Third International Workshop on

Hybrid Systems and Biology

Vienna, Austria, July 23-24, 2014

at **CAV 2014**

Invited speakers

David Harel
The Weizmann Institute of Science

Eshel Ben-Jacob
Tel-Aviv University

Program co-chairs

Ádám Halász
West Virginia University

Oded Maler
VERIMAG/CNRS, Grenoble

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Ezio Bartocci
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Carla Piazza
University of Udine

Call for Papers

Systems biology aims at providing a system-level understanding of biological systems by unveiling their structure, dynamics and control methods. Living systems are intrinsically multi-scale in space, in organization levels and in time; they also exhibit a mixture of deterministic and stochastic behaviors. It is therefore very difficult to model them in a uniform way, for instance, by systems of differential equations or by discrete-event systems. Furthermore, such models are often not easily amenable to formal analysis and their simulations at the organ or even the cell level are frequently impractical. Indeed, an important open problem is finding appropriate computational models that scale-up well for both simulation and formal analysis of biological processes.

Hybrid modeling techniques, combining discrete and continuous processes, are gaining more and more attention in systems biology, and they have been applied to successfully capture the behavior of several biological complex systems, ranging from genetic regulatory networks, metabolic reactions, signaling pathways as well as higher level models of tissues and organs. As the challenges of scale and intrinsic inhomogeneity are coming to the forefront of systems biology efforts, they highlight the value of a hybrid dynamical modeling paradigm that integrates mathematical models that apply at different spatio-temporal scales and subsystems.

In this spirit, the scope of the HSB workshop is the general area of **dynamical models** in Biology with an emphasis on hybrid approaches, which are not restricted to a narrow class of mathematical models, and which take advantage of techniques developed separately in different sub-domains.

Topics of interest include, but are not limited to:

- Hybrid models of metabolic, signaling, and genetic regulatory networks in living cells
- Hybrid models of tissues, organs and physiological models
- Biological applications of analysis techniques from hybrid systems theory (reachability computation, model checking, abstract interpretation, bifurcation theory, stability and sensitivity analysis)
- Parametric and non-parametric system identification techniques (learning models from experimental data)
- Efficient techniques for combined (stochastic/deterministic, spatial/non-spatial) simulations for biological models
- Hybrid modeling languages for biological systems, analysis and simulation tools
- Models coping with incomplete and uncertain information, stochastic hybrid systems
- Hierarchical hybrid systems for multi scale analysis
- Abstraction, approximation and model-reduction techniques
- Hybrid systems models for synthetic biology and control of biological systems

We solicit the submission of unpublished results that address both theoretical and applied aspects of hybrid modeling techniques in systems biology. Submissions accepted as full papers will be published by Springer in the LNCS/LNBI series.

Paper Submission

Full papers should be no more than **15 pages** long, typeset in the **LNCS style**. Electronic submissions of full-length papers (in PDF format), will be done through EasyChair. The submission link is accessible from the workshop page: **hsb2014.imag.fr**

Location

HSB 2014 will be a two-day satellite workshop of CAV 2014, Conference on Computer-aided Verification, the 26th International which is part of the Vienna Summer of Logic.

Important dates

Paper submission deadline:	**- March 10, 2014**
Author notification:	**- May 8, 2014**
Camera-ready versions for the proceedings:	**- October 1, 2014**

Program Committee

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