



IEEE Tokyo Section Life Members Affinity Group

In this issue, lecture meetings sponsored or co-sponsored by LMAG-Tokyo, R10 SYWL Congress, LMAG-Tokyo's 10th Anniversary Symposium, the next officer election for 2021-2022, and the future events are reported.

1. Lecture Meeting “Frontier of AI and Face Recognition Technology”

The lecture meeting was held in a hybrid manner (face-to-face and on-line lecture) at 15:00-17:00 on July 27, Monday, sponsored by LMAG Tokyo and TPC of IEEE Tokyo Section. The lecturer was Dr. Hitoshi Imaoka, NEC Fellow. The participants were 69 on line and 8 at the meeting room 66, 6F, in Kikai-Shinko Kaikan.

Dr. Imaoka first mentioned his interest in a hybrid-style lecture. He was comfortable in giving a lecturer in a hybrid-style lecture as he could feel reactions of the audience, instead, merely in an on-line lecture, he could not get reactions of the audience.

Dr. Imaoka has been engaged in research and development on face recognition for about 20 years. In the course of the R&D effort, he encountered difficult times as the face recognition technology could not achieve better performance compared with other methods like fingerprint recognitions. However, he never gave up and continued the research and finally successfully achieved good results to win the top place multiple times in the international face recognition performance competitions. Dr. Imaoka is now recognized as “the Face of NEC's Face-Recognition” and frequently reported in the media.

He first explained features, usefulness and difficulties of face-recognition technologies. Face recognition is one of main biometric authentication technologies comparable to iris and fingerprint recognitions. Face recognition is superior in its accuracy and convenience. The technology is so convenient as it does not require any dedicated devices and no contact is necessary for recognition. In addition, human can verify the recognition results. On the other hand, not like other recognition technology, it has a difficulty that face components are always varying due to a variety of reasons.

Dr. Imaoka next talked about a history of face recognition technology referring to a pioneering work of Prof. Kanade of Carnegie Mellon University in his doctoral research, and introduced statistical methods using principal component analysis for classifying face patterns.

Currently NEC is developing advanced face recognition systems using model-based image

processing and AI technologies with deep learning. NEC's original methods superior to others seem to utilize differences between “the correct person” and “someone who resembles the correct person” as much as possible. As a result, they won the top rating among major vendors in the world in a strict benchmark test conducted by National Institute of Standards and Technology (NIST), where the recognition accuracy and processing speed are evaluated using a large amount of image data (12,000,000 registered images and 480,000 images in question).

An introduction of AI technologies has remarkably improved the robustness in face recognition performance. Even for those faces wearing masks or sunglasses, or faces in profile could also be recognized successfully. The system can recognize the right person even if there are changes in face according to age. Dr. Imaoka explained that machine's recognition performance sometimes exceeds human's ability by showing recognition challenges to various aged faces of the same person.

Dr. Imaoka finally mentioned about expanding application range of biometric authentication technologies including face recognition and pointed out that those technologies could contribute to solutions for a new life style (new normal) against COVID19. He also mentioned that practical implementations of the technology that make a balance between security and privacy is important for the future.

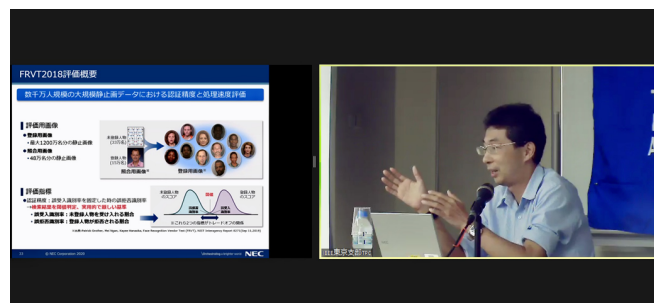


Fig. 1 Dr. Imaoka giving a lecture online (captured from Zoom screen).

After the lecture, there were more than 20 questions from online participants and one question from the venue. Online questions were raised by

texting and the moderator picked up and read them so that the lecturer answered questions. This total operation required some efforts to a moderator and supporting staff. However, a great potential of hybrid-style lecturer was indicated by many questions from remote participants.

2. Lecture Meeting “Ultimate Electronics using Silicon Single-electron Devices”

The Lecture Meeting of Tokyo Section in 2020 was hosted by Tokyo Technical Program Committee (TPC) and co-sponsored by IEEE LMAG-Tokyo from 15:00 to 17:00, Friday, August 28 with 60 participants via the Web by Zoom Webinar in order to avoid Corona Virus disaster. The lecturer, Dr. Akira Fujiwara is a Senior Special Researcher, NTT Basic Research Laboratories, and was awarded IEEE Fellow in 2018.

