

# Computational Sensor Networks

*Thomas C. Henderson*<sup>1</sup>, *Christopher Sikorski*<sup>1</sup>,  
*Edward Grant*<sup>2</sup> and *Kyle Luthy*<sup>2</sup>

UUCS-07-003

<sup>1</sup>School of Computing  
University of Utah  
Salt Lake City, UT 84112 USA

<sup>2</sup>Dept of Electrical and Computer Engineering  
North Carolina State University  
Raleigh, NC 27695-7911

February 5, 2007

## *Abstract*

We propose *Computational Sensor Networks* as a methodology to exploit models of physical phenomena in order to better understand the structure of the sensor network. To do so, it is necessary to relate changes in the sensed variables (e.g., temperature) to the aspect of interest in the sensor network (e.g., sensor node position, sensor bias, etc.), and to develop a computational method for its solution. As examples, we describe the use of the heat equation to solve (1) the sensor localization problem, and (2) the sensor bias problem. Simulation and physical experiments are described.