

In this issue, lecture meetings sponsored or co-sponsored by LMAG-Tokyo, Japan SYWL Workshop in Hiroshima, Tokyo-Shin-etsu Joint Section WIE Kick-off event, 17th TOWERS Workshop, IEEE Milestone events, LMAG Joint Committee, Next LMAG-Tokyo officers, and the future events are reported.

1. Lecture Meeting “Networked Autonomy”

The lecture meeting sponsored by IEEE Tokyo Section and co-sponsored by LMAG-Tokyo was held online (Zoom Webinar) at 15:00 ~ 16:30 on Nov. 16 (Mon), 2020. The lecturer was Prof. Masayuki Fujita (Professor at Graduate School of Information Science and Technology, the University of Tokyo). The participants were 85 in number.

Dr. Fujita presented theory and practice to cooperatively control networked autonomy with guaranteed stability from a viewpoint of control theory.

He first explained that a stability condition to control a robot manipulator, an example of autonomous system, is that the system has passivity. This is the same condition known in circuit theory which was proved by Prof. Suguru Arimoto.

Dr. Fujita researched if the passivity still holds in autonomous systems such as living things, focusing on the case that the brain controls body using visual information. He made a process model of predators that recognize movement of preys as 3D rigid body characteristics. As a result, he proved that the system has passivity. Furthermore, Dr. Fujita revealed that the whole system combined with feedback robot control is passive and stably controllable. Passivity still holds in the case of distributed cooperative control for networked multiple robots and they can move cooperatively and synchronize.

Dr. Fujita is currently focusing on a research to realize distributed cooperative control for multiple robots so that they avoid obstacles and do not collide each other, in addition to realizing stability and synchronization in cooperative control. An advanced topic was introduced that scattering transform can resolve instability problems due to communication delay in remote robot control. Dr. Fujita also introduced an experiment where a human operator visually synchronizes multiple robots, showing that the system has passivity and can be controlled stably. Additionally, he touched on practical system examples of distributed cooperative control such as Amazon Robotics.

Finally, there were several interesting questions including scalability in number of robots to be

controlled, effects of friction loss, etc. in a Q&A session, and the lecture was ended successfully.



Fig. 1 Dr. Fujita giving his lecture online (captured from Zoom screen).

2. 17th TOWERS Workshop

TOWERS (Transdisciplinary-Oriented Workshop for Emerging Researchers) is organized for young IEEE members, and is operated by student members. This 17th workshop was held on November 27, via Web meeting due to COVID 19. The total attendants were 105. The paper submission is widely asked for students of junior high schools, high schools and universities, and young researchers. All papers were presented in poster presentations.

The presentations were arranged on the virtual meeting rooms set on the Web site; see the picture below. The attendants clicked the presentation number shown on the table and connected to the presenter.

The workshop started with an opening ceremony, where the summary of this workshop, sponsors, events, and awards for significant papers were introduced.

In the morning, all attendants were divided into 6 groups in the Web for discussing about ‘What is the appropriate discussion theme for IEEE TOWERS?’. After the presentation of each group, the best theme was selected as ‘On going along the on-line research, how can we assemble the information?’

The number of poster presentations was 67 and covered information, communication, robotics, foods, and biology. Every presentation aroused positive questions and deep comments. In the end of the workshop, 7 winners of the awards were celebrated;

TOWERS Best Award went to Mr. Katsumi Sudou with Kanagawa Prefectural Shiroyama High School, Outstanding Poster Award to Miss Haruna Miyakawa Tsukuba University Graduate Course, and Undergraduate Student Award to Mr. Shota Tatarai with Senshu University.

The workshop was ended with a closing ceremony and operated without any trouble.



Fig. 2 The virtual meeting room on the Web.

