Proceedings of the 2012 Forum on specification & Design Languages

Vienna, Austria
September 18\textsuperscript{th}-20\textsuperscript{th}, 2012

General Chair:
Jan Haase
Vienna University of Technology

FDL is an \textit{ecsi} event!
The 2012 Forum on specification & Design Languages (FDL)
Vienna, Austria
September 18-20, 2012

ISBN - IEEE Xplore Compliant Files
978-2-9530504-5-5

ISBN - ECSI Media
978-2-9530504-7-9

ISSN
1636-9874

Editors
Dr. Adam Morawiec
Jinnie Hinderscheit

ECSI
Electronic Chips & Systems design Initiative
Parc Equation
2, Avenue de Vignate
38610 Gières, France
office@ecsi.org

© ECSI Electronic Chips & Systems design Initiative, 2012
No part of the work may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, microfilming, recording or otherwise, without written permission from the Publisher, with the exception of any material supplied specifically for the purpose of being entered and executed on a computer system, for exclusive use by the purchaser of the work.
Welcome........................................................................................................................................6
Keynote Speakers................................................................................................................................7
Technical Area Chairs ..........................................................................................................................8
Special Session Chairs ........................................................................................................................9
Program Committee ............................................................................................................................11
Technical Area Overview ..................................................................................................................12
Conference Papers .............................................................................................................................12
ABD 1: Property-based Verification ..................................................................................................12
    Formal Plausibility Checks for Environment Constraints ...............................................................13
        Binghao Bao, Markus Wedler, Dominik Stoffel and Wolfgang Kunz (University of Kaiserslautern)
    Assertion Based Verification of Signal Processing Systems with Affine Arithmetic ......................20
        Carna Radojicic, Florian Schupfer, Michael Rathmair and Christoph Grimm
            (Institute of Computer Technology, Vienna University of Technology)
    An Efficient Refinement Strategy Exploiting Component Properties in a Cegar Process ................27
        Syed Hussein Syed Alwi, Cécile Braunstein and Emmanuelle Encrenaz (LIP6 - CNRS UMR 7606)
ABD 2: Languages & Tools for Probabilistic & Temporal Specifications ........................................35
    Reliability Annotations to Formal Specifications of Context Sensitive Properties
        in Embedded Systems ..............................................................................................................36
        Aritra Hazra, Priyankar Ghosh and Pallab Dasgupta (Indian Institute of Technology Kharagpur)
    MODEST – A Unified Language for Quantitative Models (Invited presentation) .........................44
        Arnd Hartmanns (Saarland University)
EAMS 1: Simulation & Design of Cyber-physical Systems ................................................................52
    QoC-Oriented Efficient Schedule Synthesis for Mixed-Criticality Cyber-Physical Systems ...............53
        Reinhard Schneider, Dip Goswami, Alejandro Masrur and Samarjit Chakraborty
            (Technical University of Munich)
    Unified and Comprehensive Electronic System Level, Network and Physics Simulation for Wirelessly.....61
        Networked Cyber Physical Systems
            Javier Moreno, Markus Damm, Jan Haase (Vienna University of Technology),
            Christoph Grimm (TU Kaiserslautern) and Edgar Holleis (Tridonic)
    A Unified Platform for Design and Verification of Mixed-Signal Systems Based on SystemC AMS ..........68
        Yao Li, Ramy Iskander, Farakhd Javid and Marie-Minerve Louerat (UMPC LIP6)
Table of Contents

EAMS 2: Verification of Mixed-Signal Systems .................................................................76

Configurable Load Emulation using FPGA and Power Amplifiers for Automotive Power ICs
Manuel Harrant, Fabrizio Dona, Georg Pelz (Infineon Technologies),
and Christoph Grimm (TU Kaiserslautern)

A SystemC AMS extension for controlled modules and dynamic step sizes..........................83
Christiane Reuther and Karsten Einwich (Fraunhofer IIS/EAS Dresden)

Analog Assertion-Based Verification on Partial State Space Representations using ASL ...........91
Sebastian Steinhorst (TUM CREATE Centre for Electromobility Singapore)
and Lars Hedrich (Goethe-Universitaet Frankfurt am Main)

LBSD 1: SystemC Analysis ..................................................................................................98

TLM POWER3: Power Estimation Methodology for SystemC TLM 2.0 ...................99
David Greaves (University of Cambridge)
and Muhammad Mehboob Yasin (King Faisal University, Al-Ahasa)

Scandal: SystemC Analysis for NonDeterminism AnomaLies ........................................105
Christoph Schumacher, Jan Henrik Weinstock, Rainer Leupers and Gerd Ascheid
(RWTH Aachen University, ICE)

Localizing Features of ESL Models for Design Understanding
Marc Michael, Daniel Grosse and Rolf Drechsler (University of Bremen)

LBSD 2: Architectural Aspects in Models and Languages ..................................................119

Minimal MPI as Programming Interface for Multicore System-on-Chips ..................120
Adan Kohler, Juan Manuel Castillo-Sanchez, Joachim Groß and Martin Radetzki
(University of Stuttgart)

