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Preface

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Preface

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This volume of ECEASST presents the contributions of the Workshop on Multi-Paradigm Modeling 2009 held as a satellite event of MoDELS 2009 in Denver, CO, USA. The fact that this workshop is the third in its series indicates the growing interest in the field.

Multi-Paradigm Modeling (MPM) deals with engineering problems that can be expressed by abstract models permeating multiple domains. It includes methods for describing the various formalisms of domains such as metamodeling, processing these models by various model transformation techniques, and approaches for the composition of the models to form a coherent model of the considered system.

These principles imply that MPM is inherently a multi-disciplinary field. This is clearly justified by the contribution titled "Modeling and Formal Verification of a Passive Optical Network" by Luiza Gheorghe, Gabriela Nicolescu and Ian O'Connor, where they offer a modeling approach for the validation of behavior in a passive integrated photonic routing structure. In the paper "An Architectural Approach to the Design and Analysis of Cyber-Physical Systems", Akshay Rajhans et al. present a tool set for the modeling and analysis of cyber-physical systems, using an architecture customized for CPS. The design of robotics systems can naturally be treated by multi-paradigm modeling. Andreas Schuster and Jonathan Sprinkle apply this technique in "Synthesizing Executable Simulations from Structural Models of Component-Based Systems", and illustrate the approach with a running example of an autonomous ground vehicle.

Perhaps the most important challenge for Multi-Paradigm Modeling is the composition of the models that belong to different paradigms. As far as model references are concerned, "A Pattern-Based Approach to Manage Model References" by Juanjuan Jiang and Tarja Systä includes a technique utilizing UML collaboration diagrams. Andres Yie et al. suggest a method for composing heterogeneous models by transforming them into a low-level homogeneous platform. Bruno Barroca, Levi Lucio, Didier Buchs, Vasco Amaral, and Luis Pedro address the issue of composition for testing purposes in the paper "DSL Composition for model-based test generation".

Model transformation is a key technique that underpins MPM. In "Explicit Transformation Modeling", Thomas Kühne et al. suggest a generation method for creating transformation description DSMLs specific to a set of input and output DSMLs. In "Toward Automated Verification of Model Transformations: A Case Study of Analysis of Refactoring Business Process Models" Márk Asztalos et al show methods to validate model transformations.

Finally, papers describing the applications of MPM are presented. A control application is discussed in "Model-Based Engineering of Supervisory Controllers using CIF" by R.R.H. Schiffelers, R.J.M. Theunissen, D.A. van Beek, and J.E. Rooda. A model transformation technique for the description of dynamic behavior of DSMLs is presented in "Code Generation with the Model Transformation of Visual Behavior Models" by Tamas Meszaros, Tihamer Levendovszky, and Gergely Mezei, while the paper titled "Concurrent Design of Embedded Control Software" by Marcel Groothuis, Raymond Frijns, Jeroen Voeten, and Jan Broenink applies MPM to embedded control design.

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MPM 09 Program Committee