

COMMISSION K: ELECTROMAGNETICS IN BIOLOGY AND MEDICINE

(November 2016 – October 2020)

Introduction

In the field of radio science, various researches have been conducted on the relationship between radio waves and a human body. Portable wireless terminals have become widespread in the field of wireless communication, and magnetic resonance imaging devices and thermal treatment devices for cancer have been put to practical use in the field of medical applications. Furthermore, in recent years, devices and equipment that use electromagnetic fields, such as wireless power supply, sensor networks, and magnetic levitation railroads, have become widespread. In addition, in the medical field, surgical devices using microwave energy so called microwave energy devices and transcranial magnetic stimulators for treatment of psychiatric and neurological disorders have also been launched. Therefore, there is a need to establish compatibility between safe and secure human life and electromagnetic fields. The following is an activity summary of Japanese URSI-Commission K for 2016-2020.

We have held regular meetings of Japanese URSI-Commission K and annual scientific symposiums on the field, and have been promoting activities in cooperation with various fields such as electrical and electronic engineering, medicine, and biology. In addition, we have been conducting activities to gain international recognition for our research results through journal papers and scientific conferences.

BioEM is the world's largest conference on bioelectromagnetics, attracting academic and industrial participants from all over the world at all career stages, and is highly regarded. Therefore, the core members of Commission K in Japan have submitted a proposal to the Bioelectromagnetic Society and the European BioElectromagnetics Association to hold BioEM 2022 in Nagoya, and as a result, it has been decided that BioEM 2022 will be held in Nagoya.

1. Annual scientific symposium on Electromagnetics in Biology and Medicine in Japan (Co-operated by Japanese Society for Electromagnetics in Biology and Medicine)

Date: January 23, 2017

Five oral presentations and one special lecture were given with 37 participants.

Special Lecture: "Dosimetry for biological effect exposed to electromagnetic field from low frequency to millimeter wave band and development of exposure apparatuses" by Suzuki, Y. (Tokyo Metropolitan University)

Date: March 1, 2018

Eight oral presentations and one special lecture were given with about 40 participants.

Special Lecture: "Medical applications of electromagnetic wave technology" by Ito, K. (Chiba Univ.)

Date: February 20, 2019

Seven oral presentations and one special lecture were given with about 40 participants.

Special Lecture: “30 years of URSI Commission K” by Taki, M. (Tokyo Metropolitan University)

Date: February 17, 2020

Seven oral presentations and one special lecture were given with 37 participants.

Special Lecture: “Development of medical devices at clinical sites” by Takeshita, N. (National Cancer Center, Hospital East, Japan)

2. Awards related to the URSI (Winner related to Japanese URSI-Commission K)

Balthasar van der Pol Gold Medal at URSI GASS 2020

Professor Koichi Ito (Chiba University) won the Balthasar van der Pol Gold Medal for his contributions to research and development in the fields of medical applications of electromagnetic waves and their evaluation using human-equivalent phantoms.

Young Scientist Award at URSI GASS 2017

Mr. Ryota Takei (Chiba University) won the Young Scientist Award for his paper entitled “Specific absorption rate and temperature rise in the abdomens of pregnant woman models exposed to a smartphone radiation.”

Dr. Jose Gomez-Tames (Nagoya Institute of Technology) won the Young Scientist Award for his paper entitled “Activation thresholds for electrostimulation by TMS and DES: Brain mapping via multiscale model.”

Young Scientist Award at URSI GASS 2019

Dr. Yuto Shimizu (National Institute of Information and Communications Technology) won the Young Scientist Award for his paper entitled “Comparisons of SAR values measured between fast and full measurement procedures for cellular phones.”

Young Scientist Award at URSI GASS 2020

Dr. Yinliang Diao (Nagoya Institute of Technology) won the Young Scientist Award for his paper entitled “Comparison of spatial averaging methods of in situ electric field for low-frequency magnetic field exposures.”

Dr. Kun Li (Kagawa University) won the Young Scientist Award for his paper entitled “Computational Comparison of Power Density Definitions in the Proximity of Antennas for the Assessment of Human Exposure to EMF above 6 GHz.”

Dr. Kento Takabayashi (Okayama Prefectural University) won the Young Scientist Award for his paper entitled “A study on Smart BAN physical layer applying multi-level PSK modulation.”

