

## Modeling On-body DTN Packet Routing Delay in the Presence of Postural Disconnections

**Authors:** Muhannad Quwaider, Mahmoud Taghizadeh and Subir Biswas

**Abstract:** This paper presents a stochastic modeling framework for store-and-forward packet routing in Wireless Body Area Networks (WBAN) with postural partitioning. A prototype WBANs has been constructed for experimentally characterizing and capturing on-body topology disconnections in the presence of ultrashort range radio links, unpredictable RF attenuation, and human postural mobility. Delay modeling techniques for evaluating single-copy on-body DTN routing protocols are then developed. End-to-end routing delay for a series of protocols including opportunistic, randomized, and two other mechanisms that capture multiscale topological localities in human postural movements have been evaluated. Performance of the analyzed protocols are then evaluated experimentally and via simulation to compare with the results obtained from the developed model. Finally, a mechanism for evaluating the topological importance of individual on-body sensor nodes is developed. It is shown that such information can be used for selectively reducing the on-body sensor-count without substantially sacrificing the packet delivery delay.