 55 at the venue and 51 online. The theme was "Interdisciplinary collaboration and social implementation accelerated by data science", and the related actual projects were introduced in five lectures.

At the opening, Prof. Haseyama (IEEE Sapporo Section Chair) gave an opening address followed by guest speeches from Dr. Takako Hashimoto (IEEE Japan Council Chair） and Dr. Toshio Fukuda（IEEE Past President）.

The first lecture was given by Dr. Shinji Yoshioka (Professor, Graduate School of Information Science and Technology, Hokkaido University), who introduced IT human resource development activities that can propose information science and technology with the aim of solving social issues. In the second lecture, Dr. Yusho Ishikawa (CEO of Basis Consulting Co., Ltd.) introduced research on data-driven infrastructure management in collaboration with infrastructure operations using actual data. Third, as an example of subway maintenance, Dr. Shinji Konishi (Director of Civil Engineering Department, Construction Department, Tokyo Metro Co., Ltd.) gave a lecture on the introduction of data science into maintenance work. In the fourth lecture, Dr. Seiji Fujita (SMH Promotion Team Leader, NEXCO East Japan Management Business Headquarters) introduced the improvement of highway asset management using ICT such as MR and AI. Finally, as the fifth lecture, Dr. Hiromichi Kishimoto (Director, Analysis Center, Research and Development Division, Sumitomo Rubber Industries, Ltd.) introduced research on improving the performance of rubber for automobile tires using information science such as supercomputers.

Fig.10 Group photo after MAW

7. IEEE Japan SYWL Workshop

This workshop was held on October 31, 2021 in Hokkaido University Graduate School/ Faculty of Information Science and Technology, from 9 am in a hybrid format of on site or online. There were about 43 participants at the venue and 10 online.

Prof. T. Yamada, Executive Committee Chaiman, gave a welcome speech, followed by a lecture by Prof. Mianxiong Dong, Vice President, Department of Sciences and Informatics, Muroran Institute of Technology, on “IEEE Activities under COVID 19 Pandemic: Pros and Cons”. He described the activities of academic societies before and after the spread of the coronavirus and pointed out the problem that online conferences increased and the number of participants increased, but communication opportunities decreased.

Then, they were divided into 8 groups, and discussions were held on each theme. At the end, each group reported the resume. There was an award for the excellent work of the "Manga Plot Contest", which was the first attempt this time. It was created based on the content of science and technology experienced in classes and research courses.

8. IEEE Sapporo Section LMAG establishment commemorative event

The LMAG commemorative event established this time in the Sapporo section was held from 2:00 pm on October 31, 2021 at the Graduate School of Information Science and Technology, Hokkaido University in a hybrid format of on-site and online. There were about 31 participants at the venue and 32 online.

It started with the moderator of Dr. Kiichi Miyanaga, President and President of Chitose Institute of Science and Technology. There was a greeting from Mr. Kiyohiko Ito (Professor Emeritus, Hokkaido University) and an introduction to LMAG.

Next, there were congratulatory speeches from Dr. Toshio Fukuda (past IEEE President), Dr. Akinori Nishihara (past R10 Director), and Dr. Tadashi Takano (JC LM Coordinator). LMAG officers: Dr. Kiyohiko Ito Chair, Dr. Masanori Koshiba Vice Chair, Dr. Yasutaka Ogawa Secretary were introduced.

There were three commemorative lectures. Dr. Tsuyoshi Yamamoto, a professor at the Graduate School of Information Science and Technology, Hokkaido University, talked “Cyber-physical System in Practice: My Hands-on Experience of IoT and DX”. Dr. Masanori Koshiba, an emeritus professor at Hokkaido University talked “Next-Generation Photonic Network Technologies: Expectations for Space-Division Multiplexing”, and Dr. Toshio Fukuda talked “Create Society of Dynamic Engagement and Activities by Life Members”.

Fig.11 Group photo after the event

9. Lecture hosted by Tokyo Section (co-sponsored by LMAG) "Autonomous decentralized robot system and its deployment"

This lecture was co-sponsored by TPC of the Tokyo Chapter and co-sponsored by LMAG and was held at Zoom Webinar from 15:00 on Thursday, November 4, 2021. The speaker was Dr. Hajime Asama (Professor, Graduate School of Engineering, The University of Tokyo, Director of Artificial Engineering Research Center), and 55 people participated online (including 48 IEEE members).

The lecture was given on the autonomous decentralized robot system that Dr. Asama has been working on as a life work. Service robotics, group robot system technology, biotechnology fusion (cooperation between biology and engineering) to solve social problems such as aging, safety and security, meet social needs, and create new value for example, a constructive approach. He talked about the research so far, basic research from there, development to applied research, and future possibilities in an easy-to-understand manner.


Fig.12 Dr. Asama giving his lecture
(Captured from Zoom screen)

10. Report on 18th IEEE TOWERS

The 18th IEEE TOWERS (Transdisciplinary-Oriented Workshop for Emerging Researchers) was held on Nov. 13, 2021, from 9:30 to 17:30 online and attracted 93 researchers. TOWERS is mainly targeted for students and young researchers including middle-high and high school. Three officers of LMAG-Tokyo participated in this event as reviewers and IEEE Tokyo section booth support. For a tool to support poster sessions and group discussions online, “Spatial Chat” was used. Participants were able to communicate with the panel presenter by moving his/her avatar close to the speaker.

