

**Cardiovascular Health Informatics:
Wearable Technologies and Unobtrusive Measurements**

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Abstract

“Advance health informatics” has been identified by the US National Academy of Engineering as one of 14 grand challenges for engineers in the 21st century. Health informatics dealing with systematically the acquisition, transmission, processing, storage, retrieval, and use of information for human health can greatly enhance the quality, efficiency and cost-effectiveness of medical care and rapidly provide the response to widespread public health emergencies. Acquisition of health-related information is considered as the first crucial step in health informatics. In particular, novel and unobtrusive sensing approaches to enable the m-p-e-Health should be developed such that the collection of information must not be limited to the infrequent hospital visits but rather seamlessly integrate into one’s daily life. This can be achieved by incorporating wireless biosensors into the daily wears, furniture, accessories, or living environment of a person, as well as patches that are adhesive on the body surface or inside the human body. In this talk, the ten grand challenges – “SUPER-MINDS” (Security, Unobtrusiveness, Personalized, Efficiency, Robustness, Miniaturization, Intelligent, Network, Digitization, and Standardization) for wearable medical devices will be discussed. The development of an unobtrusive wearable cuff-less blood pressure device will be used as an example to illustrate ways of addressing some of these challenges. The potential applications for the unobtrusive monitoring of vulnerable patients with acute cardiovascular diseases will be examined, together with the information fusion for the early predication and diagnosis of diseases. Future prospects such as flexible electronics for unobtrusive and wearable medical devices will also be addressed.