

Lecturer: **Peter Gacs** (Boston University).

Title: Reliable computation with cellular automata.

Cellular automata are the most natural theoretical model in which to pose the problem of computing reliably. First since they possess parallelism, which is necessary to deal with noise of constant intensity. Second, due to their space-time homogeneity it is arguable that no structure has been taken for granted, other than the elementary geometrical properties of space and the "physics" or "chemistry" defining the transition function.

In these lectures, I will tell the story of constructing reliable cellular automata. I will start with the simplest model, a three-dimensional one that can be defined easily, though the proof that it works is nontrivial. Then I will outline the construction of a one-dimensional reliable cellular automaton. This is a complex hierarchical construction, and the exposition will focus on the main ideas.