



Proceedings of the
Tenth International Workshop on
Graph Transformation and
Visual Modeling Techniques
(GTVMT 2011)

Preface

The tenth edition of the International Workshop on *Graph Transformation and Visual Modeling Techniques* (GT-VMT 2011) was held at the Saarland University Campus of Saarbrücken, Germany on the 2nd and 3rd of April 2011, as a satellite event of ETAPS 2011, the European Joint Conferences on *Theory and Practice of Software*.

GT-VMT 2011 is part of a series that serves as a forum for all researchers and practitioners interested in the use of graph-based notation, techniques and tools for the specification, modeling, validation, manipulation and verification of complex systems. The aim of the workshop is to promote engineering approaches that provide effective sound tool support for visual modeling languages, enhancing formal reasoning at the semantic level (e.g., for model analysis, transformation, and consistency management) in different domains, such as UML, Petri Nets, Graph Transformation or Business Process/Workflow Models.

The rationale of the series of workshops is that successful applications of visual modeling notations depend on the ability

- to provide tool support beyond graphical editors including facilities for code generation, simulation or verification, and consistency management;
- to adapt and specialize languages, methods, and tools to the needs of specific application domains, enterprises, or projects.

Engineering approaches based on robust formalizations are thus required for the success of a graphical notation in terms of usability, design of supporting tools, and integration with other techniques. A key technology for the implementation of visual techniques is the generation of tools from high-level specifications, including language aspects like

- syntax and well-formedness;
- static and dynamic semantics;
- analysis and verification;
- refinement and model transformation;
- integration and consistency.

This year's workshop had a special focus on the visualisation, simulation, and verification of evolving systems. In particular, the workshop centered on the analysis of changes, upgrades and any sort of evolution that can target software systems, possibly with those run-time features often present in modern architectures, such as the plug-in based and service oriented ones.

Topics relevant to the scope of the workshop included (but were not restricted to)

- visual/graph-based analysis of evolution in software systems (including verification & validation, static & dynamic analysis techniques)
- application of visual/graph-based modeling techniques in engineering and designing evolving systems
- conformance analysis of evolving systems
- formal specification of run-time evolving systems, including plug-in based and service-oriented architectures
- on-the-fly and in-the-field verification & validation of run-time evolving systems
- model-driven development of evolving systems
- model transformations and their application to evolving systems
- case studies and novel application areas

This volume contains a selection of the papers presented at GT-VMT 2011. After the refereeing process ten papers, out of fifteen submissions, were selected for a presentation, of which nine are included in the present volume. In addition to the presentations of original research results, the programme included three invited lectures, and one of them turned into a paper also present in the volume. The submissions balanced theoretical and applied concepts, including tool support. The workshop programme was thus organized into four technical sessions, spanning over two days, and designed under the collective titles of Model Transformation and Synchronization, Software Evolution and Verification, Visual Languages, and Framework Expressiveness.

The workshop' organization is reflected in the structure of this volume which, as for the GT-VMT 2010 edition, is published as a separate issue in the Electronic Communications of the EASST. The series can be accessed online through the URL <http://www.easst.org/eceasst/>

The first workshop was held in Geneva, Switzerland as a satellite event of ICALP 2000, the 27th International Colloquium on *Automata, Languages and Programming*. Since then, the workshop has been a yearly meeting, except for a short biannual parenthesis. After 2004, it became part of the ETAPS confederation. In the spirit of celebration of the tenth year of its existence, the invited speakers were tightly linked with the history of the workshop. Together with Andrea Corradini, Reiko Heckel was the chair of the first meeting, and he has been one of its driving forces since then. Mauro Pezzè was one of the invited speakers of the 2000 edition, as well as the chair of the second one. An additional speaker was Maribel Fernandez: hers and Reiko Heckel's presentations were jointly shared with the 6th International Workshop on *Computing with Terms and Graphs* (TERMGRAPH 2001), whose topics complement those of GT-VMT.

The Programme Committee, chaired by Fabio Gadducci and Leonardo Mariani, consisted of

Paolo Baldan, University of Padova
Artur Boronat, University of Leicester
Andrea Corradini, University of Pisa
Claudia Ermel, TU Berlin
Fabio Gadducci, University of Pisa
Holger Giese, HPI Potsdam
Ekkart Kindler, TU Denmark
Barbara König, University of Duisburg-Essen
Fabrice Kordon, Université Pierre et Marie Curie
Jochen Küster, IBM Research Zurich
Juan de Lara, Universidad Autónoma de Madrid
Leonardo Mariani, University of Milan Bicocca
Alberto Lluch Lafuente, IMT Institute for Advanced Studies Lucca
Mark Minas, Universität der Bundeswehr München
Henry Muccini, University of L'Aquila
Flavio Oquendo, Université de Bretagne Sud
Francesco Parisi-Presicce, University of Rome
Arend Rensink, University of Twente
Gabriele Täntzer, University of Marburg
Emilio Tuosto, University of Leicester
Dániel Varró, TU Budapest

For their excellent work in reviewing and selecting the submitted papers, we are grateful to the Programme Committee members as well as to the external referees. We are also indebted to Tiziana Margaria, Julia Padberg, and Gabriele Täntzer, Managing Editors of ECEASST, for publishing the proceedings of GT-VMT 2011 as a separate volume in this series. We would like to thank the *University of Milan Bicocca* and the *University of Pisa* for their financial support, allowing to partially cover the expenses for the invited speakers. Finally, GT-VMT was a satellite event of ETAPS 2011, and for their assistance we are thankful to the Organizing Committee of the conference, and in particular the Workshop Chair, Bernd Finkbeiner

25 October 2011

Fabio Gadducci and Leonardo Mariani