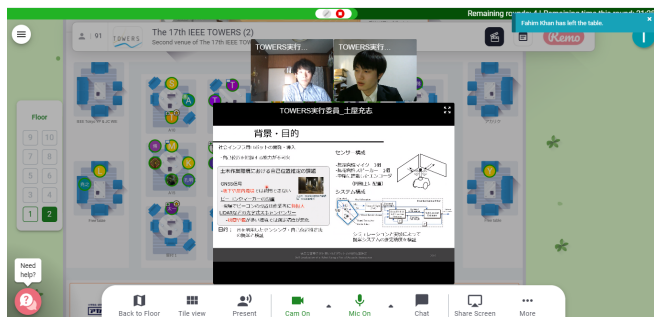


Fig. 3 An example of poster presentations. After choosing the presentation number, the presenter and document appeared to start the explanation followed by questions and comments.

3. IEEE Japan SYWL Workshop in Hiroshima (and Online) 2020

The workshop was held at 9:50 ~ 12:30 on Oct. 17 (Sat) in a hybrid manner (in-person workshop at Hiroshima Garden Palace Hotel mixed with online participation by Zoom) sponsored by the IEEE Japan SYWL workshop organizing committee and Japan Council. The event was also co-sponsored by all the Affinity Groups (AGs) in Japan, Student Branch, Young Professionals, Women in Engineering and Life Member, so that it was a valuable opportunity for the AG members to get together. The workshop theme was “MAKE A NEW NORMAL ~ we change the future by ourselves~” and attracted 43 participants (20 onsite and 23 onsite) including 4 LMs.

The workshop started with an opening address by Dr. Ryuichi Takemura, the organizing committee chair and JC YP Coordinator. First, Ms. Fumie Uchida, Micron Memory Japan, gave a talk on career development as a woman engineer based on her own experience.

Next, the participants were divided into groups consisting of four or five members from different AGs and discussed on the theme decided by each

group. There were five on-line groups, three on-site groups, and two hybrid groups mixed with on-line and on-site participants. The on-site group discussion was carefully held considering to prevent COVID19 infection. After each group presented what they discussed, finally Dr. Toshio Fukuda, IEEE President gave an address that encouraged all the participants.



Fig. 4 On-site participants discussing their theme.

4. Lecture Meeting on Technology Information by LMAG-Nagoya

This meeting was composed of 4 lectures and a panel discussion, and held on-line at 13:30 to 17:30 on 28 November. Members of LMAG-Tokyo attended to utilize the event opportunity and to share information.

The meeting started with an address by Dr. M. Umeno, Chair of LMAG Nagoya. Then, Mr. M. Ichikawa, Secretary of LMAG Nagoya, formerly Mitsubishi Heavy Industry made a lecture on “Experiences of an electric engineer in the field of heavy industry”, and talked about his job history starting from wiring design to system matters. Next, Dr. Umeno, Professor Emeritus of Nagoya Institute of Technology made a lecture on “Up-to-date solar cells and solar power, and resultant possibility of solar cars”, and talked about the present status and future trend of the technologies concerned.

After coffee break, Dr. A Mizuno, Vice Chair of LMAG Nagoya, Professor Emeritus of Toyohashi University of Technology made a lecture on “Possibility of static electricity as infection prevention technique”, and talked about sterilizing effect of static electricity. Next, Dr. T. Matsumoto, Professor of Japan Advanced Institute of Science and Technology made a lecture on “Network information theory and wireless communication”, and explained his research history starting from information transformation technology to deep mathematical world.

In the final panel discussion, they discussed student’s tendency to research and the insight of companies. Generally speaking, it was valuable to hear about various fields. The event was well suited for LMs to expand their culture, and for young engineers to get knowledges out of their special fields.

5. Tokyo-Shin-etsu Joint Section WIE Kick-off Event

The kick-off event was held online (Zoom) at 15:00 ~ 17:00 on Dec. 5 (Sat) with 34 participants including 3 LMs from LMAG-Tokyo.

The event started with an opening address by Dr. Mamiko Inamori, the chair of Tokyo/Shin-etsu Joint Section WIE, followed by a congratulatory address by Ms. Emi Yano, R10 WIE Coordinator. Dr. Inamori explained WIE and circumstances how Tokyo/Shin-etsu Joint section WIE was established.