Student Paper Competition at URSI GASS 2020

Mr. Shuang Liu (The University of Tokyo) was selected as a finalist of student paper competition for his paper entitled “Design of multi-locus transcranial magnetic stimulation coil with single driver.”

Young research excellent presentation awards at the Scientific Symposium of the Japanese Society for Electromagnetics in Biology and Medicine

Dr. Kun Li (National Institute of Information and Communications Technology) won the young

research excellent presentation award for his presentation entitled “Theoretical analysis of human exposure to electromagnetic waves from 6 GHz to 1 THz.”, 2018.

Dr. Atsushi Saito (Central Research Institute of Electric Power Industry) won the young research excellent presentation award for his presentation entitled “Real-time detection of nerve excitation by intermediate frequency magnetic field.”, 2019.

Ms. Yingyi Xiao (The University of Tokyo) won the young research excellent presentation award for her presentation entitled “Numerical evaluation and experimental validation of magnetic markers for localised tumour excision.”, 2020.

Commission K (Electromagnetics in Biology & Medicine) Activity Report

October 2016 – March 2017

March 20, 2017

Koichi Ito

1 Activity

4th meeting of Japanese URSI-Commission K for the 23rd term of the Science Council of Japan

◆ Date: January 23, 2017

◆ Place: Akihabara satellite campus of Tokyo Metropolitan University, Tokyo

◆ Topics:

The URSI sub-committee, Science Council of Japan, and URSI GASS 2017 were reported by Emeritus Prof. Ito.

Scientific symposium (Co-operated by Japanese Society for Electromagnetics in Biology and Medicine)

One invited lecture and five research reports were presented with 37 participants.

- “Development of a transcranial magnetic stimulation coil absorbing navigation error for home care” by Kawasaki, Y. (Tokyo University) *et al.*
- “Acceleration of FEM calculation of induced electric field in human body due to low frequency magnetic field exposure” by Yoshikawa, Y. (Utsunomiya University) *et al.*
- “Development of scalpel using microwave and RF electric current” by Suzuki, S. and Saito, K. (Chiba University) *et al.*
- “Test for electromagnetic interference with medical devices due to radio waves emitted by Wireless-LAN terminals” by Shimojima, S. (NTT DOCOMO, INC.) *et al.*
- “Injury and disaster by static electricity in medical front” by Endo, Y. (JNIOOSH) *et al.*
- Invited lecture: “Dosimetry for biological effect exposed to electromagnetic field from low frequency to millimeter wave band and development of exposure apparatuses” by Suzuki, Y. (Tokyo metropolitan University)

2 Associated meetings

2.1 Past meetings

- 1) Action and perception thresholds of static and ELF magnetic and electric fields and contact currents in humans, Federal Office for Radiation Protection, Oberschleissheim/Neuherberg, Germany, 26-27 October, 2016
- 2) 5th International Workshop on the Causes of Childhood Leukemia, Munich, Germany, 14-16 November, 2016, <<http://www.leukemia-workshop.de/>>
- 3) NICT/ICNIRP WS, Tokyo, Japan, 2 December 2016

2.2 Future meetings

- 4) BioEM2017, Hangzhou, China, 5-9 June 2017
- 5) IEEE MTT-S International Microwave Bio Conference (IEEE-IMBioC), Göteborg, Sweden, 15-17 May 2017, < <http://www.imbioc-ieee.org/about>>
- 6) IEEE EMBC2017, Jeju Island, Korea, 11-15 July 2017, <<http://embc.embs.org/2017/>>
- 7) Asian Electromagnetics Symposium, Karnataka State, India, 23-27 July 2017, < <http://www.asiaem2017.org/index.html>>
- 8) URSI GASS2017, Montreal, Canada, 19-26 August 2017, <<http://www.ursi2017.org/>>
- 9) The 34th annual meeting of Japanese society for thermal medicine, Kyoto, Japan, 15-16 September 2017, <<http://web.apollon.nta.co.jp/jstm34/index.html>>

