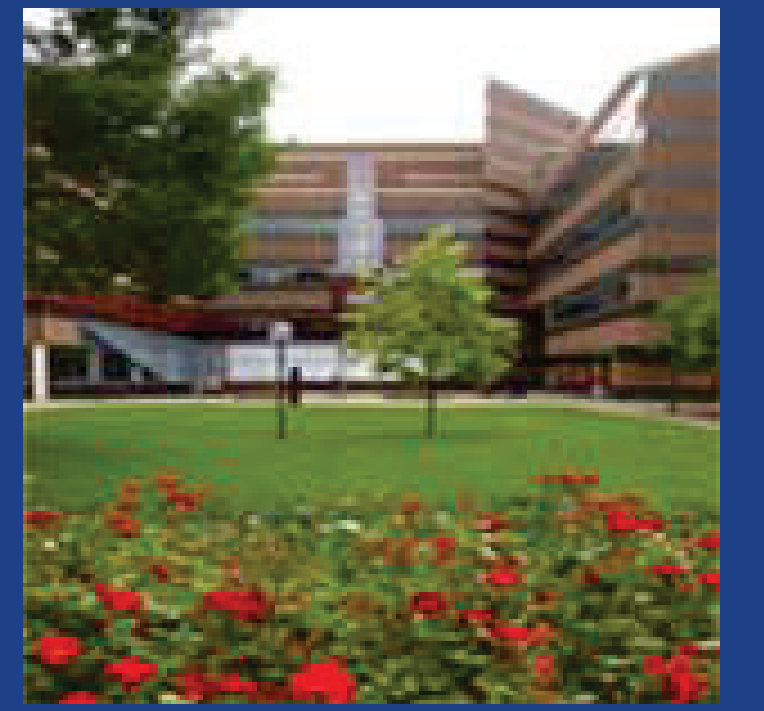


Sleipnir: A Versatile Extremely Low Duty-Cycle Sensor Network



Yu Gu

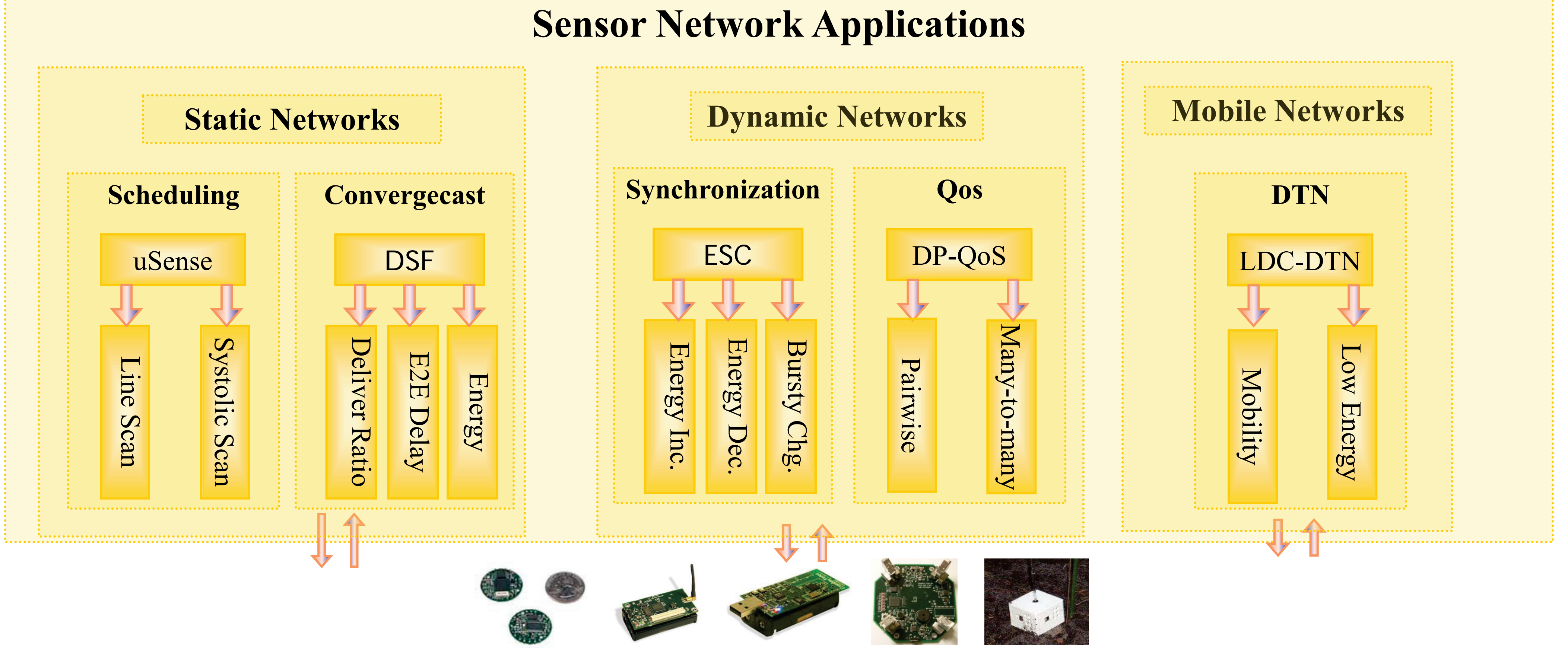
Advisor: Tian He, Mcknight Land-Grant Professor
Department of Computer Science and Engineering