Dr. Haruko Kawahigashi of Mitsubishi Electric gave a keynote speech entitled “Communication Network Technology and Career Development”. She introduced her own experiences as a woman engineer in a company on how she dealt with issues including research topic selections, academic society activities, child and family care. The talk was so impressive and encouraging especially for woman engineers.

Next, the participants were divided into online groups consisting of four members to discuss a theme decided by each group such as “a desired woman engineer”. Each group was consisting of a variety of members including high school and technical college students. All groups finally presented what they discussed.

Dr. Inamaori finally closed the successful Kick-off event of Tokyo/Shin-etsu Joint Section WIE.

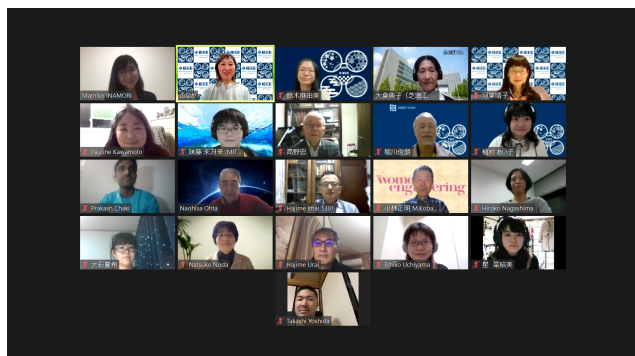


Fig. 5 Screenshot of participants (captured from Zoom screen).

6. Lecture Meeting “Picture Coding Technologies – Development, Standardization and Deployment”

This meeting was held sponsored by LMAG and TPC of IEEE Tokyo Section at 15:00 to 17:00 on 7 December in the Web form of Zoom gathering 95 participants. The speaker was Dr. Kohtaro Asai, a technical advisor of Mitsubishi Electric Company, who was awarded IEEE Fellow in 2018.

He first described his involvement with picture coding technique in relation with the history of technology development. In the middle, he touched on a high-definition TV and DVD, and then streaming reception and its application to moving picture transmission. Going into the details of technologies,

Dr. Asai explained differentiated pictures using scene pictures of a ball game in an easy manner.

Next, he told about Motion Compensation (MC) based on the action of a feedback loop, which is invariable as the basic structure in the latter history. The difference of the predicted picture and an original picture is expanded with two-dimensional cosine functions in Discrete Cosine Transformation (DCT), and the deployment coefficients are quantized. On the basis of MC and DCT, various kinds of coding schemes were invented starting from H261.

Dr. Asai explained the history of picture coding standardization separating ITU-T series for communications and ISO / IEC series for data storage. The development was realized due to large memory and high-speed processors in terms of hardware. Namely, these technologies enabled to use many frames, and resultantly bidirectional prediction, four tree coding, affine transformation, de-blocking and adaptive filtering.

In order to put picture coding technology to practical uses, it may be necessary to define coders, decoders and the structure of bit-stream. He says, however, that standardization is aimed only to decoders and the bit-stream. Therefore, a coder is designed according to an application system, and coding technologies have been developed for utilization conditions. High-definition coders for communications have been developed with NTT to be used in ISDN and FTTH. For broadcasting, development has been achieved to digitize TV signals and video storage. In mobile communications, video streaming is expanding very quickly.

In the case texts and graphics are mixed in a picture, effective coding scheme is proposed at present. He said that they are studying technologies to analyze and synthesize parts of pictures, and further to synthesize a picture based on brain signals.

After the lecture, we had Question & Answer time. Four questions were raised, two of which were via chat with the other questions from the chair himself. As a total, the lecture was easy to understand and reflected the speaker's personality. We could feel reaction from audience in the far distance.



Fig. 6 Dr. Asai giving his lecture on-line (captured from Zoom screen).

7. IEEE Milestone Award Ceremony and Commemorative Lecture Meeting

(1) Award Ceremony

The following two accomplishments by NEC were certified as IEEE Milestones.

