1086-68-824 **Robert Erbacher**, Army Research Lab, **Trent Jaeger**, Penn State University, **Nirupama Talele**, Penn State University, and **Jason Teutsch*** (teutsch@cse.psu.edu), Penn State University. *On the fixed-parameter tractability of Lattice Cut with applications to network security.* Preliminary report.

Preventing security vulnerabilities before they occur, as opposed to patching them once revealed by an attack, remains an outstanding problem in computer security. We propose an automated, proactive security program for maintaining data integrity across a distributed system. One may interpret the components of a distributed system as nodes in a directed graph with edges indicating which components can communicate directly with others. Some information traveling through the system will have high integrity, and other information will have lower integrity, and we wish to keep these types separated. To this end we identify in the graph a set of "terminal" nodes representing the possible attack surfaces for the system, and each terminal corresponds to a specific integrity level as measured by a finite poset. Given such a graph with distinguished terminals and a poset, how many edges must we cut, or "mediate," in order to prevent illegal information flows across the system? We show that when the poset is a total ordering, we can find an optimal solution for this problem in polynomial time parameterized in both the cut size and number of terminals. The more general case is equivalent to Directed Multicut and thus remains a distinguished open problem. (Received September 23, 2012)