# ▼ Introduction to the Wireless Sensor Networks and Applications Minitrack

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With the continuing evolution of wireless sensor network platforms, algorithms, protocols, and standards, research in wireless sensor networks must provide solutions to practical problems. These solutions must be both cost-effective and an improvement over previous practice. This often requires improvements in understanding the issues specific to networking a large number of low-energy, low-cost wireless devices, some of which may be in motion.

The papers in this minitrack address a variety of networking issues related to wireless sensor networks. Classical networking topics include wireless ad-hoc network routing and medium access control. The other topics are more specifically focused on sensor networks, and include radio direction finding, ways of programming and making tradeoffs in wireless sensor networks, and practical concerns when deploying wireless sensor networks in freshwater environments.

The papers in the first session include a fault tolerant, graph-theory based routing algorithm, a flow-based Medium Access Control protocol, and a direction finding algorithm using multiple radio frequencies. The second session includes a practical evaluation of a wireless sensor network in a freshwater environment, a multiobjective adaptation framework to help sensor networks satisfy competing objectives, and a macroprogramming paradigm for specifying wireless sensor network behavior globally rather than by programming individual nodes.

The first paper of the first session describes Cooperative Wireless Sensor Medium Access Control (CWS-MAC), which combines TDMA with a flow-based priority mechanism. Priorities are defined in a manner understood by all the nodes in the network. The second paper describes a way to build a communications backbone (pivot routing) with redundant nodes and redundant routes that can be used should any of the backbone nodes become unavailable. This paper has been nominated for a best paper award. The third paper uses a combination of time difference of arrival and adaptive beamforming to localize nodes and enhance reception from those nodes.

The first paper of the second session describes a network of Crossbow motes used at a freshwater lake. Motes were placed near, on, and in the water, and the resulting performance is reported. The second paper presents Monsoon, a biologically inspired adaptation mechanism designed to support data collection, event detection, and applications combining the two. Finally, the third paper the Space-Time Oriented Programming paradigm (STOP), which can be used to specify the tasks of a wireless sensor network as a whole instead of having to specify the behavior of individual units. STOP does this by allowing programmers to define and use three-dimensional spacetime objects to identify the set of events and data of interest.

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