First, he simply explained coulomb blockade effect and a box known as a quantum dot which accepts a single electron as its application of the effect. Then, a gate is installed between a source and a drain, which enables to precisely control and detect each electron. As a result, a periodic current was observed, and the condition of the current flow define the so-called coulomb diamond. The experiment was expanded from extremely low to normal temperature.

The next was a latest topic of quantum bit that utilizes electron spin. In Germany, its operation at 1GHz was observed using GaAs. In Australia, it operated at several GHz under the microwave control using Si. Intel Co. also succeeded in the experiment using Si. These are based on a potential fluctuation depending on deformation, size and boundary.

An application of the technique was the revision of International System of Units (SI). On the World Metrology Day in 2019, the weight, kg was determined in a quantum-mechanical way that was called the Kibble balance method. In terms of quantum electrical standard, voltage, resistance and current are defined by Josephson effect, Hall effect and a single electron method, respectively. These can be calibrated each other to be called quantum measurement triangle. A single electron turn-style is composed of an array of three conductor islands, and controls each electron without shot noise. A single electron turn-style with variable barrier using a Si thin wire can operate at 20 K. The measurement error is said to be determined by the time of a process in which an electron of Decay Cascade Mode escapes.

Next, as for a research result of Fujiwara group, he talked about the experiment of Maxwell's devil. Particles at high excitation and low excitation exist in a mixed state in two boxes, and can be classified through a hole on the boundary wall to two kinds of excited particles without energy consumption. This is against the second law of thermodynamics. However, admitting the equivalence between information and

energy, this process can be explained without contradiction.

Dr. Fujiwara demonstrated the electron coherent oscillation using a single electron pump. It was expected to verify in a future that the product of three constants in the quantum measurement triangle is 2.

After the lecture, remote participants asked questions via chat function, and the lecturer answered through a screen. This sequence of question and answer lasted 6 times. Finally, Dr. Kawanishi, IEEE TPC Chair expressed his gratitude and terminated the session. We were impressed as unpopular topics were simply explained, and felt his enthusiasm through a plenty of research topics.

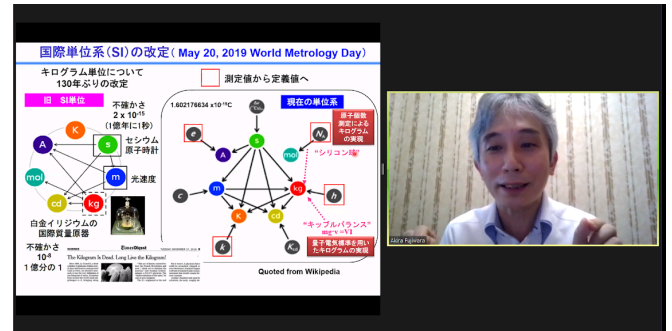


Fig. 2 Dr. Fujiwara giving his talk (captured from Zoom screen).

3. Lecture Meeting “Building a Movie Map – Virtual Exploration in a City”

The lecture meeting was held online at 15:00-17:00 on Sept 14, Monday, sponsored by TPC of IEEE Tokyo Section and LMAG Tokyo. The lecturer was Dr. Kiyoharu Aizawa. He is a Professor at the Department of Information and Communication Engineering of the University of Tokyo, awarded an IEEE Fellow in 2016. There were 208 participants online.

Dr. Aizawa first mentioned that map information is one of the most frequently searched subjects along with food information in our lives. This lecture's topic “Movie Map” is supposed to provide video information not given by conventional maps, so that the users can feel a real state of a city. The technology is expected as useful media for such applications as a virtual exploration, an introduction to a region, or a guide to a special spot.

Dr. Aizawa explained previous works related to virtual exploration based on 3 categories: (1) Interactive Image/Video, (2) AR (Augmented Reality), and (3) VR (virtual Reality).

In the first category, Aspen Street Map was a remarkable project which was conducted in the 1980's. It was an interactive video map example which presented a smoothly connected video consisting of short video clips of walking down streets, and crossing intersections in Aspen city. The video was shot with a film in advance. The concept of this project seems like Dr. Aizawa's Movie Map. As enormous efforts were required to build, it was difficult to deploy this method to cover wide regions. In contrast, Google Street View that uses still images

like a slide show can cover an extremely wide area with excellent comprehensiveness.

Dr. Aizawa next explained how to shoot, process and link each video clip with map information to make the Movie Map. A 360-degree spherical video was used for shooting video clips. They shoot video clips of walking along street segments (between intersections) bidirectionally. The video clip is post processed with hyperlapse processing to avoid a shaking becomes more visible during fast-forwarding the video, by selecting appropriate video frames for stabilization.

