PREFACE

Special Section on the 8th World Congress on Industrial Process Tomography (WCIPT8)

IOP Publishing Measurement Science and Technology
Meas. Sci. Technol. **29** (2018) 060101 (1pp) https://doi.org/10.1088/1361-6501/aabb44

Preface

Special Section on the 8th World Congress on Industrial Process Tomography (WCIPT8)

Guest Editor

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Multiphase flow systems are widely used in the industrial production of polymers, minerals, pharmaceuticals and food processing, among others. Industrial process tomography (IPT) may contribute to increase the production and quality control of the means of production or the industrial product itself. There has been a remarkable development in IPT technology over the past two decades, a fact demonstrated by the quality and innovation of the works presented at the 8th World Congress on Industrial Process Tomography (WCIPT8). This scientific meeting, held in Foz do Iguaçu, Brazil, in September 2016, was crowned by a high scientific and technological level within the natural beauty of the Iguaçu Falls.

New sensor technologies and the processing of electronic signals have been continuously under development, and these themes were discussed in the WCIPT8. These new technologies are being implemented in the new IPT versions and, as a corollary, some improvement in the sensitivity of what may be measured with modern IPTs, with the desired accuracy, has been observed. In addition, the miniaturization of sensors and the use of nano-technology push these limits further. Further, thanks to the advancement of modern computers, sophisticated online image reconstruction algorithms are now available and have been incorporated into modern IPT allowing *in-situ* and on-line data processing. A large number of IPT measurement principles have been and are still under development: electrical methods, such as the measurement of capacitance, inductance and resistance, optical and radiation-based methods, ranging from infrared, microwave, x-rays, gamma rays and even neutrons, magnetic resonance, ultrasound and acoustic methods, to mention a few. The sensor technology for a specific application is primarily selected to achieve sensitivity to a physical property which differs for each of the components of the process, e.g. density or electrical permittivity. For the measurement or imaging of more than two components, multi-modality systems are often employed, either by measuring with one principle at several wavelengths or energies, or by combining several independent sensor principles. IPT is inherently interdisciplinary, so that R&D requires skills in each of the engineering processes (chemical, combustion, pharmaceutical, etc), physics and electronic engineering for the sensor system, plus mathematics and computer science for data processing algorithms. This special issue of *Measurement Science and Technology* presents innovative papers on IPT technologies, presented at the 8th World Congress on Industrial Process Tomography (WCIPT8), promoted by the International Society on Industrial Process Tomography (ISIPT) and organized by the Nuclear and Energy Research Institute (IPEN) and the Federal University of Technology, Parana. We hope that all readers of this Special Section may find not only interesting information, but also data that is useful for their scientific work.

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