

Discrete Event Formalisms for Modeling, Analysis and Control in Systems and Synthetic Biology

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Challenging questions arise when one attempts to model, analyse and control the behavior of biological systems, from cells to higher levels of organization (e.g. tissues and organs). The benefits of satisfactory answers to these questions are manifold, and include, besides a better understanding of life itself, the possibility to design microorganisms capable of performing customizable computations for biotechnological purposes (e.g. detect and clean waste in environment) or of optimally synthesizing metabolites with economic interest (e.g. biofuels), and the development of better treatments to human diseases.

The aim of this special session is, among others, (a) to foster the discussion on how discrete event formalisms can be used as abstractions to understand the dynamics of biological systems, (b) to debate how control synthesis tools developed for discrete event models can be used to control the behavior of organisms for medical and biotechnological applications, and (c) to discuss how recent advances in the field of Synthetic Biology can be exploited to better comprehend biological organisms, control their dynamics or design novel functionalities. Excursions into ethical questions concerning these engineering efforts are also welcoming.

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