Relative movement and rotation of a camera can be calculated from the video using an open-source tool called vSLAM (Visual Simultaneous Localization and Mapping). The corresponding map coordinates are linked to the start and end point of each video clip.

An existence of intersection is detected. A transition video of direction change according to the walking path is synthesized by blending images depending on the rotation angle.

At first, a manual operation is necessary to link map coordinates and a start and end point of each video clip. However, the rest of the process is fully automatic.

Finally, Dr. Aizawa demonstrated a virtual exploration in the campus of the University of Tokyo implemented on a server using those technologies. In a Q&A session after the lecture, there were many questions raised about the influence of weather and unnatural motion in video due to hyperlapse processing, etc. The lecture attracted much interests in the technology targeted for familiar applications.



Fig.3 Dr. Aizawa giving his talk.
(captured from Zoom screen)

4. 2020 R10 SYWL Congress

The event, a region-wide congress covering 4 AGs (S: Student, Y: Young Professionals, W: Women in Engineering, and L: Life Members) in R10, was held online from Sept.19 to Oct. 4, 2020. The theme of the congress was “Pandemic to Opportunity – Collaborative Leadership Towards Technology Advancement for Humanity”. It gathered 1553 participants altogether.

LMAG-Tokyo members participated as a moderator and speakers in two sessions of Life

Member Track and as attendees in other sessions. In this article, activities in the following two sessions are reported.

(1) LM Track Session1 – LMAG Meet

This session was planned that all 16 LMAGs in R10 meet in a venue and they report and share their activities to discuss the activity goal. Actually 9 LMAG Chairs or Vice Chairs participated online and 30 people attended altogether. Mr. Asthana, R10 LMAG Committee (LMC) Chair, presented activity goals and agenda of LMC for 2020, and each LMAG's activity was reported.

Dr. Takano, LMAG-Tokyo Chair could not attend the session due to a trouble of the conference system's password so that Dr. Ohta, LMAG-Tokyo Secretary presented LMAG-Tokyo activity as a substitute. This session was a good opportunity for LMAGs in R10 as they could meet together online, share and discuss their activities.

(2) LM Track Session 4 – IEEE Milestones

Dr. Imai, LMAG-Tokyo Vice-chair delivered a speech on IEEE Milestones, while Dr. Ohta, LMAG-Tokyo Secretary moderated the session. The number of online attendants was 33.

Dr. Imai reviewed IEEE Milestones according to the HP of IEEE Milestones. The Milestone is a grass roots and bottom up program. It honors the achievement, rather than the person or the place. The achievement must be more than 25 years old. The submission is to the historical committee belonging to the local sections.

The proposer(s) (at least one must be a current IEEE member or student member) obtains the sponsorship from appropriate IEEE organization unit(s). The proposer(s) obtains a permission letter from an owner of the site where a milestone plaque is to be placed.

After the submission is sent to the Historical Committee, an Advocate is appointed to review the proposal. The advocate reviews proposal and obtains reviews from a minimum of two experts. If History Committee approves, History Committee submits milestone to IEEE Board of Directors for final approval.

The final approval is sent to the proposer(s). Sponsoring organizational unit(s) plan the dedication ceremony and order plaque. The proposal-to-dedication process takes between 9 and 15 months.

The milestones approved in Japan were introduced. The number of them was 34 by 2018. It was stressed that the time elapsed from the proposal to the ceremony. It ranged from less than one year to 3 years.

Last of talk, it was introduced how to utilize the milestones in Japan. The examples were the technical tours after milestones and the technical meetings. For examples of technical yours, Keage power station, Mt. Fuji radar, Yosami radio transmission station, Automotive navigation system,

Nobeyama 45-m telescope were explained with their origins and histories.

After the presentation, there were some questions; why the procedure took long time and how the fundamental achievements were to be candidates. The reasons why it took long time, were because the HC meeting takes place twice a year and the determination process of the advocator sometimes is long. The fundamental achievement for 25 years old was qualified for the milestone. In spite of WebEx meeting, the hot discussions were enjoyed.

