Discrete structures in cell biology

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This talk deals with molecular networks of interactions arising in different biological and medical contexts. Specifically, we address two questions that cell biologists are facing:

- when the "local" mechanism of interaction is known; what is the global behaviour of the network?

- when the global behaviour of a network has been observed; what are the local mechanisms of interaction?

The first question leads mathematically to a problem of logic. We present several new results in this direction. In particular, a generalization of the polynomial time algorithm for solving 2-SAT instances will be given. The second question leads mathematically to the problem of reconstructing the set of all regulatory network from a given series of experimental observations. We present an exact algorithm for solving this problem that is based on combinatorial arguments.