In this workshop, 63 research posters from a variety of technical fields were presented in 3 sessions followed by a group discussion. Members of the group were consisting of students and young researchers from different fields. Each group simulated social implementation and proposition of a project and made a presentation of the result. Finally, based on the evaluation by reviewers,

seven excellent poster presentations were awarded, including those by 2 high-school students. TOWERS Best paper award went to Mr. Takumi Suzuki (Graduate School of Ibaraki University) and Outstanding Poster Presentation Award went to Ms. Mana Nomura (Ichikawa High School).

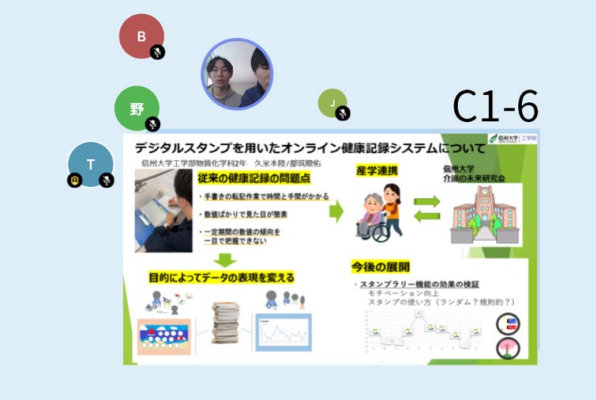

Fig.13 Poster presentation
(Screen capture of Spatial Chat)

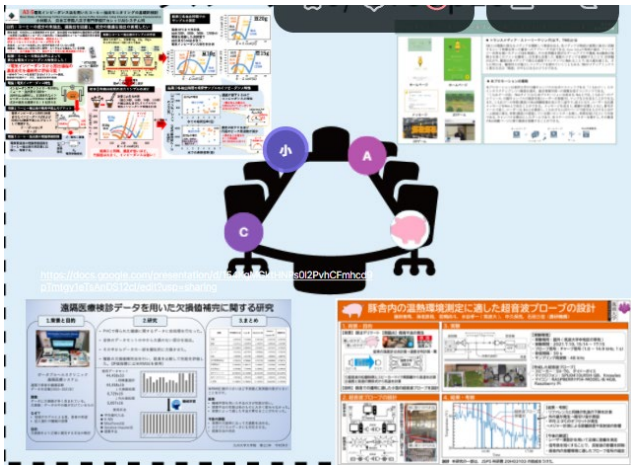

Fig.14 Group discussion
(Spatial Chat screen capture)

11. "Evening Salon" sponsored by LMAG-Tokyo

The 4th Evening Salon sponsored by LMAG-Tokyo was held on Thursday, November 18, 2021, from 15:00 to 17:00 in the meeting room of the Kikai-Shinko-Kaikan with 17 participants. It is a discourse meeting intended to freely exchange opinions on the topic. It was difficult to hold the event due to the epidemic of the new corona, and it was held after two and half year's absence.

The theme of this evening salon was provided by Hitachi, Ltd., and Dr. Digh Hisamoto (Technology Advisor, Center for Technology Innovation-Electrification) provided the topic of "Current status of SiC power devices". Awareness of environmental issues is increasing, and in the energy field, there is a strong demand to reduce the loss of power devices and reduce the environmental load. For medium- and high-voltage applications such as railways, industrial equipment, and automobiles, replacing conventional Si power devices with SiC, which has a high breakdown voltage, can be expected to significantly reduce losses, so many inverters using SiC power devices are available. Power modules are starting to hit the market. Mr. Hisamoto introduced his expectations for SiC devices in the field of power devices and his efforts to tackle the issues that have become clear in recent years by deeply understanding of SiC MOS structures.

In the second half, there was a lively question and answer session while eating and drinking.

Fig.15 Dr. Hisamoto giving his lecture

Fig.16 Evening salon scenary

Fig.17 Group photo after the Evening Salon

12. Lecture hosted by Tokyo Section (co-sponsored by LMAG) "Looking back on power electronics research and development"

This lecture was held at Zoom Webinar from 10:00 on December 15, 2021 (Wednesday), sponsored by TPC of the Tokyo Section, co-sponsored by LMAG, and co-sponsored by the Institute of Electronics, Information and Communication Engineers.

The speaker was Dr. Toshihisa Shimizu (Specially Appointed Professor and Professor Emeritus, Tokyo Metropolitan University), and there were 52 online participants (including 42 IEEE members). The content of the lecture was about the research and development of power electronics, which Dr. Shimizu has been advancing for 40 years, especially focusing on increasing the power density. He also talked about EMC in power electronics. In the future, power electronics will be required to be integrated with the materials field, information and communication field, and measurement technology.


Fig.18 Dr. Shimizu giving his lecture
(Captured from Zoom screen)

13. Future Events

The following events are planned carefully considering the prevention of Covid-19 infection. Information will be sent out via e-mails or updated on the Web site as soon as fixed.

Technical Tour associated with IEEE Milestone (Sponsored by LMAG and TPC of IEEE Tokyo Section)

- Date & Time: To Be Determined
- Venue: Shinkansen Museum and Railway Technical Research Institute

Technical Tour (Sponsored by LMAG and TPC of IEEE Tokyo Section)

- Date & Time: To Be Determined
- Venue: ANA Airplane Maintenance Facility (Haneda Airport)

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