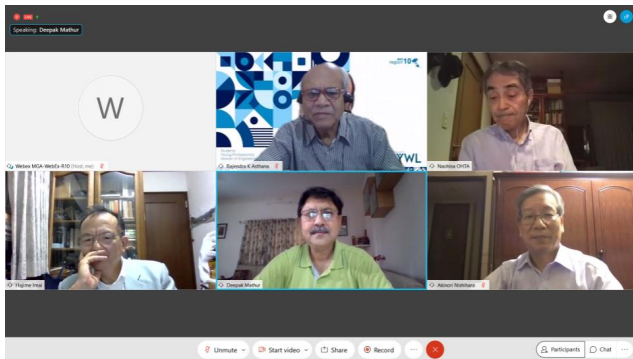


Fig. 4 IEEE Milestones Session
(from upper left: Mr. Asthana, Dr. Ohta, from lower left: Dr. Imai, Dr. Ahmad, and Dr. Nishihara)

5. LMAG-Tokyo's 10th Anniversary Symposium and IEEE Day Party

The event was held online (Zoom Webinar) at 14:00-17:00 on October 8 (Thu) sponsored by IEEE Tokyo Section and LMAG-Tokyo, co-sponsored by Japan Council, Tokyo YP, JC WIE, Tokyo SAC, and Tokyo Section TPC. Altogether 70 people participated: 7 people of the steering committee worked at the main venue in Tokyo and the others participated online.

The symposium started with an opening address by Dr. Hajime Imai, LMAG-Tokyo Vice Chair. First, Dr. Hideyuki Tokuda, Tokyo Section Chair, gave a sponsor's remark on LMAG-Tokyo's 10th anniversary. Then, Dr. Tadashi Takano, LMAG-Tokyo Chair, delivered an address and introduced LMAG-Tokyo's activities for 10 years highlighting on the first experience of each activity. Next, Dr. Toshio Fukuda, IEEE President and Dr. Akinori Nishihara, R10 Director delivered congratulatory speeches for the 10th anniversary. Also, all other LMAG chairs in Japan, Dr. Yukihiro Nakamura of Kansai, Dr. Masayoshi Umeno of Nagoya and Dr. Koji Mizuno of Sendai, gave congratulatory addresses.

Dr. Kosaku Habara, LMAG-Tokyo's founding Chair, gave a talk entitled "Dawn of LMAG-Tokyo" on the initial objectives and activities of LMAG-Tokyo including a hidden story. He also mentioned that the origin of "Symposium" in Greek is "Drinking together for a lively conversation".

A panel discussion on "What contributions are expected to LMAG" was held moderated by Dr. Naohisa Ohta, LMAG-Tokyo Secretary. The

panelists were Dr. Tomonori Aoyama, the former R10 LMAG Coordinator, Dr. Takashi Yoshida, Tokyo YP Chair, Dr. Natsuko Noda, JC WIE Chair, and Dr. Yukihiro Nakamura, LMAG-Kansai Chair. After self-introduction, each panelist presented suggestions to LMAG activity from her/his own viewpoint, and active discussions among panelists and the audience followed, as described below.

Dr. Aoyama first pointed out, from a viewpoint of LMAG coordinator, three important things: 1) to increase LMAGs in accordance with LM's aging, 2) to promote participations to potential members who have not yet reached the age of LM, and 3) to collaborate with S, Y and W. Dr. Nakamura introduced that a person who has not reached the age of LM is actively working as a secretary of Kansai-LMAG. Dr. Aoyama added a comment that LMAG-Tokyo's activity is excellent in R10 and it is worth to apply for the achievement award.

Dr. Takano of LMAG-Tokyo replied that they are preparing for the application next time, and improving its Web site. Dr. Onoe, JC Chair, asked about a possibility of collaborating with domestic academic institutes and Dr. Takano commented that LMAG-Tokyo is considering about it.

Dr. Yoshida stated his opinion from a viewpoint of YPs. He first pointed out that a variety of interactions between LMs and YPs are important. Particularly, YPs get very motivated by encouraging words from LMs. In addition to conventional lecture meetings, suggestions are made to plan the following activity: 1) an event that convey an impact of technology development process by LMs, 2) educational events for kids, and 3) a scheme of mentoring for young engineers, etc. Dr. Takano commented that technical tour with lectures associated with IEEE Milestones would be effective opportunities for such purposes.

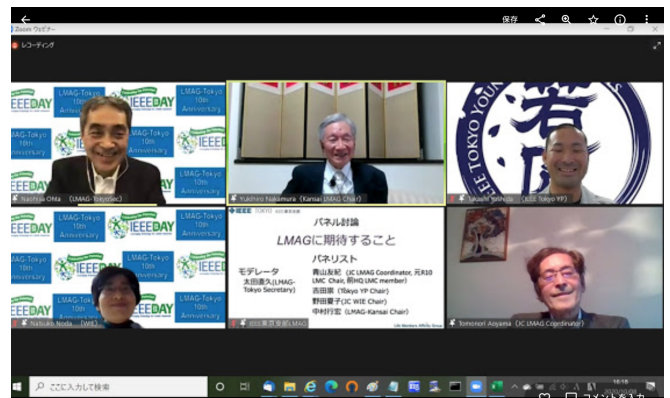


Fig. 5 Active discussion in the panel
(from upper left: Dr. Ohta, Dr. Nakamura and Dr. Yoshida)
(from lower left Dr. Noda and Dr. Aoyama)