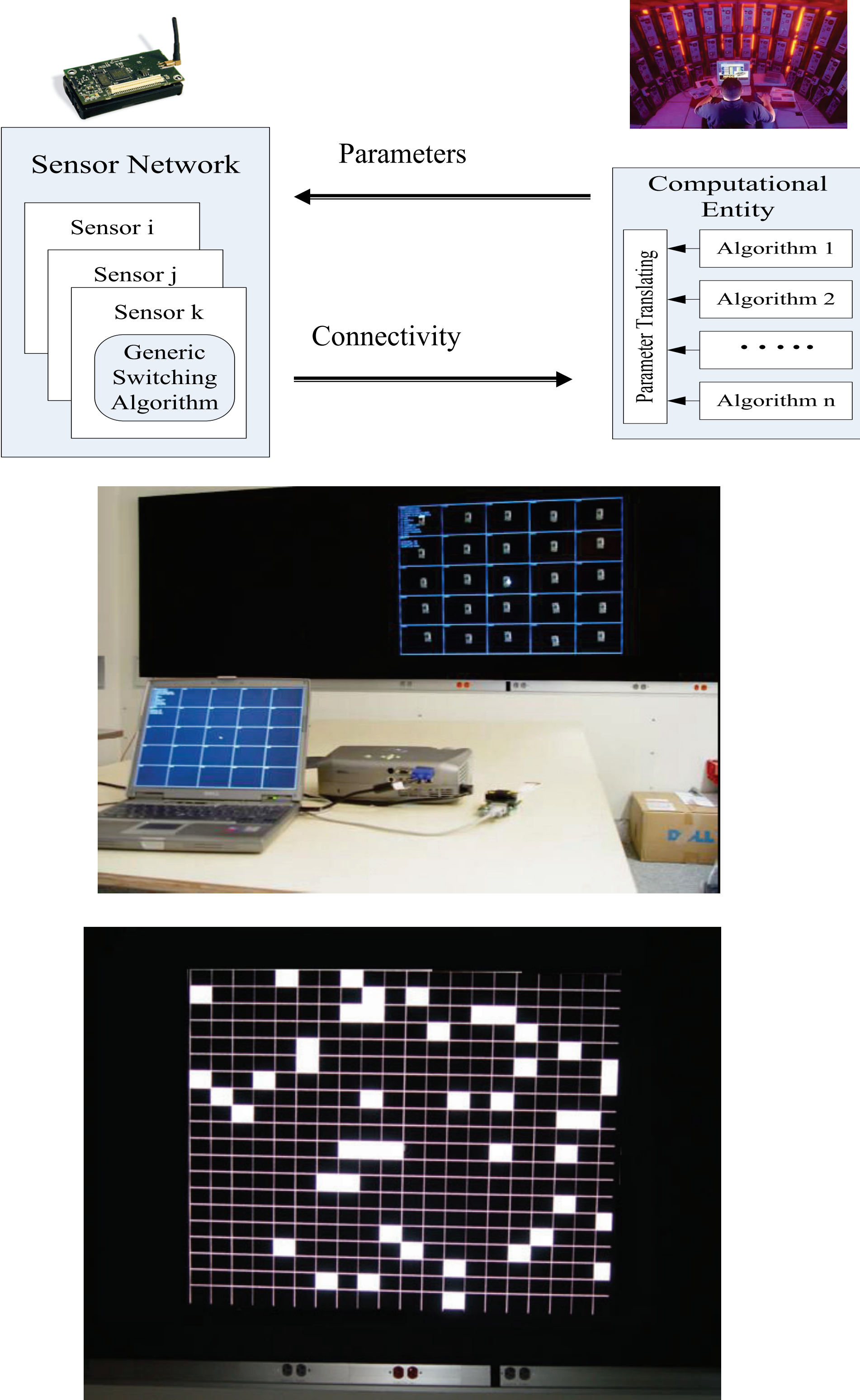
Background:

