Special Issue on the 2017 IEEE International Instrumentation and Measurement Technology Conference

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THE 34th IEEE International Instrumentation and Measurement Technical Conference (I2MTC) was held in Turin, Italy, from May 22 to 25, 2017. I2MTC is the flagship conference of the IEEE Instrumentation and Measurement Society and has attracted researchers from many countries in the world, who are working on instrumentation and measurement, from novel measurement methods and instruments to new applications.

As is well known, the measurement science is the base of others because it provides, in the most objective way, the prime information on physical quantities, which is needed, e.g., by Galileo's experimental method based on the observation of facts.

Although the measurement science has a long history, a measurement with low uncertainty for any specific application will always challenge researchers. The wide diffusion of digital instrumentation could not solve this problem but often gives a false sense of confidence to instrument users. Therefore, a lot of efforts are constantly made by researchers to find new methods and instruments, which can provide minimal uncertainty, the widest metrological capability, and the highest grade of reproducibility of the results. This endless process encourages wide attendance to I2MTC, a variety of subjects, and fruitful discussions at oral presentations, and poster sessions of the conferences.

I2MTC 2017 consisted of educational and technical sessions, and some sessions were focused on industrial achievements. The final technical program included a selection of 347 papers among 524 papers submitted, with an acceptance rate of 66%. The program included four plenary lectures and more than 40 technical sessions. In addition, a special Industry Day session was introduced to foster the exchange of knowledge and encourage collaboration between scientists and industry.

The extraordinary attendance from all over the world presented an innovative advance in the fields of instrumentation and measurement. For this special issue, a small number of those papers are selected, which are technically extended by the authors and carefully reviewed by the journal reviewers. All the methods have been thoroughly validated by means of experimental investigation.

The contributions to this special issue deal with research areas in instrumentation and measurement in general. More specifically, they cover: 1) characterization of systems and samples; 2) signal processing methods for measurement; 3) sensors and sensing methods; 4) measurement for medicine and biology; and 5) distributed measurement systems and remote laboratories.

Nine papers come from the first group. They present methods for estimating the measurement uncertainty; methods and instruments to characterize samples, systems, and instruments; and also, methods for improving the metrological characteristics of existing instruments.

Five papers come from the second group. They are focused on adoption of signal processing algorithms as a fundamental part of measurement methods or instruments.

Nine papers come from the third group. They are mainly aimed at the design and experimental characterization of new sensors or sensing systems or significant improvements in existing ones.

Four papers come from the fourth group. They indicate that instrumentation and measurement have a significant role in the diagnosis or the treatment of several diseases, as well as in the wide diffusion of commercial monitors of physiologic parameters.

Finally, one paper proposes a laboratory that can be remotely managed specifically designed for long time tests, such as experiments related to electronic component failures, material fatigue, and corrosion.

We sincerely thank all the authors for their outstanding work and the colleagues, who made contribution to the review process. Both the authors and the reviewers' efforts guaranteed the high quality of the published papers in this special issue. A special thank goes to the Editor-in-Chief, who has the overall responsibility of the journal quality, and to Mrs. Reta Wehmeier and Mrs. Cam Ingelin for their assistance during the publication process.

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Digital Object Identifier 10.1109/TIM.2018.2813779

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Dr. Rapuano was a recipient of the Outstanding Young Engineer Award from the IEEE IMS in 2008. He is a Member-at-Large of the Administrative Committee and a Vice President for Membership of the IEEE Instrumentation and Measurement Society (IMS), Secretary of the IEEE IMS TC-25, Sub-Committee Chair of the IEEE IMS TC-10, and Treasurer of the IEEE Italy Section.

Sebastian Yuri Catunda (M'01–SM'13) is currently a Full Professor with the Department of Computer Engineering and Automation, Federal University of Rio Grande do Norte, Natal, Brazil. He has authored over 130 journal and conference papers and book chapters. His current research interests include instrumentation and microelectronics, including the topics of sensors, analog and mixed circuits, embedded systems, and data acquisition systems.

Dr. Catunda is Member-at-Large of the Administrative Committee of the IEEE Instrumentation and Measurement Society (IMS). He founded the Joint Chapter IEEE IMS/CASS of the Bahia Section in 2013, and the International Symposium on Instrumentation Systems, Circuits and Transducers in 2016, and is currently a member of its steering committee. He is a titular researcher in the microelectronics area of the Brazilian National Council for Scientific and Technological Development, and a member of its Advisory Board from 2012 to 2018.

Wuqiang Yang (SM'05–F'12) has been with the University of Manchester, Manchester, U.K., since 1991. He is currently a Professor with the School of Electrical and Electronic Engineering, and also a Founder and the Director of ECT Instruments Ltd., Cheshire, U.K. He has authored over 400 papers. His current research interests include electrical capacitance tomography, sensing and data acquisition systems, electronic circuit design, instrumentation, and multiphase flow measurement.

Dr. Yang is a fellow of IET and the Institute of Measurement and Control. He is an Associate Editor of the IEEE TRANSACTIONS ON IM, the Associate Editor of the *IET Science, Measurement & Technology*, and an Editorial Board Member of six other journals, including *Measurement Science and Technology*. He was an IEEE IMS Distinguished Lecturer from 2010 to 2016. His biography has been included in *Who's Who in the World* since 2002.