



## Wireless Engineering Research and Education Center

### Network Protocols and Applications for Wireless Body Area Networks

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#### Abstract

Wireless Body Area Network (WBAN) is an emerging enabling technology for a slew of health care, sports medicine and defense related applications. Body Area Networks can be engineered for collecting real-time physiological information for remote monitoring and medicine administration as a part of the broader managed healthcare routines. Sports medicine can leverage such networks for athlete's posture monitoring, gait analysis and fine tuning for automated physiotherapy, and other activity measurement applications. Remote physiological and activity monitoring can also offer a series of useful applications for managing soldier health in the battlefield. While demonstrating a rich set of promises, the technology for WBAN itself is in its infancy, especially in the aspects of energy-efficient implanted sensor technology, energy harvesting, low-power wireless links, and network protocols that can adapt with unreliable on-body wireless links, dynamic postural movements, and crucial data security issues. Research in these aspects of WBAN has started in both Academia and Industry. This talk will provide a formulation of the network protocol-centric problems specific to Wireless Body Area Networks. It will also present a number of specific protocol level solutions for: 1) Transmission Power Assignment with Postural Position Inference for On-body Wireless Communication Links, 2) Probabilistic Routing in On-body Sensor Networks with Postural Disconnections, and 3) Physical Context Detection using Wearable Wireless Sensor Networks. Implementation experience and performance results for all these protocols obtained from a WBAN test-bed in our lab (<http://neews.egr.msu.edu>) will be also shown during this presentation.

#### Bio

Subir Biswas is an Associate Professor and the director of the Networked Embedded and Wireless Systems (*NeEWS*) laboratory at the Michigan State University. Subir received his Ph.D. from University of Cambridge and he held various research positions in NEC Research Institute, Princeton, AT&T Laboratories, Cambridge, and Tellium Optical Systems, NJ. He has published over 90 peer-reviewed articles in the area of network protocols and a co-inventor of 4 US patents. His current research interests include the broad area of wireless data networking, low power network protocols, and application-specific sensor networks. He is a senior member of IEEE and a fellow of Cambridge Philosophical Society. [sbiswas@egr.msu.edu](mailto:sbiswas@egr.msu.edu).

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**235 BROUN HALL**