Highlights of the JEMEA2018 Symposium in Japan

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JEMEA, Japan Society of Electromagnetic Wave Energy Applications, is a Japanese scientific society which promotes science and technology of electromagnetic wave energy applications. The aim was to disseminate the advances in basic and applied electromagnetic energy, and to spread a science culture to contribute to the development of industry and the improvement of life. JEMEA was established based on the Institute of Electromagnetic Wave Application, Japan (IEAJ) and Microwave Technology Forum on August 31, 2006. JEMEA was certified NPO (Registered Non-Profit Organization) by the Tokyo Metropolitan Government on May 23, 2007, and registered as NPO on June 1, 2007.

Every year JEMEA organizes a symposium and several workshops on electromagnetic wave energy applications. Some working groups, for e.g. computer simulation of the electromagnetic waves, safety issues, education, standardization, etc. are also set up within JEMEA.

On November 15th – 16th, the 12th JEMEA symposium was held in Kitakyushu international conference hall in Japan. The general chair of the JEMEA symposium was Prof. Shokichi Ouchi of Kyushu Inst. of Tech. The total number of accepted papers was 87 (58 orals in two parallel sessions, 25 posters, 2 keynote speeches from oversea, and 2 speeches as award ceremony). There were excellent and interesting presentations which resulted in fruitful discussions (Fig. 1 and 2). Keynote speakers were Prof. Gregory B. Dudley of West Virginia University, US, whose paper title was “Selective microwave heating of organic reaction mixtures”, and Prof. Cristina Leonelli of University of Modena and Reggio Emilia, Italy, whose paper title was “An overview of AMPERE activities and members research in Europe” (Fig. 3). Apart from the keynote talks, all other papers were presented in Japanese.

Figure 1: Conference Room

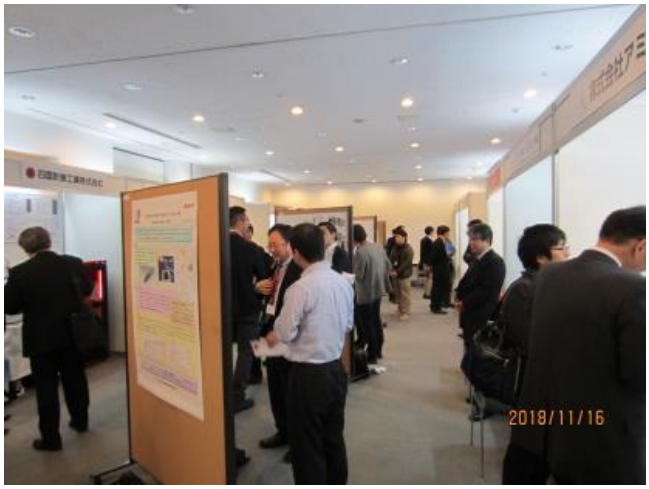

Figure 2: Poster Session

In every symposium, JEMEA's review committee chooses JEMEA best paper award from the orals presentations and the JEMEA best poster award. In 2018, we chose the following award winners:

JEMEA Best paper award:

Highest award

- "Microwave Heating of Metal Nanoparticles supported on Metal Oxides" by T. Ano, Tokyo Inst. of Tech., et al.

Award of excellence

- "Preparation and Particle Size Control of Rh Nanoparticles via Microwave-assisted Alcohol Reduction" by Y. Nishida, Oita Univ., et al.

JEMEA Best poster award:

- "Electronic component mounting on low heat resistance substrate by using magnetic field heating of microwaves" by T. Nakamura, The National Institute of Advanced Industrial Science and Technology (AIST)
- "Degradation of methyl orange by Au/TiO2 photocatalytic nanoparticles prepared using microwave heating" by Y. Arimura, Kindai Univ., et al.
- "Pressurized microwave degradation of waste bathtub resin and recycling" by T. Hatanaka, Sojo Univ., et al.

JEMEA is supported by a number of companies which promote the use of electromagnetic wave applications. In the JEMEA symposium, 14 companies exhibited their products (Fig.4). They introduced their products in a special oral session dedicated to industry. The companies exhibiting were:

- Astech Corp.
- Amil Co., Ltd.
- Anton Paar Japan K.K.
- Anritsu Meter Co., Ltd.
- M3 Laboratory Co., Ltd.
- Orient Microwave. Corp.
- KESCO (Keisoku Engineering System Co., Ltd.
- Shikoku Instrumentation Co., Ltd.
- Tokyo Rikakikai Co., Ltd.
- Fuji Electronic Industrial Co., Ltd.
- Milestone General K.K.
- Micro Denshi Co., Ltd.
- Mitsubishi Electric Corporation
- Chengdu Wattsine Electronic Technology (China)

