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Preface

This year, the Activity-based Modeling and Simulation workshop (ACTIMS) has been welcomed for 3 days (January 16-18) at the Department of Environmental Systems Sciences, Eidgenössische Technische Hochschule (ETH) Zürich, Switzerland.

ACTIMS14 was hosted by the Terrestrial Systems Ecology Group led by Prof. Dr. Andreas Fischlin and locally chaired by Dr. Rodrigo Castro, with the steering support of Prof. Dr. François E. Cellier (Modeling and Simulation Research Group, ETH Zürich).

Initiated in 2009, the goal of the workshop (on invitation only) is to present, discuss, and work collectively on the activity concept, in an interdisciplinary environment, without competition and in a friendly atmosphere. The more advanced ones help the others, while the less advanced test their ideas and explore innovative approaches to extend, validate and enrich the concept of activity.

During the last years, activity-based modeling and simulation has been becoming more and more a core abstract concept to describe the computation of dynamic systems, gaining an increasing role as a lingua franca among specialists in heterogeneous disciplines (notably from the Computer Science domain but also from Economics, Biology, Ecology, Philosophy, etc.)

As a *theory of change*, activity allows for describing what changes or not in a dynamical system, in a multi-aspect and a multi-approach way. Such descriptions can in turn be adapted stage by stage throughout the process of an usual simulation model development (i.e., from model conceptualization to validation).

In this edition of the workshop the concept of activity has been used successfully in different fields: Software Engineering, Continuous System Simulation, Biology and Artificial Intelligence (with new perspectives).

In "Using activity metrics for DEVS simulation profiling", A. Muzy, et al. use activity as a means to predict analytically the execution times of models in software environments, resorting to the McCabe complexity metric well established in the Software Engineering domain. In "Activity in PythonPDEVS", Y. Van Tendeloo and H. Vangheluwe use activity at the simulation level to distribute and track computations more efficiently.

In the field of continuous systems simulation, the article "Representing quantization-based numerical solvers using hybrid flow systems" by F. Barros offers new perspectives for the use of activity in dynamic structure systems, while in "An n–th Order Generalization of the Activity Measure for Continuous Systems" R. Castro and E. Kofman present a remarkable generalized analytical result based on continuous activity to predict lower bounds in the number of computations required to solve a given system using quantized-state numerical methods.

In "Organisms modeling: The question of radial basis function networks", A. Muzy, L. Massardier and P. Coquillard worked on the integration of usual radial basis functions for the modeling and simulation of an organism at the system level. Finally, in "Context and attention in activity-based intelligent systems", S. Mittal and B.P. Zeigler introduce new perspectives for the use of activity by intelligent systems.

A healthy community is emerging with the challenge of dealing efficiently with complex systems at many levels and from many aspects. We are confident that the contributions presented in ACTIMS14 will serve as fresh seeds, guaranteeing rich new generations of research efforts in the field.

On behalf of the organizers and chairs we would like to thank all those who participated, either by attending to the workshop or giving remote presentations.
In particular, we thank all who submitted their manuscripts to ACTIMS14 and those who were part of the peer review process.

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