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# Conference Reports

## The 2017 First IEEE MTT-S International Microwave Bio Conference

■ Andreas Fhager, Christoph Baer, and Katia Grenier

The first IEEE Microwave Theory and Techniques Society (MTT-S) International Microwave Bio Conference (IMBioC 2017) was held at the Lindholmen Conference Center in Göteborg, Sweden, 15–7 May 2017 (Figure 1). IMBioC 2017 was financially sponsored by the MTT-S, and the conference was hosted by Chalmers University of Technology, Göteborg, and MedTech West.

IMBioC is a new annual conference founded by the MTT-S with the aim of providing an international forum for the exchange of ideas and information on state-of-the-art research in microwave and RF theory and techniques that bridge the science and engineering gap as applied to biological systems. It is intended as a forum for sharing new ideas on emerging techniques and applications.

IMBioC was created by merging two former MTT-S conference and workshop formats: the IEEE Topical Conference on

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Biomedical Wireless Technologies, Networks, and Sensing Systems (BioWireless) and the International Microwave

Workshop Series on RF and Wireless Technologies for Biomedical and Healthcare Applications (IMWS-Bio). Because the established BioWireless conference was colocated during MTT-S Radio & Wireless Week, its venue was always in the United States. In contrast, IMWS-Bio was created as a small international workshop series with alternating venues around the globe (former sites include Singapore, London, and Taipei).



**Figure 1.** The conference venue at the Lindholmen Science Park in Göteborg, Sweden. (Photo courtesy of Helene Lindström.)



**Figure 2.** Attendees listening to a presentation at the conference venue. (Photo courtesy of Andreas Flager.)

The decision to merge these conferences meant establishing a novel conference format. Therefore, IMBioC brings together experts from different communities such as microwave engineering, biology, and medicine as well as academia and industry. Its alternating worldwide venues will foster international visibility for state-of-the-art technologies and applications in the biomedical field.

IMBioC 2017 opened with General Chair Henrik Mindedal officially launching the new conference. Conference Cochair Christoph Baer and MTT-S representative Dominique Schreurs both greeted attendees with a warm welcome

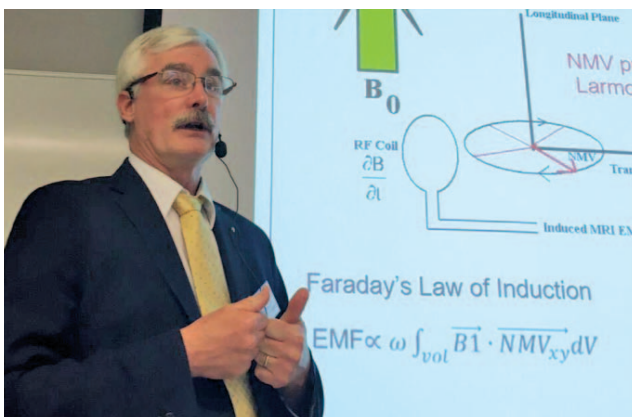
and wished everyone a fruitful and rewarding conference.

The conference was a three-day, single-track event with six oral sessions and a poster exhibition covering various topics focused on microwaves in biomedical applications ranging from microwave imaging to hyperthermia treatment of cancer to the analysis of biochemical samples in lab-on-chip applications to various aspects and uses of magnetic resonance imaging and other diagnostic techniques within the terahertz domain.

In total, 47 submissions were evaluated by 38 reviewers; out of these, 36 papers were accepted for

presentation at the conference, along with 28 oral presentations and eight posters (Figure 2). Four keynote lectures were presented by internationally recognized experts in their respective fields. Each speaker addressed a different topic regarding improvements that microwave technology can bring to health care and how technology is implemented in clinical applications research.

Prof. Robert H. Caverly (Figure 3), presented a lecture, “RF Aspects of Magnetic Resonance Imaging,” followed by Prof. Mikael Elam (Figure 4) with his presentation “Microwave-Based Detection of Intracranial



**Figure 3.** IMBioC 2017 keynote speaker Prof. Robert H. Caverly. (Photo courtesy of Helene Lindström.)



**Figure 4.** IMBioC 2017 keynote speaker Prof. Mikael Elam. (Photo courtesy of Helene Lindström.)



**Figure 5.** IMBioC 2017 keynote speaker Paul M. Meaney. (Photo courtesy of Helene Lindström.)



**Figure 6.** IMBioC 2017 keynote speaker Prof. Gerhard van Rhoon. (Photo courtesy of Helene Lindström.)

Hemorrhage.” Next, Prof Paul M. Meaney (Figure 5) delivered a paper, “Addressing Multipath Signal Corruption in Microwave Tomography and the Influence on System Design and Algorithm Development,” and Prof. Gerhard van Rhoon (Figure 6) gave the talk “Heating Tumors to Enhance the Effectiveness of Radiotherapy and Chemotherapy.”

A student paper contest was held, with nine students participating. The winner of the award was Mario Müh (Figure 7), with his contribution “Complex Dielectric Characterization of African Trypanosomes for Aptamer-Based Terahertz Sensing Applications.” His work is a brilliant example of a truly interdisciplinary research project in which developments in both biochemistry and engineering have been combined into a novel and important application.

IMBioC 2017 participants also enjoyed two social activities. On the first evening, a combined mingle and poster session was organized at the conference venue with a buffet dinner and entertainment by Martin Bagge (Figure 8), a singer who performed traditional Swedish songs written

by 16th-century poet and composer Carl-Michael Bellman. On the second evening, a dinner was organized at a nearby restaurant, where guests were served a three-course meal, highlighted by a hallmark of Göteborg cuisine, fresh fish.

All attendees of IMBioC 2017 have been invited to submit extended versions of their papers for a special issue of the new *IEEE Journal of Electromagnetics, RF, and Microwaves in Medicine and Biology (J-ERM)*. *J-ERM*'s focus is on unifying the medical and biological science behind and applications for utilizing electromagnetics, RF signals, and microwaves/millimeter-waves (the theme of IMBioC 2017).

We thank all attendees and speakers for making this conference a successful three-day event during which many important and interesting research problems in various fields were presented and discussed. The conference was single track, which provided an intimate and casual atmosphere and offered great opportunities for participants to meet and exchange ideas with researchers outside their own fields of expertise (Figure 9). Fifty-two attendees



**Figure 7.** Student paper contest winner Mario Müh (second from left) is congratulated by IMBioC 2017 General Chair Henrik Mindedal (far right), as Conference Cochair Christoph Baer (far left), Technical Program Chair Andreas Flager (center), and Awards Committee Chair Mikael Persson (second from right) look on. (Photo courtesy of Helene Lindström.)



**Figure 8.** Martin Bagge performed songs written by 16th-century Swedish composer Carl-Michael Bellman. (Photo courtesy of Katia Grenier.)



**Figure 9.** *A coffee mingle at IMBioC 2017. (Photo courtesy of Helene Lindström.)*

from 15 different countries participated in the conference. We are confident that all left with very positive impressions

of this first IMBioC and look forward to next year's meeting in Philadelphia, Pennsylvania, United States, where

IMBioC 2018 will be held 14–15 June (colocated with the IEEE MTT-S International Microwave Symposium).