A Functional Language for Describing Reversible Logic ..............................................128
Michael Kirkedal Thomsen (University of Copenhagen)

Integrating Virtual Platforms into a Heterogeneous MoC-Based Modeling Framework ........136
Gilmar Silva Beserra (University of Brasilia),
Seyed Hosein Attarzadeh Niaki and Ingo Sander (KTH Royal Institute of Technology)

LBSD 3: System-level Behavioral Modeling and Simulation ..............................................144

Transformation of Event-Driven HDL Blocks for Native Integration into Time-Driven System Models .....145
Ralph Görgen (OFFIS), Jan-Hendrik Oetjens (Robert Bosch GmbH),
and Wolfgang Nebel (Carl von Ossietzky University Oldenburg)

Formal Heterogeneous System Modeling with SystemC ..............................................153
Seyed Hosein Attarzadeh Niaki and Ingo Sander (KTH Royal Institute of Technology),
Mikkel Koefoed Jakobsen (Technical University of Denmark), and Tero Sulonen (DA-Design Oy)

Extended Framework for System Simulation with Affine Arithmetic ................................161
Michael Rathmair, Florian Schupfer, Carina Radojicic (Vienna University of Technology)
and Christoph Grimm (TU Kaiserslautern)
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>UMES: Effective Exploitation of the UML Profile for MARTE</td>
<td>169</td>
</tr>
<tr>
<td>A Model-Driven Methodology for the Development of SystemC Executable Environments</td>
<td>170</td>
</tr>
<tr>
<td>Fernando Herrera, Pablo Peñil, Héctor Posadas and Eugenio Villar (University of Cantabria)</td>
<td></td>
</tr>
<tr>
<td>Modeling and Simulation of Secure Wireless Sensor Network</td>
<td>178</td>
</tr>
<tr>
<td>Alvaro Diaz Suarez, Pablo Peñil and Pablo Sanchez (University of Cantabria), Juan Sancho and Juan Rico (TST)</td>
<td></td>
</tr>
<tr>
<td>Special Session: Energy Harvesting and Ultra-low Power Design</td>
<td>186</td>
</tr>
<tr>
<td>Example-Driven Interconnect Synthesis for Heterogeneous Coarse-Grain Reconfigurable Logic</td>
<td>187</td>
</tr>
<tr>
<td>Clifford Wolf, Johann Glaser, Florian Schupfer, Jan Haase (Vienna University of Technology), and Christoph Grimm (TU Kaiserslautern)</td>
<td></td>
</tr>
<tr>
<td>Minimum Energy Point of Sub-threshold Operated Pass-transistor Circuits</td>
<td>195</td>
</tr>
<tr>
<td>Aleksandar Pajkanovic (University of Banja Luka), Tom Kazmierski (University of Southampton), and Branko Dokic (University of Banja Luka)</td>
<td></td>
</tr>
<tr>
<td>Special Session: Invasive Programming of Heterogeneous Multi-core Systems</td>
<td>201</td>
</tr>
<tr>
<td>An Integrated Simulation Framework for Invasive Computing</td>
<td>202</td>
</tr>
<tr>
<td>Michael Gerndt, Andreas Herkersdorf, Andreas Hollmann, Marcel Meyer, Josef Weidendorfer, Thomas Wild and Aurang Zaib (Technical University Munich), Frank Hannig and Sascha Roloff (University of Erlangen-Nuremberg)</td>
<td></td>
</tr>
<tr>
<td>Invasive Computing - Concepts and Overheads</td>
<td>210</td>
</tr>
<tr>
<td>Jürgen Teich, Andreas Weichslgartner, Benjamin Oechslein and Wolfgang Schröder-Preikschat (University of Erlangen-Nuremberg)</td>
<td></td>
</tr>
<tr>
<td>Invasive Computing with iOMP</td>
<td>218</td>
</tr>
<tr>
<td>Michael Gerndt, Andreas Hollmann, Marcel Meyer, Martin Schreiber and Josef Weidendorfer (Technical University Munich)</td>
<td></td>
</tr>
<tr>
<td>Special Session: Model Based Design of Electronic Systems in Systems</td>
<td>225</td>
</tr>
<tr>
<td>Polynomial-Metamodeling Assisted Fast Power Optimization of Nano-CMOS PLL Components</td>
<td>226</td>
</tr>
<tr>
<td>Oleg Garitselov, Saraju Mohanty and Elias Kougianos (University of North Texas)</td>
<td></td>
</tr>
<tr>
<td>Model-Based Progressive Design and Verification of an Integrated CMOS Magnetic Sensor for Automotive Applications</td>
<td>232</td>
</tr>
<tr>
<td>Gael Close (Melexis) and Gjalt de Jong (Melexis, ArchWorks)</td>
<td></td>
</tr>
<tr>
<td>Fast Optimization of Analog Amplifier Architecture Using Simulated Annealing</td>
<td>239</td>
</tr>
<tr>
<td>Sumit Adhikari, Florian Schupfer (Vienna University of Technology), and Christoph Grimm (TU Kaiserslautern)</td>
<td></td>
</tr>
</tbody>
</table>