

# **Symposium on Theory of Modeling and Simulation – DEVS Integrative M&S Symposium**

**(DEVS 2013)**

**2013 Spring Simulation Multi-Conference (SpringSim'13)**

**Simulation Series Volume 45 Number 4**

**San Diego, California, USA  
7-10 April 2013**

**Editors:**

**Gabriel A. Wainer  
Pieter Mosterman**

**Gregory Zacharewicz  
Fernando Barros**

**ISBN: 978-1-62748-032-1**

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571  
[www.proceedings.com](http://www.proceedings.com)



Some format issues inherent in the e-media version may also appear in this print version.

**© 2013 SIMULATION COUNCILS, INC.**

Responsibility for the accuracy of all statement in each paper rests solely with the author(s). Statements are not necessarily representative of, nor endorsed by, The Society for Modeling and Simulation International.

Printed by Curran Associates, Inc. (2013)

Permission is granted to photocopy portions of this publication for personal use and for the use of students provided credit is given to the conference and publication. Permission does not extend to other types of reproduction nor to copying for incorporation into commercial advertising nor for any other profit-making purpose. Other publications are encouraged to include 300- to 500-word abstracts or excerpts from any paper contained in this book, provided credits are given to the author and the conference. For permission to publish a complete paper write: The Society for Modeling and Simulation International (SCS), 2598 Fortune Way, Suite I, San Diego, CA 92081, USA.

**Additional copies of the Proceedings are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571  
[curran@proceedings.com](mailto:curran@proceedings.com)  
[www.proceedings.com/0128.html](http://www.proceedings.com/0128.html)

or

The Society for Modeling  
and Simulation International  
2598 Fortune Way, Ste I  
Vista, CA 92081 USA  
[www.scs.org](http://www.scs.org)

ISBN: 978-1-62748-032-1  
PRINTED IN THE UNITED STATES

# TABLE OF CONTENTS

<b>On the Representation of Product Lines using Pluggable Software Units: Results from an Exploratory Study</b> .....	1
<i>Fernando J. Barros</i>	
<b>Hybrid Agent based Simulation with Adaptive Learning of Travel Mode Choices for University Commuters (WIP)</b> .....	9
<i>Nagesh Shukla, Albert Munoz, Jun Ma, Nam Huynh</i>	
<b>A Cellular Automaton Model for Psoriasis Disease</b> .....	15
<i>Morgan Germain, Christopher Banerji, Chrysanthi Ainali, Nour Shublaq</i>	
<b>A Metamodel-Based Approach For Generalizing Requirements In Database-Driven 3D Simulation (WIP)</b> .....	23
<i>Martin Hoppen, Michael Schluse, Juergen Rossmann</i>	
<b>Principles for the Realization of an Open Simulation Framework Based on fUML (WIP)</b> .....	29
<i>J�r�mie Tatibouet, Arnaud Cuccuru, S�bastien G�rard, Fran�ois Terrier</i>	
<b>Semantics for an Interdisciplinary Computation (WIP)</b> .....	35
<i>Justyna Zander, Pieter J. Mosterman</i>	
<b>Multiple Real-Time Semantics on Top of Synchronous Block Diagrams</b> .....	41
<i>Andreas Naderlinger</i>	
<b>Comparison of Three Agent-based Platforms on the Basis of a Simple Epidemiological Model (WIP)</b> .....	48
<i>Kishoj Bajracharya, Raphael Duboz</i>	
<b>Towards a Theory of Interface-Based Design of Hierarchical Reactive Systems</b> .....	54
<i>Herbert Pr�hofer</i>	
<b>Enabling Formal Analysis of Energy-Aware Automotive Embedded Systems in EAST-ADL</b> .....	62
<i>Eun-Young Kang, Pierre-Yves Schobbens</i>	
<b>Informal DEVS Conventions Motivated by Practical Considerations (WIP)</b> .....	70
<i>Rhys Goldstein, Simon Breslav, Azam Khan</i>	
<b>Abstraction in Physiological Modelling Languages</b> .....	76
<i>Steve McKeever, Mandeep Gill, Anthony Connor, David Johnson</i>	
<b>NOISYSIM: Exact Simulation of Stochastic Chemically Reacting Systems with Extrinsic Bounded Noises (WIP)</b> .....	84
<i>Giulio Caravagna, Alberto D'Onofrio, Giancarlo Mauri</i>	
<b>A Method for DEVS Simulation of E-Commerce Processes for Integrated Business and Technology Evaluation (WIP)</b> .....	90
<i>Carlos Mar�a Chezzi, Ana Rosa Tymoschuk, Ricardo Lerman</i>	
<b>GAMME, a Meta-model to Unify Data Needs in Simulation Modeling (WIP)</b> .....	96
<i>Judica�l Bedouet, Nicolas Huynh, Romain Kervarc</i>	
<b>Observations on Real-time Simulation Design and Experimentation</b> .....	102
<i>Soroosh Gholami, Hessam S. Sarjoughian</i>	
<b>Efficient Online Analysis of Accidental Fault Localization for Dynamic Systems using Hidden Markov Model</b> .....	110
<i>Ning Ge, Shin Nakajima, Marc Pantel</i>	
<b>Model-based, Composable Simulation for the Development of Autonomous Miniature Vehicles</b> .....	118
<i>Christian Berger, Michel Chaudron, Rogardt Heldal, Olaf Landsiedel, Elad M. Schiller</i>	
<b>The Impact of Operations Strategies for Emergency Room in Taiwan</b> .....	126
<i>Shao-Jen Weng, Po-Yu Huang, Wei-Hsiu Chang, Lee-Min Wang, Chun-Yueh Chang</i>	
<b>Model-based Animation of Micro-Traffic Simulation (WIP)</b> .....	133
<i>Philip Guin, Eugene Syriani</i>	
<b>Transformation of Extended Actigram Star to BPMN2.0 and Simulation Model in the Frame of Model Driven Service Engineering Architecture</b> .....	139
<i>Hassan Bazoun, Gregory Zacharewicz, Yves Ducq, Hadrien Boye</i>	
<b>GAMETE: General Adaptable Metric Execution Tool and Environment (WIP)</b> .....	147
<i>Kurt Rohloff, Kyle Usbeck, Joe Loyall</i>	
<b>Data and Behavior Decomposition for the Model-Driven Development of an Executable Simulation Model</b> .....	153
<i>G�rkan �zhan, Halit Oguzt�z�m</i>	
<b>Systematic Management of Simulation State for Multi-Branch Simulations in Simulink</b> .....	162
<i>Zhi Han, Pieter J. Mosterman, Justyna Zander, Fu Zhang</i>	

