Collaborative beamforming using randomly distributed sensor nodes in wireless sensor networks.

Authors: Serkan Sayilir, Yung-Hsiang Lu, Dimitrios Peroulis, and Byunghoo Jung

Abstract: Collaborative beamforming is an energy efficient communication technique in wireless networks. Single-antenna transmitters in wireless networks cooperate to form a phase array in order to direct common message to an intended distant base station. In order to obtain high SNR gains from collaborative beamforming, the signals transmitted by the transmitters are required to be well aligned at the remote receiver. The transmitters especially relying on self-contained energy source that provides limited energy are also required to consume low power for the synchronizations. We propose a complete protocol and its supporting architecture for collaborative beamforming by employing frequency division duplexing and reference broadcasting. We use data echoing technique to decrease the data traffic and use a chirping signal for efficient phase estimation between individual sensor nodes and the base station.

Contact Information:
Serkan Sayilir
Purdue University, ECE
465 Northwestern Ave.
West Lafayette, IN, 47907
ssayilir@purdue.edu