EDITORIAL

13th International Conference on Electrical Bioimpedance and 8th Conference on Electrical Impedance Tomography (Graz, Austria, 29 August–2 September 2007)

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13th International Conference on Electrical Bioimpedance and 8th Conference on Electrical Impedance Tomography
(Graz, Austria, 29 August–2 September 2007)

This issue of *Physiological Measurement* follows the successful 13th ICEBI conference held at the Graz University of Technology, Austria, from 29 August to 2 September 2007. It was organized jointly with the 8th Conference on Electrical Impedance Tomography. The conference was co-organized by the Impedance Imaging Research Centre (IIRC) in Seoul and the Austrian Society for Biomedical Engineering (ÖGBMT), and it was kindly endorsed by the IFMBE. The combined conferences created a platform for investigators from both research communities of bio-impedance and EIT to engage in common areas of interest whilst also allowing an opportunity for the community to broaden its outlook in the areas of bio-sensors, clinical applications and new technologies. This upholds the tradition of successful conferences on biomedical applications of electrical impedance tomography and bio-impedance. It follows the 7th Conference on Biomedical Applications of Electrical Impedance Tomography combined with the World Congress 2006, which took place in Seoul from 27 August to 1 September 2006. The next EIT conference is scheduled to take place in Dartmouth College, USA, in June 2008.

This issue contains papers produced from discussion and feedback during the conference in both bio-impedance and EIT research areas. It was also an opportunity for new researchers to join the community and propose recent innovations. Of the 259 papers presented at the conference, Springer Verlag published 207 in the IFMBE proceedings. All authors were invited to prepare new papers for inclusion in this issue of *Physiological Measurement*. The manuscripts were put through a process of careful review before selection. A total of 43 were accepted, covering an important range of topics from bio-impedance, hardware, algorithms, new technologies and clinical applications.

From the scientific point of view, bio-impedance has a very long tradition that dates back to the days of Maxwell. Nevertheless, until the end of the 20th century, research was focused on the development of methods and basic experimental work while clinical or other practical applications remained limited. Consequently, there were not so many companies interested enough to produce professional equipment for easy and reliable data collection and interpretation. This may appear surprising as bio-impedance reflects so many (patho-) physiological processes, but on the other hand, a number of proposed applications, though sensitive, still exhibit low specificity, especially when aimed at processes far from the body surface. The 2007 conference may have shown a slight change of tendency. From 2000 to 2006, the number of papers cited in Medline and containing the keywords ‘bio-impedance’ or ‘impedance tomography’ increased by 56%. At the same time, we face an increasing number of applications related to micro- and nano-technologies that have emerged along with the tremendous growth of biochemical and cellular engineering. In recent years both the number of newly founded companies for bio-impedance devices and the involvement of established companies in bio-impedance research have increased.
The papers included in this year’s issue clearly reflect this. New developments and trends are visible, such as non-contact methods using magnetic fields; MREIT, bringing together EIT and magnetic resonance imaging; and magnetic induction tomography (MIT), clinical applications, bio-impedance spectroscopy, new hardware and algorithms. The presentations of these new technologies continue to grow and it will be interesting to see how these contribute to future clinical applications.

At this conference, clinical applications were strongly represented; they included brain function, breast imaging, and thorax and gastric applications. It is important that researchers do not neglect the challenges of clinical applications of bio-impedance and EIT as there are still many technical difficulties that the technology needs to overcome in order to provide valuable clinical tools; however, there are promising signs that these tools are close to realization.

The future of both EIT and bio-impedance continues to provide researchers with new challenges. The high quality of research papers in this special issue shows clear evidence of significant advances in this research field.

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Guest Editors