Wireless Sensor Network (WSN), is a new information paradigm based on the collaboration of a large number of self-organized sensing nodes that can be used for applications such as assisted living, infrastructure protection and scientific exploration. Along with advantages such as low-cost and low-profile, sensor networks are severely resource constrained, especially in terms of energy supply due to its small-form-factor. However, many sensor network based applications require a lifetime that can span tens of years. In order to bridge the gap between limited energy supply and long-term operation requirement, we then have to build extremely low duty-cycle sensor networks where sensor nodes stay in a dormant state for most of the time. In this thesis research, we initiate the first systematic research in this frontier under a wide spectrum of design space, including static, dynamic and mobile networks.

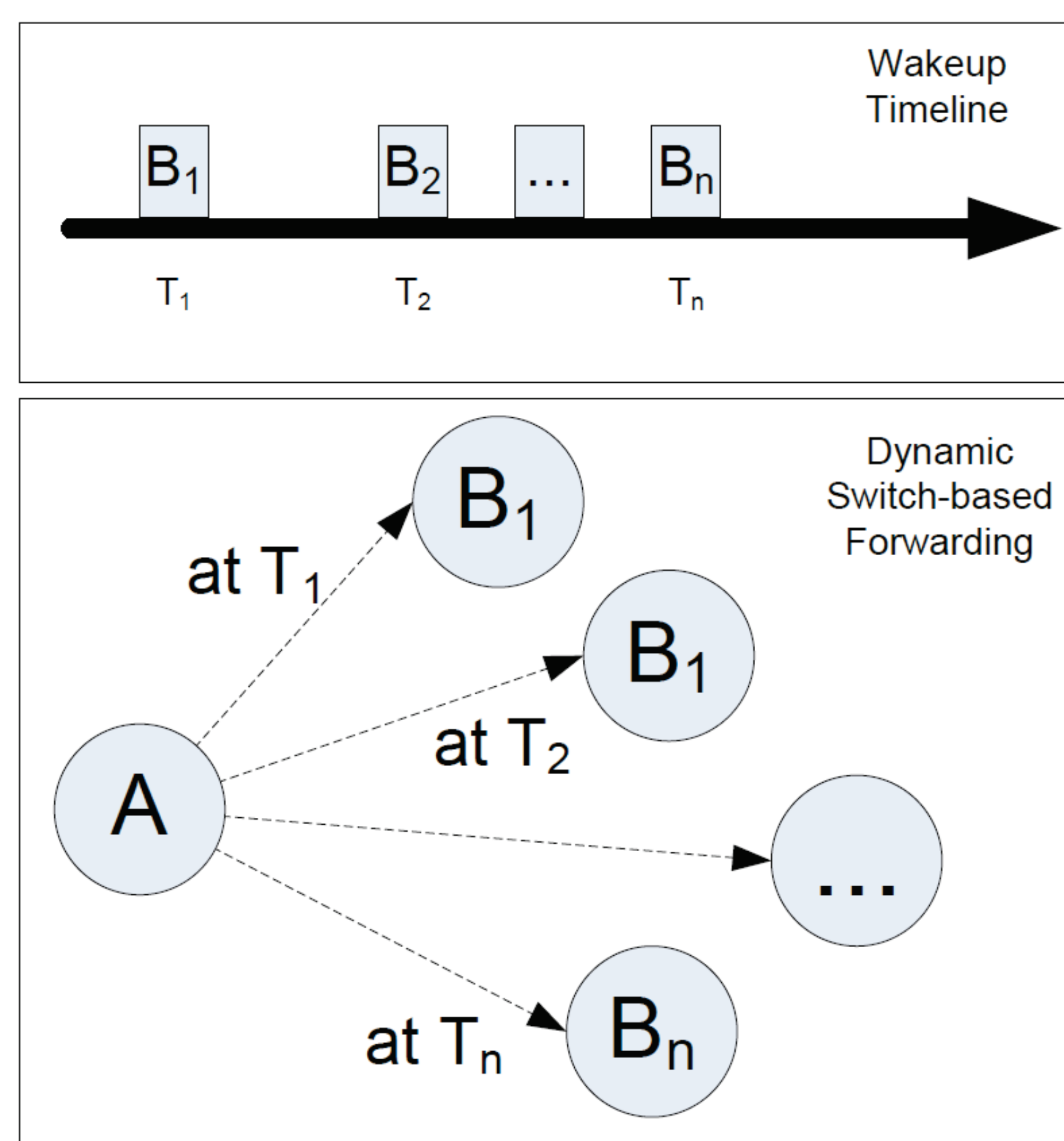
Dissertation Overview:



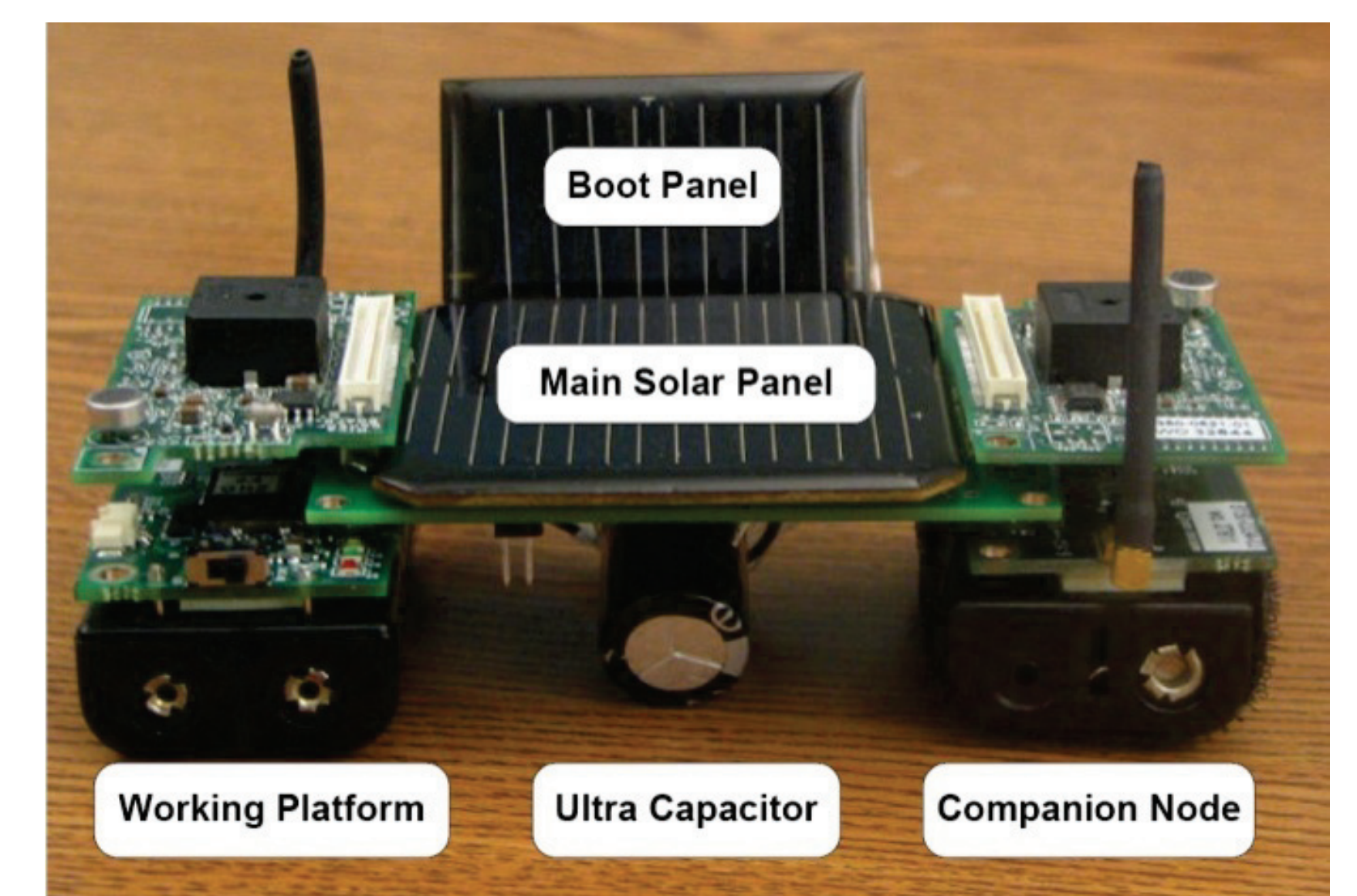
