Editorial of the Special Issue on
Software Modelling and Meta-Modelling

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Software modelling is to represent software systems at a high level of abstraction in the form of models, which are often in graphic or formal notations and sometimes a combination of them. In a model, the implementation details are omitted or hidden in order to facilitate both human comprehension and communication and automated reasoning about the system. A large number of modelling languages and/or notations have been proposed in the past decades as a core part of software development methodologies, such as dataflow diagrams in the structured analysis and design, UML in object-oriented development, and Petri-net, finite state machine, and statechart etc. in formal methods. With the rapid development of model-driven software development methodology, modelling plays an increasingly important role in software development. Meta-modelling, which models software models, has emerged as one of the key techniques that formalise the definitions of modelling languages and the specification of various processes and transformations of models. It has been an active research topic in the past a few years.

This journal special issue aims at reflecting the current frontier in the research on the scientific and technological principles of software modelling and meta-modelling, and further promoting the research and practices. An open call for papers and some personal invitations were made in the consolidation of submissions to this special issue. A total of 11 submissions were received. The papers included in this special issue are selected based on the reviews by experts in the subject area according to the journal's procedure and quality standard. Each paper is reviewed by at least two reviewers and some of the papers were revised for two rounds according to the reviewers' comments.

The special issue includes 8 papers in total: 4 papers on software modelling and 4 papers on meta-modelling. The papers on meta-modelling covered the issues about the semantics, metrics, reverse engineering and applications of meta-models.

In the paper entitled "*Towards an Interoperable Metamodel Suite: Size Assessment as One Input*", Henderson-Sellers, Qureshi and Gonzalez-Perez report their

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study of the size measurements of metamodels in the context of an investigation of the interoperability of metamodels.

In the paper entitled "*A Meta-Model for Model-Driven Web Development*", Fatolahi, Somé and Lethbridge propose a meta-model for model-driven development of web-based applications.

Shan and the guest editor Zhu address the semantics of multiple layer meta-modelling in UML in the paper entitled "*Unifying the Semantics of Models and Meta-Models in the Multi-Layered UML Meta-Modelling Hierarchy*"[1]. They propose a framework for formally defining the semantics of UML's meta-modelling hierarchy in predicate logic.

Motivated by the evolution of models and meta-models, in the paper entitled "*Application of Metamodel Inference with Large-scale Metamodels*", Liu, Gray, Mernik and Bryant propose an approach to reverse engineering aiming at re-construction of meta-models from model instances.

The papers on software modelling also cover a wide range of issues. In the paper entitled "*Comparative Evaluation of Model Transformation Specification Approaches*", Lano, Kolahdouz-Rahimi and Poernomo compare and evaluate various approaches to the specification of model transformations.

In the paper entitled "*Secure System Modeling: Integrating Security Attacks with Statecharts*", Ariss and Xu apply statecharts to the modelling of attacks to security systems.

In the paper entitled "*Towards True Dynamic Workflow for Emergency Response*", Tepfenhart and Wang propose an approach to dynamic workflow modeling and enactment for handling emergency situation. It integrates BDI (Belief-Desire-Intention) agents with WIFA workflow model based on their previous work.

In the paper entitled "*Formal Analysis of Sequence Diagram with Time Constraints by Model Transformation*", Zhu, Wang, Liu and Han address the problem of time constraint analysis via model transformation in the context of modelling and analysis of real-time embedded systems.

The guest editor would like to thank the reviewers of the papers. Their detailed and constructive comments have greatly helped the authors in the revision their manuscripts. The guest editor is also grateful to the authors for their contribution to the special issue. The guest editor is most grateful to Prof. Ruqian Lu, the editor-in-chief of the International Journal of Software and Informatics, for providing this opportunity to develop such a journal special issue on this active research topic. His great help and support in the process of editing the special issue are highly appreciated.

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[1] The review of this paper was handled by the journal's editor-in-chief as a regular submission rather than by the guest editor