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**Fern Y Hunt\*** ([fern.hunt@nist.gov](mailto:fern.hunt@nist.gov)), Mail Stop 8910, National Institute of Standards and Technology, Gaithersburg, MD 20899. *Finding Nodes for Fast Communication in Small and Large Networks.*

The identification of nodes in a network that will enable the fastest spread of information is an important if not fundamental problem in network control and design. It is applicable to the optimal placement of sensors, the design of secure networks and the problem of control when network resources are limited. We consider a discrete time model of information spread that is associated with a random walk in a graph with a set of nodes  $V$  and a subset  $A \subseteq V$  of spreaders. The most effective set of nodes is identified by finding or approximating a set  $A$  that minimizes the sum of the expected first hitting times of random walkers starting outside the set. Minimization is over all sets of some constrained cardinality. Two approaches to the solution of this problem are discussed. The first uses the supermodularity of the function to be minimized. The second scalable approach is suitable for networks with millions of nodes, producing approximate solutions in a fraction of a second. (Received September 21, 2018)