- First Operational Large-Scale Latent Fingerprint Identification System
- First Commercial Digital Signal Processor Chip

The award ceremony was held by IEEE Tokyo Section at 11:00 to 11:30 on 15 December in hybrid style where the relevant persons from IEEE and NEC attended in the hall of the NEC Head-quarter in Tokyo and the others were on line. Altogether, there were 164 attendees.

The ceremony was chaired by Dr. Y. Takishima, Secretary of IEEE Tokyo Section. At first, Prof. H. Tokuda, Chair of IEEE Tokyo Section addressed on behalf of the host. It was explained that the milestones number 209 in the whole world, 35 in the whole Japan and 22 in the territory of IEEE Tokyo Section to which 2 milestones are newly added in this ceremony. Then, Prof. T. Fukuda, President of IEEE made a congratulatory address.

Prof. Fukuda sent the commemorative plaque to Dr. N. Endo, Chairman, and Mr. T. Niino, President and CEO, both of NEC. Then, Mr. Niino made a gratitude address on behalf of the awardees. He depicted the history of fingerprint identification technique starting with manual work, and the core of its technology development. As for Signal Processor Chip, he introduced competition with rivals in academic meetings, and applications to actual uses.



Fig. 7 A scene of the award ceremony. In the front row, from the left: Dr. H. Tokuda, Dr. T. Fukuda, both from IEEE, and Dr. N. Endo, Mr. T. Niino, both from NEC. In the back row, from the left: Dr. I. Shirakawa, IEEE JCHC Chair and Mr. M. Nishihara, NEC Director.

(2) Commemorative Lecture Meeting

The commemorative lecture meeting on the IEEE Milestones followed the award ceremony at 14:00 ~

16:00, sponsored by IEEE Tokyo Section TPC and co-sponsored by LMAG-Tokyo. The participants were 223 in number.

First, prior to technical talks, Dr. Isao Shirakawa, IEEE Japan Council History Committee Chair, gave an overview of IEEE Milestones and introduced past milestones in Japan and oversea. Then, four lecturers who contributed to the IEEE Milestones gave talks as follows.

(i) Mr. Yukio Hoshino (Former NEC Security Systems Director)

Mr. Hoshino gave a lecture entitled “Research on NEC/AFIS – dedicated to Mr. Kazuo Kiji – “. Research and development of NEC’s automated fingerprint identification system (NEC/AFIS) started as a company-wide project in 1971. At that time, fingerprints were identified manually and automated identification was considered as difficult. Particularly identification of low-quality latent fingerprints against a large-scale database was a difficult task due to poor processing power of equipment. His research group established effective image processing, feature point extraction, and a matching scheme against low-quality latent fingerprints. A newly developed high-speed image processing processor (MP16) reduced processing time and made it possible to move into a practical system development. Mr. Hoshino mentioned two names, Mr. Hiroshi Asai and Mr. Kazuo Kiji, as contributors for the research results and their achievement was introduced.



Fig.8 Mr. Hoshino giving his lecture.

(ii) Mr. Masanori Hara (NEC 2nd Government and Public Solution Division)

Mr. Hara gave a talk entitled “Looking back on the Practical Realization of Operational Large-Scale Latent Fingerprint Identification System” introducing a practical system development, especially on some episodes and achievement in practical system implementations. Without any experience even in Japan, NEC challenged to propose a high-speed, high-accuracy AFIS to San Francisco Police Department, and it was adopted in 1982. At first, much efforts were required to register a large amount of fingerprint data and to accommodate the need for real-time search in system implementation, they got customer trust gradually. Once the system

started working and got identification results, more systems were adopted. NEC/AFIS became famous after the system adopted by California State Ministry of Justice successfully identified a serial killer's fingerprint.



Fig. 9 Mr. Hara giving his lecture.

