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## Introduction to the Special Section on Biomedical Devices for Personal Health Applications

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This Special Section of *Frontiers of Mechanical Engineering* (FME) is dedicated to the topic of Biomedical Devices for Personal Health Applications. To reflect the fast pace of development in this area of research, a number of special sessions were firstly organized in the 2010 IEEE International Conference on Robotics, Automation, and Mechatronics (RAM 2010) from 28 to 30 June 2010 in Singapore. The special session organizers, also the guest editors of this journal special section, had identified wearable sensors, wearable haptic devices, and micro ingestible capsules as the topic of interests for these sessions as these topics are also the new area of growth for the medical device industry. RAM 2010, with about 200 attendees, is the 4th edition of this event held in Singapore with its predecessors in Chengdu, China (2008), Bangkok, Thailand (2006), and Singapore (2004). The scope of RAM covers niche areas in robotics, mechatronics and automation as well as their applications.

The articles published in this Special Section are rigorously selected from the papers submitted to these special sessions in RAM 2010. All of the articles presented here have gone through the process of peer review for conference publication, evaluation of the presentations during the conference, and two rounds of journal publication reviews in order to meet the publication standard of FME. We hope that through such a progressive review process, the advancement in this field can be reported in a rigorous and timely manner.

This Special Section contains one feature article and eight technical papers dealing with wearable sensors, ingestible robotic capsules, wearable robotic exoskeleton, wearable brain-computer interface device, and a sensing device for cognitive study on infants. Chen et al. give an overview of the personalized medical devices and point out their future challenges. Lim et al. report the design of a novel digital miniature linear sensor that has the function of goniometer for human joint movement measurement. A virtual reality system for upper limb rehabilitation based on this novel sensor is reported by Luo et al. to demonstrate its potential for rehabilitation medicine. In the article by Lin et al., the development of a new ingestible capsule was introduced. Unlike the available commercial systems, this new capsule has active mechanism to perform therapeutic functions inside the human gastronomical tracks. Rasouli et al. report two different variations of the new capsule system for enhance treatment. The design of wearable robots, or the exoskeletons are reported by Yang et al. and Sergi et al. for upper limb and lower limb applications respectively. The link from human brain to the control of upper limbs for stroke patients is reported by Ang. This link has great future potential in rehabilitation medicine. Lastly, Campolo et al. report an interesting and novel hand-held sensing device for cognitive study of infants which are the most difficult type of human subjects for study.

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