Commission K (Electromagnetics in Biology & Medicine) Activity Report

March 2017 – September 2017

September 15, 2017

Koichi Ito

1 Activities

1.1 Commission K Business Meetings

- ◆ Date: August 21, 23 and 25, 2017
- ◆ Place: The venue of URSI GASS 2017, Montreal, Canada
- ◆ Topics:
 - 1) Election of New Chair, Vice-Chair, ECR (Early Career Representative)
 - Chair: Joe Wiart, France (3 years)
 - Vice-Chair: Koichi Ito, Japan (3 years as VC and then 3 years as Chair)
 - ECR: Kensuke Sasaki, Japan (6 years)
 - 2) Appointment of Technical Advisory Committee
 - Joe Wiart, France (Chair)
 - Koichi Ito, Japan (Vice-Chair)
 - Puyan Mojabi, Canada (ECR)
 - Kensuke Sasaki, Japan (ECR)
 - Masao Taki, Japan
 - Guglielmo D'Inzeo, Italy
 - Alexandre Legros, Canada
 - Lluís Mir, France
 - Tongning Wu, China
 - Niels Kuster, Switzerland
 - Vijayalaxmi, US
 - Mahta Moghaddam, US
 - 3) Appointment of RSB Associate Editor
 - Kensuke Sasaki, Japan
 - 4) Review the terms of reference

The Commission is charged with promoting research and development in the following domains (No change proposed):

 - Physical interaction of electromagnetic fields* with biological systems;
 - Biological effects of electromagnetic fields;
 - Mechanisms underlying the effects of electromagnetic fields;
 - Experimental electromagnetic fields exposure systems;
 - Assessment of human exposure to electromagnetic fields;

•Medical applications of electromagnetic fields.

* (frequency range from static to optical)

1.2 The 5th meeting of Japanese URSI-Commission K for the 23rd term of the Science Council of Japan

- ◆ Date: September 12, 2017
- ◆ Place: Setagaya campus of Tokyo City University, Tokyo
- ◆ Topics:
 - 1) Prof. Jianqing Wang (Nagoya Institute of Technology) was approved as the nominee of the committee chairperson of Japanese URSI-Commission K for the 24th term of the Science Council of Japan by a confidence vote with bylaw.
 - 2) The URSI sub-committee, Science Council of Japan, and URSI GASS 2017 were reported by Emeritus Prof. Ito.

2 Associated meetings

2.1 Past meetings

- 1) BioEM2017, Hangzhou, China, 5-9 June 2017
- 2) IEEE MTT-S International Microwave Bio Conference (IEEE-IMBioC), Göteborg, Sweden, 15-17 May 2017, < <http://www.imbioc-ieee.org/about>>
- 3) IEEE EMBC2017, Jeju Island, Korea, 11-15 July 2017, <<http://embc.embs.org/2017/>>
- 4) Asian Electromagnetics Symposium (ASIAEM), Karnataka State, India, 23-27 July 2017, < <http://www.asiaem2017.org/index.html>>
- 5) URSI GASS2017, Montreal, Canada, 19-26 August 2017, <<http://www.ursi2017.org/>>

2.2 Future meetings

- 6) The 34th annual meeting of Japanese Society for Thermal Medicine, Kyoto, Japan, 15-16 September 2017, <<http://web.apollon.nta.co.jp/jstm34/index.html>>
- 7) AT-RASC 2018, Gran Canaria, Spain, 28 May – 1 June, 2018, < <http://www.atrasc.com/homepage.php> >
- 8) IEEE-IMBioC2018, Philadelphia, USA, 14-15 June 2018, < <https://imbioc-ieee.org/>>
- 9) BioEM 2018, Piran, Slovenia, 25-29 June 2018, < <http://www.bioem2018.org/>>
- 10) AP-RASC 2019, New Delhi, India, 9-15 March 2019, <<http://apasc2019.com/>>

Commission K (Electromagnetics in Biology & Medicine) Activity Report
October 2017 – May 2018

June 11, 2018
Jianqing Wang

1 Activities

1.1 Core member (past- chairperson and secretaries, nominee of next chairperson and candidates of next secretary) meeting of the Japanese Commission K

Date: December 19, 2017

Place: Akihabara Satellite Campus, Tokyo Metropolitan University, Tokyo

Topics:

- 1) The candidates of secretaries of the Japanese URSI-Commission K for 24th term of the Science Council were decided.
- 2) Inheritance and confirmation of work contents of Japanese URSI-Commission K were done.

