

ZebraNet and Beyond: Applications and Systems Support for Mobile, Dynamic Networks

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Mobile and wireless computing has the potential to offer the next big revolution in how we relate to and make use of our computing devices. In addition to untethered operation, mobile and distributed systems offer the opportunity to consider new computational models in which dynamic, sparsely-connected confederations of compute devices collaborate across wide areas to gather information and solve problems. In this talk, I will describe our experiences building the ZebraNet system for wildlife tracking, based on sparse, mobile collections of GPS-based sensing devices. Drawing from ZebraNet and other systems experiences, my most recent work seeks to provide dynamic, optimizable systems layers for expressing mobile node relationships and for allowing distributed confederations of nodes to collaborate. I will discuss both the technical challenges of dynamic networks, as well as the broader opportunities for deploying such opportunistic networks, particularly in low-infrastructure developing regions.

Presenter Biography:

Margaret Martonosi is currently Professor of Electrical Engineering at Princeton University, where she has been on the faculty since 1994. She also holds an affiliated faculty appointment in Princeton CS. Martonosi's research interests are in computer architecture and the hardware/software interface, with particular focus on power-efficient systems and mobile computing. In the field of processor architecture, she has done extensive work on power modeling and management and on memory hierarchy performance and energy. This has included the development of the Wattch power modeling tool, the first architecture level power modeling infrastructure for superscalar processors. Her memory hierarchy work has included early performance-oriented studies, as well as more recent work on energy-aware memory hierarchies. In the field of mobile computing and sensor networks, Martonosi lead the Princeton ZebraNet project, which included two real-world deployments of tracking collars on Zebras in Central Kenya. She is now co-leader of the Sarana project, which is building software interfaces for collaborative computing among mobile devices. Martonosi is co-author on over 100 refereed publications and inventor on five granted US patents. She is on ACM SIGARCH's board of directors. Martonosi completed her Ph.D. at Stanford University, and also holds a Master's degree from Stanford and a bachelor's degree from Cornell University, all in Electrical Engineering.