Parameterized Complexity of Access Control Problems

Gregory Gutin
(joint work with Jason Crampton and Anders Yeo)

A workflow specification defines a set of steps, the order in which those steps must be executed, and constraints on which groups of users are permitted to perform subsets of those steps. A workflow specification is said to be satisfiable if there exists an assignment of users to workflow steps that satisfies all the constraints. An algorithm for determining whether such an assignment exists is important, both as a static analysis tool for workflow specifications, and for the construction of run-time reference monitors for workflow management systems. Finding such an assignment is a hard problem in general, but work by Wang and Li in 2010 using parameterized complexity suggests that efficient algorithms exist under reasonable assumptions about workflow specifications. In this talk, improved complexity bounds for the workflow satisfiability problem (WSP) will be discussed. We also generalize and extend the types of constraints that may be defined in a workflow specification such that the satisfiability problem remains fixed-parameter tractable. Finally, we consider kernels for WSP.