1112-03-665 **Titus H. Klinge**, **James I. Lathrop** and **Jack H. Lutz*** (lutz@cs.iastate.edu), Department of Computer Science, Iowa State University, Ames, IA 50011. *Robust Biomolecular Finite Automata.*

In this paper we present a uniform method for translating an arbitrary nondeterministic finite automaton (NFA) into a deterministic mass action chemical reaction network (CRN) that simulates it. The CRN receives its input as a continuous time signal consisting of concentrations of chemical species that vary to represent the NFA's input string in a natural way. The CRN exploits the inherent parallelism of chemical kinetics to simulate the NFA in *real time* with a number of chemical species that is *linear* in the number of states of the NFA. We prove that the simulation is correct and that it is robust with respect to perturbations of the input signal, the initial concentrations of species, the output (decision), and the rate constants of the reactions of the CRN. (Received August 11, 2015)