1.2 Preparation meeting of the Japanese URSI-Commission K for the 24th term of the Science Council of Japan

Date: March 1, 2018

Place: Akihabara Satellite Campus, Tokyo Metropolitan University, Tokyo

Topics:

- 1) The nominees of the 24th term committee members were introduced by Prof. Jianqing Wang (Nagoya Inst. of Tech.), who was approved as the nominee of the committee chairperson of Japanese URSI-Commission K for the 24th term of the Science Council of Japan.
- 2) The candidates of secretaries of the committee were confirmed.
- 3) The activity policy of the committee was discussed.
- 4) The meeting of the Japanese URSI for the 23rd term of the Science Council of Japan was introduced by Prof. K. Ito (Chiba Univ.).

1.3 Scientific symposium (Co-operated by Japanese Society for Electromagnetics in Biology and Medicine)

8 oral presentations and one special lecture were given with ?? participants. A young research excellent presentation award was given to the third presenter.

- 1) "Assessment of human exposure to radiofrequency electromagnetic fields in the

vicinity of smart meter” by T. Shina (CRIEPI) et al.

- 2) “A study on nonlinear effect of modulated low frequency electromagnetic field on response of nerve stimulation” by H. Shinoda, et al. (Nagoya Inst. of Tech.)
- 3) “Theoretical analysis of human exposure to electromagnetic waves from 6 GHz to 1 THz” by K. Li (NICT) et al.
- 4) “A flexible coil for various transcranial magnetic stimulation patterns” by M. Liu (Tokyo Univ.) et al.
- 5) “Study on SAR probe calibration by two antenna method and uncertainty of calibration method” by S. Shimoyama (Tokyo Univ. of Agriculture Tech.) et al.
- 6) “Evaluation of heat generation characteristics of implantable medical devices” by T. Komatsu (Tokai Univ.) et al.
- 7) “Evaluation of the thermal damages by microwave surgical devices” by R. Manago (Chiba Univ.) et al.
- 8) “Multiband antenna for wireless capsule endoscopic communication by impulse radio system” by Y. Peng (Chiba Univ.) et al.
- 9) “Medical applications of electromagnetic wave technology” (Special lecture) by K. Ito (Chiba Univ.)

2 Associated meetings

2.1 Past meetings

- 1) WHO meeting on the International Systems of Radiation Protection, Munich, Germany, 8-10 November 2017
- 2) Global Coordination of Research and Health Policy on RF Electromagnetic Fields (GLORE Meeting BioEM2017, Washington D.C., USA, 30 November-1 December 2017
- 3) The 7th Asian Congress of Hyperthermic Oncology (ACHO), Seoul, Korea, 23-25 May 2018
- 4) AT-RASC 2018, Gran Canaria, Spain, 28 May-1 June, 2018, < <http://www.atrasc.com/homepage.php> >
- 5) 5th European IRPA Congress, 4-8 June 2018, The Hague, Netherlands
- 6) IEEE-IMBioC2018, Philadelphia, USA, 14-15 June 2018, < <https://imbioc-ieee.org/>>

2.2 Future meetings

- 7) BioEM 2018, Piran, Slovenia, 25-29 June 2018, < <http://www.bioem2018.org/>>
- 8) The 35th annual meeting of Japanese Society for Thermal Medicine, Fukui, Japan, 30 August-1 September 2018, < <http://web.apollon.nta.co.jp/jstm35/>>

9) AP-RASC 2019, New Delhi, India, 9-15 March 2019, <<http://aprasc2019.com/>>

Commission K (Electromagnetics in Biology & Medicine) Activity Report
July 2018 – April 2019

April 15, 2019
Jianqing Wang

1 Activities

1st Meeting of the Japanese URSI-Commission K for the 24th term of the Science Council of Japan

Date: July 17, 2018

Place: Akihabara Satellite Campus, Tokyo Metropolitan University, Tokyo

- Topics: 1) Election of Professor Jianqing Wang as the new chair of Commission K Japanese Committee.
- 2) Plan of committee activities.
- 3) Schedule and session organization of AP-RASC 2018.
- 4) Minute of 24th term of Japanese URSI Committee Meeting.

Core member (present- and past- chairperson, secretaries, and several members) meeting of the Japanese Commission K

Date: November 6, 2018

Place: National Institute of Information and Communications Technology, Otemachi, Tokyo

- Topics: 1) Scientific symposium (Co-operated by Japanese Society for Electromagnetics in Biology and Medicine)
- 2) Hosting the 2022 Annual Meeting of BioEM in Japan.

