Felix Klaedtke (ETH Zurich). Automata and Linear Arithmetics.

As already pointed out by Büchi, automata can be used to decide certain first-order theories of linear arithmetic, like Presburger arithmetic: Integers are represented as words (e.g., using the 2's complement representation), and the automata are recursively constructed from the formulas. The constructed automaton for a formula precisely accepts the words representing integers that make the formula true. After introducing the basic concepts, I will analyze such automata-based decision procedures. The analysis provides upper and lower bounds on the automata sizes of the minimal deterministic automata for Presburger arithmetic formulas. Furthermore, I will sketch applications of this automata-based approach in infinite state model checking. Finally, I will conclude with some open research problems.