

URSI Commission B EMTS 2019 Symposium

In addition to the URSI General Assembly and Scientific Symposium, and the Atlantic and Asia-Pacific Radio Science Conferences, an important meeting within URSI Commission B is the triennial Electromagnetic Theory Symposium (EMTS). The EMTS 2019 symposium was held at the Westin San Diego Hotel, in downtown San Diego, California, USA May 27-31, 2019. The conference provided a forum for researchers to present papers on current topics in fields and waves in radio science.

Radio science covers the study, understanding, and application of electromagnetics and electronics in natural and man-made environments. The impact and importance of radio science for modern technology and society cannot be overstated. Telecommunications, nanotechnology, radio astronomy, and remote sensing for monitoring of the environment and global change are but some of the fields that rest on the foundations of radio science. We believe that the foundations of radio science rest on electromagnetics – the study of fields and waves – which is the domain of Commission B of URSI.

The tradition of the Electromagnetic Theory Symposium (EMTS) is impressive, spanning a rich history of 66 years. The first EMTS was held at McGill University, Montreal, Canada, in 1953. The year 2019 marks the twenty-third time the symposium has been held, this time at Westin San Diego, in San Diego, USA.

The four days of the symposium addressed a wide range of topics in Commission B, consisting of 52 technical sessions and four plenary talks. The technical content of the meeting concentrated on fundamental and theoretical aspects of electromagnetics, from both the analytical and computational points of view. Examples of approaches were scattering and diffraction, high-frequency methods,



Figure 2. The winners of the Young Scientist Best Paper Awards.

novel mathematical methods in electromagnetics, and mathematical modeling of EM problems. However, several application areas were also covered, such as millimeter-wave antennas and 5G communications, and advanced metamaterial concepts in electromagnetics. One of the highlights was a historical session on the International Union of Radio Science: 100 Years of History and Achievements of Commission B, which had 11 interesting papers.

The papers submitted to the conference were evaluated by the review board, which consisted of 44 experts in electromagnetics. The final program included 308 presentations from 31 countries. EMTS 2019 was a perfect platform for scientific interactions after the presentations and during coffee breaks.

Unfortunately, there were 15 no-shows, mostly due to visa problems experienced by the presenters. Participants had the option of submitting extended abstracts or summaries. The two-column, two- to four-page summaries presented



Figure 1. A general lecture.



Figure 3. Prof. Michael Havrilla, course instructor, URSI Commission B School for Young Scientists.



Figure 4. The welcome reception.

by the authors that opted for submission to IEEE Xplore have been submitted to the IEEE and will be published.

In addition to the contributed presentations, each day of the conference included a one-hour general lecture (see Figure 1). The talks covered the scope of Commission B, from theory through computations to applications in 5G communications.

- Prof. Weng Cho Chew (Purdue University, USA), “Progress in Computational Electromagnetics”
- Prof. Akira Ishimaru (University of Washington, USA), “The History and Future of Statistical Electromagnetic Theories and Applications”
- Prof. John Volakis (Florida International University, USA), “Wideband Beaming Arrays for 5G Communications”
- Prof. Ari Sihvola (Aalto University, Finland), “Unimodularity and Magneto-Electric Coupling – Looking for Unconventional Taxonomy of Electromagnetic Materials”

In the best of URSI traditions, a strong emphasis was put on young scientists. 20 Young Scientist Awardees (YSAs) were selected from 42 applicants. These Young Scientist Awardees were given free registration to the conference, free accommodations, and banquet tickets. A poster session of EMTS was dedicated to these Young Scientists, who also gave a poster presentation in addition to their talk in one of the oral sessions.

Based on the submitted summaries and poster presentations, the Young Scientist Program Committee of EMTS 2019, chaired by Kazuya Kobayashi, awarded three Young Scientist best paper prizes. These were given to Viktor S. Asadchy (Aalto University, Espoo, Finland, \$1000); Younes Ra’di (Advanced Science Research Center, New York, NY, United States, \$750); and Yakir Hadad (School of Electrical Engineering, Tel-Aviv University, Tel-Aviv, Israel, \$500). Honorable mention was conferred



Figure 5. The banquet.

on Miguel Camacho (University of Exeter, Exeter, UK) and Mariana Dalarsson (Linnaeus University, Vaxjo, Sweden). The winners are shown in Figure 2.

Commission B also continued the tradition of Young Scientist Schools. On Monday, May 27, before the main conference, the 2019 URSI Commission B School for Young Scientists took place at the Westin San Diego hotel. The topic of this short course was “Field and Potential Based Methods in Anisotropic and Bianisotropic Electromagnetics.” The course instructor was Prof. Michael Havrilla, from the Air Force Institute of Technology, Wright-Patterson AFB, OH, USA (Figure 3).

Expanded contributions of selected presentations in the conference will be published in the “Special Issue of the 2019 URSI International Symposium on Electromagnetic Theory” in the journal *Radio Science*. In addition, the “Special Issue of the Papers from the EMTS 2019 Young Scientist Award” will also be published in the *Radio Science Bulletin*, which will contain the full-length versions of the papers by the Young Scientist Awardees.

The welcome reception and the banquet were enjoyed by the attendees, as seen in Figures 4 and 5.

If you missed EMTS 2019, you will have an opportunity to attend the next EMTS. We hope to see you in Moscow, Russia, during EMTS 2022!

Sembiam R. Rengarajan
Chair, Local Organizing Committee, EMTS 2019
Chair, USNC-URSI
E-mail: sembiam.rengarajan@csun.edu

Kazuya Kobayashi
Chair, Technical Program Committee, EMTS 2019
Chair, URSI Commission B
E-mail: kazuya_k@sea.plala.or.jp