2nd Meeting of the Japanese URSI-Commission K for the 24th term of the Science Council of Japan

Date: February 20, 2019

Place: Akihabara Satellite Campus, Tokyo Metropolitan University, Tokyo

- Topics: 1) Minute of 1st Meeting of the Japanese URSI-Commission K
- 2) Announcement of AP-RASC2019 and URSI-GASS
- 3) Announcement of JRSM2019
- 4) Hosting the 2022 Annual Meeting of BioEM in Japan
- 5) URSI Centenary Book
- 6) Associated conferences

Scientific symposium (Co-operated by Japanese Society for Electromagnetics in Biology and Medicine)

Date: February 20, 2019

Place: Akihabara Satellite Campus, Tokyo Metropolitan University, Tokyo

Seven oral presentations and one special lecture were given to the participants. A young research excellent presentation award was given to Dr. Atsushi Saito.

- 1) "SAR measurement techniques for human whole body in close proximity to MHz band wireless power transfer system" by T. Sakai et al. (Tokyo University of Agriculture and Technology)
- 2) "Measurement of increase in SAR of a translucent phantom caused by metallic implants" by E. Matsuda et al. (Hokkaido University)
- 3) "Increase in temperature within the ocular bulb caused by 6-30 GHz dipole antennas" by S. Nishikawa et al. (Aoyama Gakuin University)
- 4) "Real-time detection of nerve excitation by intermediate frequency magnetic fields" by A. Saito et al. (Central Research Institute of Electric Power Industry)
- 5) "Temperature imaging of tissues containing water and lipids for MR-guided high intensity focused ultrasound therapy" by K. Kurihara (Tokai University)
- 6) "Measurement of blood pressure based on body-area-network electrocardiography and photoplethysmography" by Y. Sawatari (Nagoya Institute of Technology)
- 7) "Development of microwave catheter for denervation and novel evaluation techniques for heating characteristics" by S. Matsuhara (Chiba University)

Special Lecture:

"30 years of URSI Commission K" by M. Taki (Tokyo Metropolitan University)

2 Associated meetings

2.1 Past meetings

1. AP-RASC, New Delhi, India, 9 – 15 March 2019, < <http://aprasc2019.com/> >

2.2 Future meetings

1. BioEM 2019, Montpellier, France, 23 - 28 June 2019, < <https://www.bioem2019.org/> >
2. 47th Annual Meeting of the Japanese Society for Magnetic Resonance in Medicine, Kumamoto, Japan, 20 – 22 September 2019, < <http://www.congre.co.jp/jsmrm47/> >
3. URSI GASS, Rome, Italy, 29 August - 5 September 2020, < <http://www.ursi2020.org/> >
4. 36th Annual Meeting of the Japanese Society for Thermal Medicine, Kawagoe, Japan, 6 – 7 September 2019, < <http://web.apollon.nta.co.jp/jstm36/> >

Commission K (Electromagnetics in Biology & Medicine) Activity Report
April 2019 – September 2020

September 18, 2020
Jianqing Wang

1 Activities

2019 URSI-Japan Radio Science Meeting

Date: September 5-6, 2019

Place: The University of Electro-Communications, Tokyo

- Topics:
- 1) Professor Emeritus Shoogo Ueno (The University of Tokyo) gave an invited lecture entitled “New horizons in electromagnetics in medicine and biology.”
 - 2) Oral Session 1: Recent Research Trends in Bioelectromagnetics (1) consisted of 5 invited talks.
 - 3) Oral Session 2: Recent Research Trends in Bioelectromagnetics (2) consisted of 5 invited talks.
 - 4) Poster Session: Electromagnetics in Biology and Medicine consisted of 5 presentations.

3rd Meeting of the Japanese URSI-Commission K for the 24th term of the Science Council of Japan

Date: September 6, 2019

Place: The University of Electro-Communications, Tokyo

- Topics:
- 1) Minute of 2nd Meeting of the Japanese URSI-Commission K.
 - 2) Hosting the 2022 Annual Meeting of BioEM in Japan.
 - 3) Recommendation of a candidate for the URSI Award (van der Pol Gold Medal).
 - 4) URSI Centenary Book.
 - 5) Organization of scientific sessions for URSI GASS 2020 at Rome.
 - 6) Associated conferences.

Scientific symposium (Co-operated by Japanese Society for Electromagnetics in Biology and Medicine)

Date: February 17, 2020

Place: Akihabara Satellite Campus, Tokyo Metropolitan University, Tokyo

Number of participants: 37

Seven oral presentations and one special lecture were given to the participants.

