The Faculty of Mathematics and Computer Science
The Weizmann Institute of Science
announces the

Amir Pnueli Memorial Lecture

to be delivered by

Professor Grzegorz Rozenberg

Leiden University
University of Colorado at Boulder

Sponsored by the Arthur and Rochelle Belfer Institute of Mathematics and Computer Science
at The Weizmann Institute of Science

A Formal Framework for Processes Inspired by Biochemistry

on Wednesday, 24 November 2010, at 11:00
in the Dolfi and Lola Ebner Auditorium, on campus

A reception in honor of Prof. Rozenberg will be held after the lecture

Abstract

Natural Computing is an interdisciplinary field of research that investigates human-designed computing inspired by nature as well as computation taking place in nature, i.e., it investigates models, computational techniques, and computational technologies inspired by nature as well as it investigates phenomena/processes taking place in nature in terms of information processing.

One of the research areas from the second strand of research is the computational nature of biochemical reactions. It is hoped that this line of research may contribute to a computational understanding of the functioning of the living cell, which is based on interactions between (a huge number of) individual reactions. These reactions are regulated, and the main regulation mechanisms are facilitation/acceleration and inhibition/retardation. The interactions between individual reactions take place through their influence on each other, and this influence happens through these two mechanisms.

In our lecture we present a formal framework for the investigation of processes carried by biochemical reactions. We motivate this framework by explicitely stating a number of assumptions that hold for a great number of biochemical reactions, and we point out that these assumptions are very different from the ones underlying traditional models of computation. We discuss some basic properties of processes carried by biochemical reactions, and demonstrate how to capture and analyse, in our formal framework, some biochemistry related notions.

The lecture is of a tutorial style and self-contained, in particular no knowledge of biochemistry is required.