Dr. Noda pointed out that there are less women engineers in IEEE members. In general, some leaders in LM's generations are inactive to promote women engineers. She requested that LMs actively participate in the WIE events and widely disseminate

the activity. Dr. Kobayashi, LMAG-Kansai Vice Chair, made a comment that LMs can join WIE at free of charge. Dr. Takano stated his opinion that a proactive approach to support women engineers to continue their activity in IEEE is important, and introduced his experience.

Dr. Nakamura introduced that LMAG-Kansai is encouraging AG members in a variety of ways using LM's rich experiences. He also mentioned that there are some members who want to deal with a proactive activity, and such activities based on LM's own motivations are considered as well. For example, activity that discuss healthcare problems of aged society such as 2025 problems are introduced.

Finally, the moderator summarized the panel, and confirmed a common understanding that LMAGs should actively continue efforts on SYWL and inter-LMAG collaborations utilizing LM's rich experiences, and should disseminate their activities.

Suzuki, the former Tokyo YP Committee Chair, also delivered a congratulatory message introducing Japanese Sake and the origin of "Kagami biraki". Dr. Sasase, a former Tokyo Section Chair, gave a congratulatory message introducing useful information about Champagne.

LMAG-Tokyo officers uncorked a Champagne bottle and opened a Sake barrel as a "Kagami biraki" and Dr. Takano led a toast. On-line participants drank a toast depending on their own situations. Dr. Takano cut a memorial cake after blowing 10 candles out for celebrating the 10th anniversary of LMAG-Tokyo and IEEE Day.

Finally, the event was closed by Dr. Imai. Due to COVID19 pandemic, the event was unusual compared with conventional ones. However, thanks to the strong support of AGs and all IEEE members, especially those who attended till the end, this event ended with a great success.

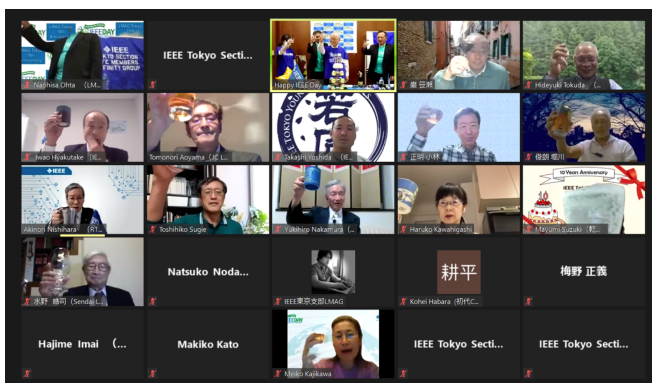


Fig. 6 Drinking a toast online(captured from Zoom screen)



Fig. 7 Participants in the venue (Kikai-Shinko Kaikan)
(from left Dr. Kanno, Dr. Ohta, Ms. Mitsui, Ms. Kato, Dr. Takano, Dr. Takishima and Dr. Imai)

After a short break, the second part of the event was held to celebrate IEEE Day along with 10th Anniversary of LMAG-Tokyo and a variety of congratulatory messages were introduced. The first message was from Mr. Asthana, R10 LMC Chair. Then Mr. Hyakutake, IEEE Japan Office Director, introduced the office and gave a message. Ms.

6. Election of Officers (2021-2022)

The candidates of LMAG-Tokyo officers for 2021-2022 were officially announced on Aug. 31, 2020 and there were no additional candidates nominated by the closing date, Sept. 30, 2020. Therefore, the following candidates were trusted as officers for the next term. Please note that this result will be reported and approved in the next Board Meeting of IEEE Tokyo Section so that the candidates will take office on Jan. 1, 2021.

◆ Candidates for 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)

7. Future Events

The following events are planned carefully considering COVID19 infection prevention.

Lecture Meeting (sponsored by Tokyo Section TPC, co-sponsored by LMAG-Tokyo)

- Date & Time: Nov. 11, 2020 15:00 ~ 17:00
- Venue: Online
- Lecturer: Dr. Masayuki Fujita (Professor, Department of Mathematical Engineering and Information Physics, School of Engineering, The University of Tokyo), IEEE Fellow (2016)
- Lecture Title: Networked Autonomy
- For further information
(<https://ieee-jp.org/application/lecture20-6/for1116.html>)

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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