- 1) "Numerical evaluation and experimental validation of magnetic markers for localised tumour excision" by Y. Xiao et al. (The University of Tokyo)
 - 2) "Investigation of the brain response to the motor cortical stimulation in rats" by Z. Xin et al. (The University of Tokyo)
 - 3) "Preliminary study on the method to estimate the condition of fruits using electromagnetic fields" by Y. Jin et al. (Tokyo Metropolitan University)
 - 4) "Development and evaluation of a catheter for microwave denervation" by S. Matsubara et al. (Chiba University)
 - 5) "Methods for calculating electric field intensity in microwave dosimetry of WPT systems" by N. Fujita (Aoyama Gakuin University)
 - 6) "FDTD simulations for investigating quantitative relations between the electric field intensity and the rat whole body SAR in a reverberation. chamber" by R. Ito (Nagoya Institute of Technology)
 - 7) "Methods for calibrating optical electric field probes for measuring induced fields in the body at 85 kHz" by E. Oho (Tokyo University of Agriculture and Technology)
- Special Lecture) Development of medical devices at clinical sites by N. Takeshita (National Cancer Center Japan)

4th Meeting of the Japanese URSI-Commission K for the 24th term of the Science Council of Japan

Date: February 17, 2020

Place: Akihabara Satellite Campus, Tokyo Metropolitan University, Tokyo

Topics: 1) Minute of 3rd Meeting of the Japanese URSI-Commission K.

2) Hosting the 2022 Annual Meeting of BioEM in Japan.

3) URSI GASS 2020 at Rome.

4) Associated conferences.

Core member meeting of the Japanese Commission K

Date: November 27, 2019, March 25, May 7, May 14, May 27, July 30, and August 19, 2020,

Place: National Institute of Information and Communications Technology, Otemachi, Tokyo or teleconference

Topic: Hosting the 2022 Annual Meeting of BioEM in Japan.

Hosting the 2022 Annual Meeting of BioEM in Japan

BioEM is the world's largest and most highly recognized bioelectromagnetics conference attracting academic and industrial participants at all career stages from all over the world.

The core members of Japanese Commission K submitted a proposal of hosting BioEM 2022 in Nagoya to the Bioelectromagnetic Society and European BioElectromagnetics Association. Their decision will be announced soon.

2 Awards

Balthasar van der Pol Gold Medal at URSI GASS 2020

- Professor Koichi Ito (Chiba University) won the Balthasar van der Pol Gold Medal for his contributions to research and development in the fields of medical applications of electromagnetic waves and their evaluation using human-equivalent phantoms.

Young Scientist Award at URSI GASS 2020

- Dr. Yinliang Diao (Nagoya Institute of Technology) won the Young Scientist Award for his paper entitled “Comparison of spatial averaging methods of in situ electric field for low-frequency magnetic field exposures.”
- Dr. Kun Li (Kagawa University) won the Young Scientist Award for his paper entitled “Computational Comparison of Power Density Definitions in the Proximity of Antennas for the Assessment of Human Exposure to EMF above 6 GHz.”
- Dr. Kento Takabayashi (Okayama Prefectural University) won the Young Scientist Award for his paper entitled “A study on Smart BAN physical layer applying multi-level PSK modulation.”

Student Paper Competition at URSI GASS 2020

- Mr. Shuang Liu (The University of Tokyo) was selected as a finalist of student paper competition for his paper entitled “Design of multi-locus transcranial magnetic stimulation coil with single driver.”

A young research excellent presentation award at the Scientific Symposium of the Japanese Society for Electromagnetics in Biology and Medicine

- Ms. Yingyi Xiao (The University of Tokyo) won the young research excellent presentation award for her presentation entitled “Numerical evaluation and experimental validation of magnetic markers for localised tumour excision.”

3 Associated meetings

3.1 Past meetings

5. BioEM, Montpellier, France, 23 - 28 June 2019, < <https://www.bioem2019.org/> >
6. URSI-Japan Radio Science Meeting, Tokyo, Japan, 5 – 6 September 2019,

< <http://www.ursi.jp/conference/jrsm2019/> >

7. BioEM, Oxford, UK, 21 - 26 June 2020, < <https://www.bioem2020.org/> >
8. URSI GASS, Rome, Italy, 29 August - 5 September 2020, < <http://www.ursi2020.org/> >