

1086-68-1876 **Ryan Williams*** (rrw@cs.stanford.edu), Computer Science Department, Stanford University,
353 Serra Mall, Stanford, CA. *Parameterized Algorithms and Circuit Lower Bounds.*

This talk is concerned with two topics: (a) parameterized algorithms for circuit satisfiability, which slightly improve on the obvious brute force algorithm, and (b) non-uniform circuit lower bounds.

It has been suggested that (a) should be a relatively simple and esoteric task, while (b) is one of the primary objectives in the theory of computational complexity. In 2010, we proved that, in a very broad sense, *(a) implies (b)*. Last year, we developed new algorithms for satisfiability of ACC circuits, which led to proofs of non-uniform ACC lower bounds. (More precisely, we proved that $\text{NEXP} \not\subseteq \text{ACC}/\text{poly}$, which had been open for 20 years.) A key piece of the puzzle is an algorithm for rapidly evaluating any large ACC circuit on all of its possible satisfying assignments, a task that seems related to incremental algorithms.

This talk will give an overview of these new developments. (Received September 24, 2012)