(iii) Dr. Takao Nishitani (Former NEC Multimedia Research Laboratories Director and Former Tokyo Metropolitan University Professor)

Dr. Nishitani gave a lecture entitled “Basic architecture of μ PD7720”. The μ PD7720 DSP was the world-first commercially available digital signal processor. It was developed for real-time signal processing especially tailored for filter processing. A special architecture was adopted to speed up filter processing where registers are used for data in/out instead of memory access and multiply-accumulate operation was executed as a pipeline processing in one clock.



Fig. 10 Dr. Nishitani giving his lecture.

(iv) Mr. Yuichi Kawakami (NEC Capital Solutions Limited Adviser)

Mr. Kawakami gave a lecture entitled “Development History and Application of μ PD7720”. The chip was developed as a peripheral LSI and targeted for a general-purpose voice-band DSP. The first trial chip fabricated with 5-micron NMOS process worked properly. The products, μ PD7720 and other family chips developed later, were adopted in tele-communication equipment such as modems

and switching systems. The μ PD7720 chips were also used for pseudo 3D game accelerators as well.

In the Q&A session after each lecture, there were many active questions such as a business model for practical use and quantity of the products sold, etc.



Fig. 11 Mr. Kawakami giving his lecture.

8. LMAG Joint Meeting

The first LMAG Joint Meeting consisting of all Japanese LMAGs was held on December 18 from 19:00. This meeting was proposed by Prof. Takano, LMAG-Tokyo Chair and organized by Prof. Nakamura, LMAG-Kansai Chair. There were 20 officers and related people from each Japanese LMAG attended. The meeting was held via the Web due to COVID 19.

First, Prof. Aoyama, JC LM Coordinator reported the JC Board Meeting. He introduced the current number of LMs (1,018), the activities of present LMAGs, the settlement of new LMAGs, and the expectation of R10 Award winner for LMAG-Tokyo. Also, the next JC LM Coordinator was suggested.

Then, self-introductions of all attendants and discussions followed.

The scheduled time was 2 hours but this hot meeting lasted fully for 3 hours. This meeting was also a get-together, and all attendants enjoyed talking about topics for LMAG activities until closing.

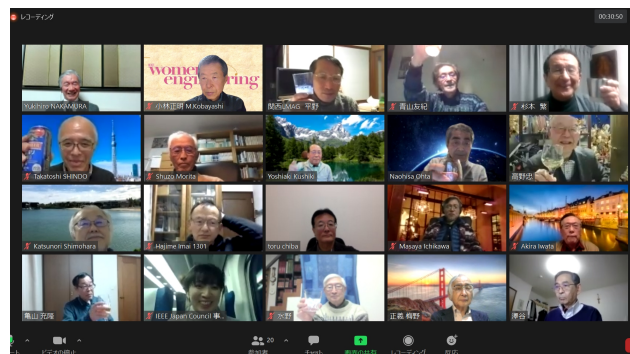


Fig. 12 Screen shot of attendants, captured from the Zoom screen.

9. Next Officers

The LMAG-Tokyo officers for 2021-2022 were officially approved at the Tokyo Section Board meeting held on Dec. 2, 2020 as follows. They are active from Jan. 1, 2021.

LMAG-Tokyo Officers

Chair	Dr. Hajime Imai (formerly with Japan Women's University)
Vice Chair	Dr. Naohisa Ohta (formerly with Keio University Graduate School)
Secretary	Dr. Takatoshi Shindo (formerly with Central Research Institute of Electric Power Industry)

10. Future Events

The following events are planned carefully considering COVID19 infection prevention.

LMAG-Tokyo 2021 Annual General Assembly

- Date & Time: March 25, 2021 14:00 ~ 14:30

For the following events, information will be sent out immediately as soon as details are fixed.

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

- Venue: Shinkansen Exhibition Hall and Railway Technical Research Institute

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

- Venue: ANA Airplane Maintenance Facility (Haneda Airport)

4th Evening Salon (Sponsored by LMAG-Tokyo and TPC of IEEE Tokyo Section)

- Dr. Hisamoto of Hitachi Ltd., will present topics related to SiC Inverters.

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