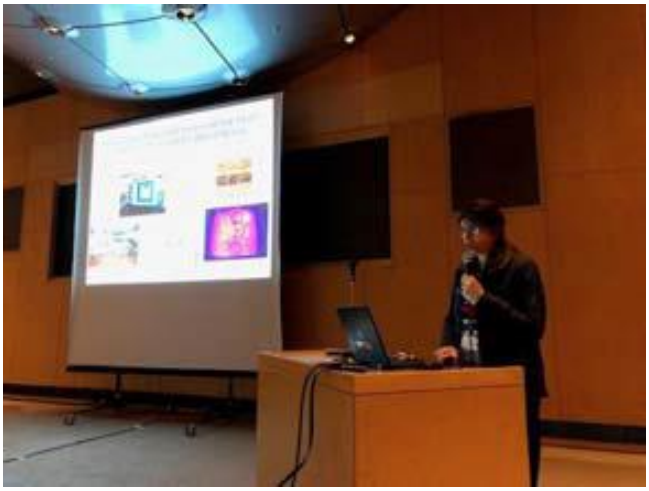

Figure 3: Prof. Leonelli as Keynote Speaker

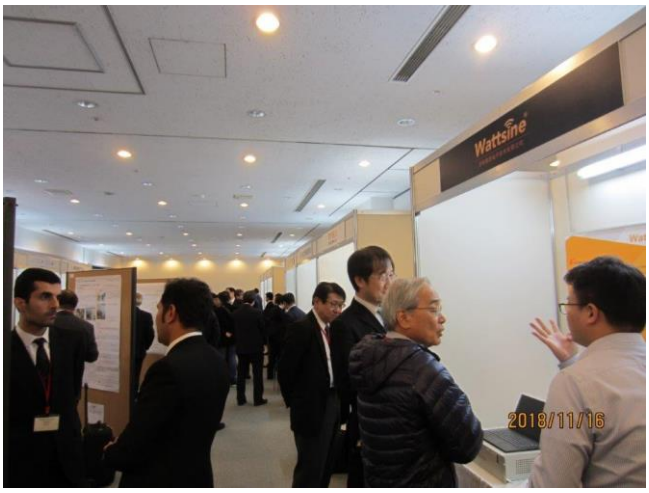

Figure 4: Exhibition Hall with 14 Companies

The total number of attendees was 169 (72 from universities, 84 from industry, and 13 from government departments). 96 participants are JEMEA members, 13 participants were technical co-sponsorship members from industry, while 8 foreign attendees did represent 6 different countries.

Additionally, there were 2 events in series to promote the electromagnetic wave energy applications in the JEMEA symposium. One was a Short Course on Nov. 14th at the same conference hall, whose title was “What we should understand for safe use of microwave energy”. To ensure that research and technical development by using electromagnetic wave energy continues well into the future, it's a well -known fact that paying full attention to safety measures is very important. Of

course, we can make some prediction of what is needed and the required experimentation, since we have our own accumulated experience. We can also use void simulation techniques to avoid costly mistakes. But without knowing, we may encounter unpredictable dangers or accidents. This short course aimed for solutions on most troubling aspects about electromagnetic wave energy application technology from the standpoint of Heinrich's law, known as "Hiyari-hatto" (unreported occurrences in English).

For the short course, we invited 3 speakers who are the experts in safety of electromagnetic waves, electromagnetic wave energy applications, and regulations related to microwave heating. In addition to 3 invited speakers, we have chosen 6 speakers from the public. It is not uncommon for people who are in charge of research or development with electromagnetic wave energy to experience errors, failures or accidents. JEMEA welcomed open-application speakers who showed their experiences within 15 min. We chose various afflictions (e.g. university, company, laboratory) and organized a "Hiyari-hatto" session.

The number of participants in the short course was 64 (43 JEMEA members, 21 non-JEMEA members which includes 4 technical co-sponsorship members. The audience enjoyed talks and a demonstration of a microwave oven.

The other series event on Nov. 17th was a public program offered to the public about the use of electromagnetic wave energy. This was an open program for everyone. Speakers were mainly from JEMEA. 5 JEMEA members introduced latest information about microwave energy. Additionally, we invited Dr. Shoko Murakami, the famous expert in microwave cooking. She gave a demonstration of her original cooking. 53 citizens attended and enjoyed this program.

The total number of attendees of all three events was 287. The 12th JEMEA symposium and related events were successful finished. The 13th JEMEA Symposium (Sympo2019) will be held from Oct. 30th - Nov.1st, 2019 at AIST Tsukuba, Ibaraki Prefecture, Japan. Dr. Hiroki Shimizu is the general Chair of Sympo2019 and will announce details in early February, 2019. We welcome your attendance to JEMEA symposium 2019.

Naoki Shinohara received the B.E. degree in electronic engineering, the M.E. and Ph.D (Eng.) degrees in electrical engineering from Kyoto University, Japan, in 1991, 1993 and 1996, respectively. He was a research associate in the Radio Atmospheric Science Center, Kyoto University from 1996. He was a Research Associate of the Radio Science Center for Space and Atmosphere, Kyoto University by joining the Radio Atmospheric Science Center from 2000, and there he was an Associate Professor since 2001. He was an associate professor in Research Institute for Sustainable Humanosphere, Kyoto University by joining the Radio Science Center for Space and Atmosphere since 2004. From 2010, he has been a Professor in Research Institute for Sustainable Humanosphere, Kyoto University. He has been engaged in research on Solar Power Station/Satellite and Microwave Power Transmission system. He is IEEE MTT-S Technical Committee 26 (Wireless Power Transfer and Conversion) vice chair, IEEE MTT-S Kansai Chapter TPC member, IEEE Wireless Power Transfer Conference advisory committee member, international journal of Wireless Power Transfer (Cambridge Press) executive editor, Radio Science for URSI Japanese committee member, technical committee on IEICE Wireless Power Transfer, communications society chair, Wireless Power Transfer Consortium for Practical Applications (WiPoT) chair, and Wireless Power Management Consortium (WPMc) chair