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- 11. H.H. Asada, et al. "Mobile monitoring with wearable photoplethysmographic biosensors" was published in IEEE Engineering in Medicine and Biology Magazine, Vol. 22, Issue 3, IEEE Engineering in Medicine and Biology Magazine, Vol. 22, Issue 3 was published in May-June 2003. Copies of this publication were made available no later than the last day of July 2003. The article is currently available for public download from the IEEE digital library, IEEE Xplore.
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Abstract:

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We address both technical and clinical issues of wearable biosensors (WBS). First, design concepts of a WBS are presented, with emphasis on the ring sensor developed by the author's group at MIT. The ring sensor is an ambulatory, telemetric, continuous health-monitoring device. This WBS combines miniaturized data acquisition features with advanced photoplethysmographic (PPG) techniques to acquire data related to the patient's cardiovascular state using a method that is far superior to existing fingertip PPG sensors. In particular, the ring sensor is capable of reliably monitoring a patient's heart rate, oxygen saturation, and heart rate variability. Technical issues, including motion artifact, interference with blood circulation, and battery power issues, are addressed, and effective engineering solutions to alleviate these problems are presented. Second, based on the ring sensor technology the clinical potentials of WBS monitoring are addressed.

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motion artifact, blood circulation

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electromyography, patient monitoring, biomedical transducers, biomedical telemetry, cardiovascular

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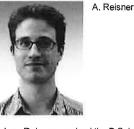
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Haruhiko Harry Asada is a Ford professor of mechanical engineering and director of the Brit and Alex d'Arbeloff Laboratory for Information Systems and Technology in the Department of Mechanical Engineering at Massachusetts Institute of Technology (MIT). He specializes in robotics, biomedical engineering, and system dynamics and control. His current research areas include wearable health monitoring, robotic aids for bedridden patients, vast DOF actuator systems, and multiphysics simulation. He received the B.S., M.S., and Ph.D. degrees in precision engineering in 1973, 1975, and 1979, respectively, all from Kyoto University, Japan. He was a visiting research scientist at the Robotics Institute of Carnegie-Mellon University from 1980 to 1981. He joined the Department of Mechanical Engineering at MIT as faculty in 1982 and became a full professor in 1989. He is a Fellow of ASME.





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