<b>Revisit of System Variable Trajectories (WIP)</b> .....	170
<i>Moon Ho Hwang</i>	
<b>Hybrid Systems Modeling and Verification with DEVS (WIP)</b> .....	176
<i>Hesham Saadawi, Gabriel Wainer</i>	
<b>Occupancy Analysis Using Building Information Modeling and Cell-DEVS Simulation</b> .....	182
<i>Sixuan Wang, Gabriel Wainer, Vinu Subashini Rajus, Robert Woodbury</i>	
<b>Agent-Oriented Approach Based on Discrete Event Systems (WIP)</b> .....	190
<i>Paul-Antoine Bisgambiglia, Romain Franceschini</i>	
<b>Metamorphic Differential Simulation Using the Multi-Delay Timing Model</b> .....	196
<i>Peter M. Maurer</i>	
<b>Survival vs. Revenue: Modelling and Reasoning on Population Dynamics (WIP)</b> .....	204
<i>Andrea Bracciali, Giulio Caravagna, Amjad Ullah</i>	
<b>Model Composability and Execution across Simulation, Optimization, and Forecast Models</b> .....	210
<i>Hessam Sarjoughian, James Smith, Gary Godding, Mohammed Muqsith</i>	
<b>4SEE: A Model-driven Simulation Engineering Framework for Business Process Analysis in a SaaS Paradigm</b> .....	218
<i>Paolo Bocciarelli, Andrea D'Ambrogio, Daniele Gianni</i>	
<b>Creating Suites of Models with System Entity Structure: Global Warming Example</b> .....	226
<i>Bernard P. Zeigler, Chungman Seo, Robert Coop, Doohwan Kim</i>	
<b>DEVS Modeling and Simulation Methodology with MS4 Me Software Tool</b> .....	234
<i>Chungman Seo, Bernard P. Zeigler, Robert Coop, Doohwan Kim</i>	
<b>Grand Challenges on the Theory of Modeling and Simulation</b> .....	242
<i>Simon J. E. Taylor, Azam Khan, Katherine L. Morse, Andreas Tolk, Levent Yilmaz, Justyna Zander</i>	
<b>Author Index</b>	