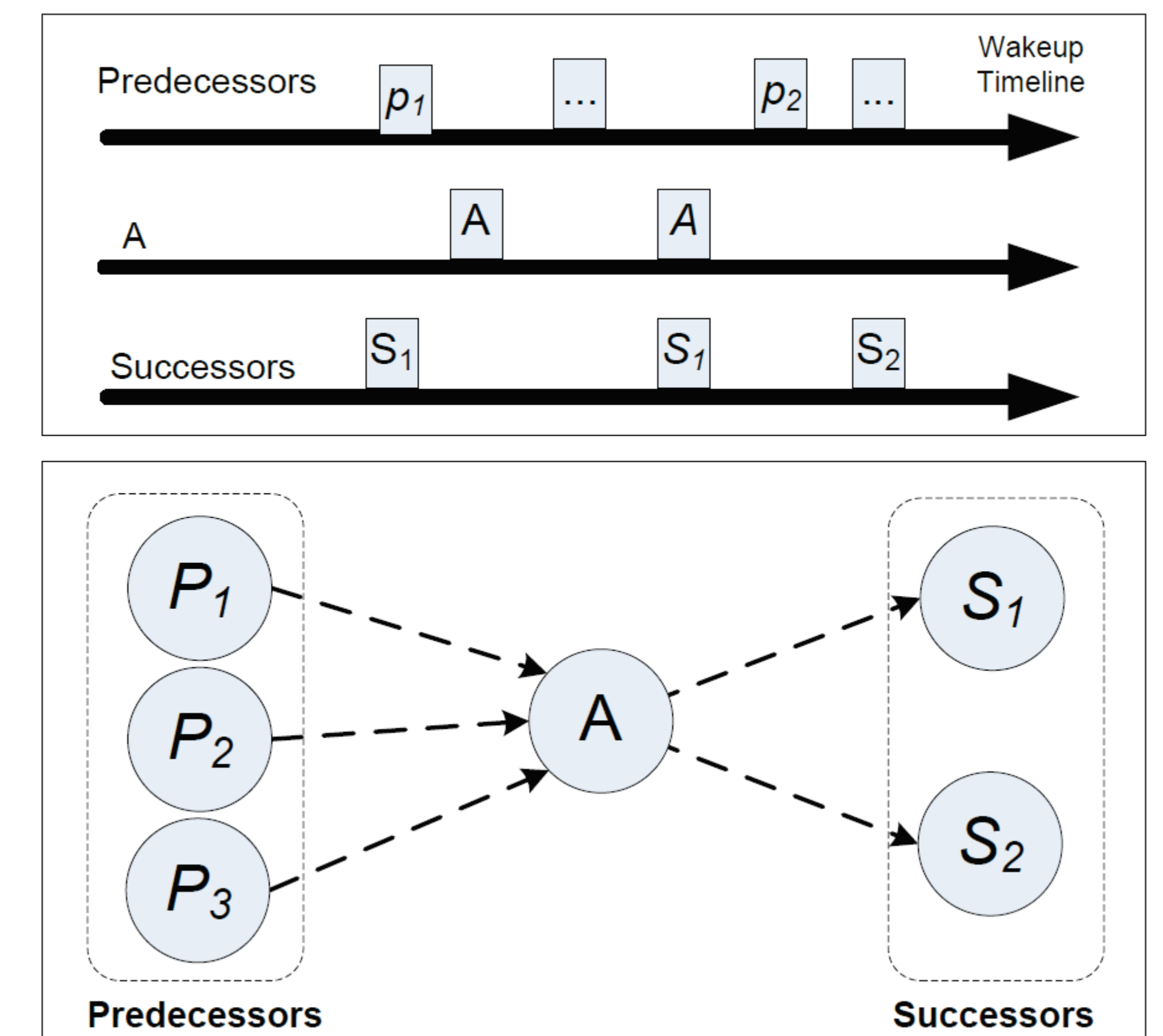
uSense:



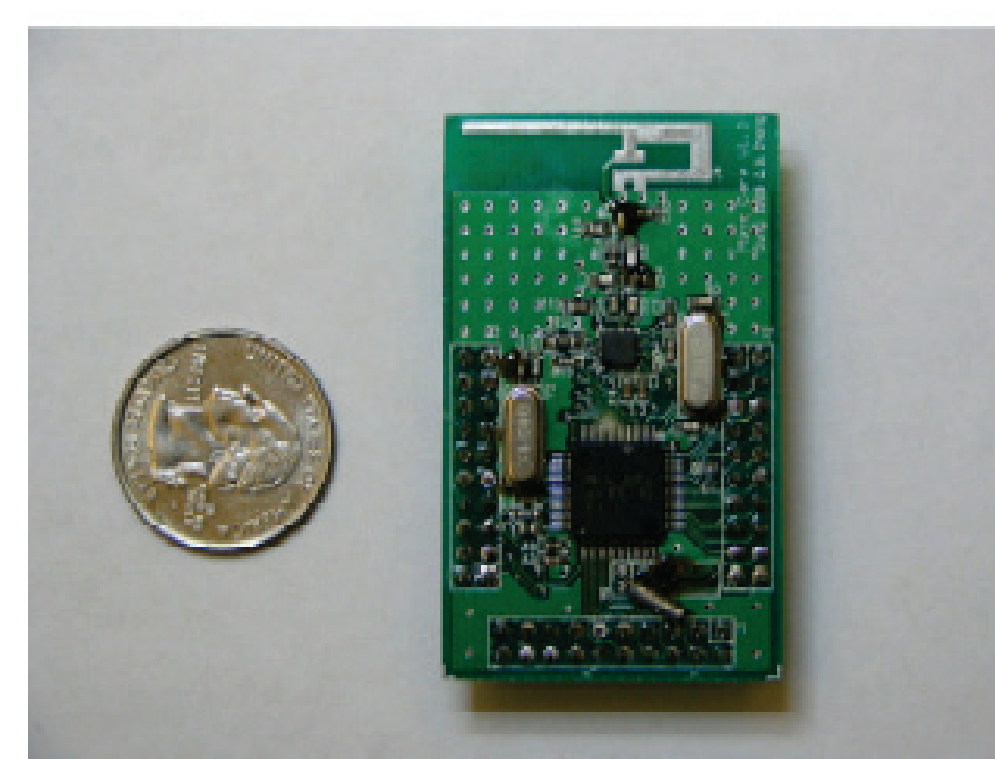
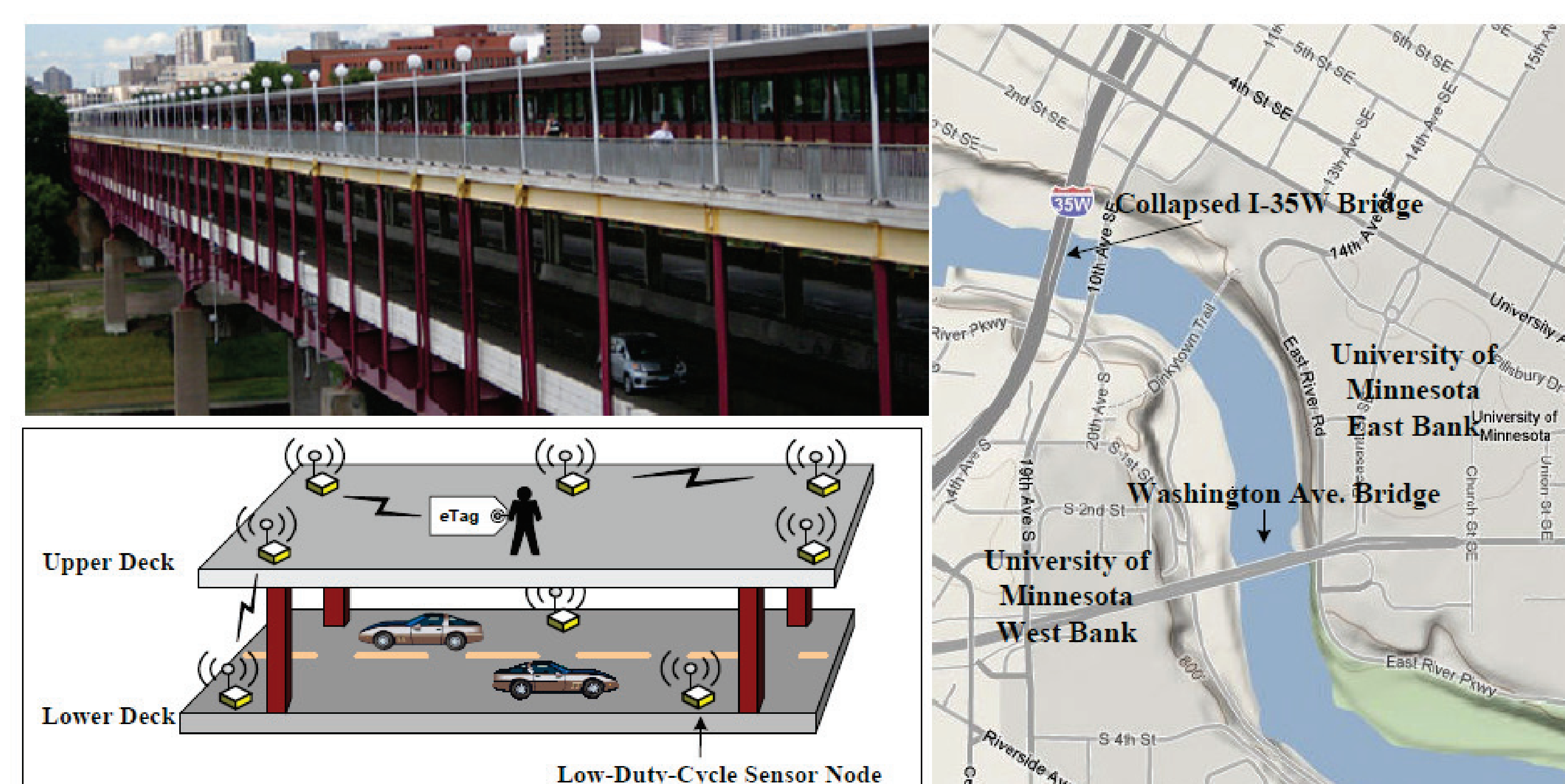
DSF: Dynamic Switch-based Forwarding



ESC: Energy Synchronized Communication



Low Duty-Cycle Delay-Tolerant Network:



Acknowledgements:

This work is supported by National Science Foundation, CSE Academic Excellence Fellowship, General Dynamics Research Fellowship, CSE Excellence in Research Fellowship and the Graduate School Doctoral Dissertation Fellowship.

More information can be found at
Minnesota Embedded Sensor System Group
<http://mess.cs.umn.edu>

