

# Invited Talk: Traffic Analysis Resilient MAC for Multi-Hop Wireless Networks

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Traffic analysis attacks in multi-hop wireless networks can extract valuable information about the data as well as expose the structure of the network opening it up to focused attacks on critical nodes. For example, jamming data sinks in a sensor network can cripple the network. We propose a new approach for ensuring traffic resilience in multi-hop wireless networks. Each node broadcasts the data that it has to transmit according to a fixed transmission schedule that is independent of the traffic being generated, making the network immune to time correlation analysis. The transmission pattern is identical at all nodes, with the exception of a possible time shift, removing spatial and temporal correlation of transmissions to data or to network structure. The scheme takes advantage of the omni-directional nature of wireless transmission: data for all neighbors are sent in one encrypted packet. Each neighbor then decides which subset of the data in a packet to forward onwards using a routing protocol whose details are orthogonal to the proposed scheme. We analyze the performance of the basic scheme, exploring the tradeoffs in terms of frequency of transmission and packet size. We also explore improvements to the scheme, including adapting the traffic pattern and using multi-path routing to take advantage of the available capacity in underutilized portions of the network.