

# Preface

Graphs are among the simplest and most universal models for a variety of systems, not just in computer science, but throughout engineering and the life sciences. When systems evolve we are interested in the way they change, to predict, support, or react to their evolution. Graph transformation combines the idea of graphs as a universal modelling paradigm with a rule-based approach to specify their evolution. The area is concerned with both the theory of graph transformation and their application to a variety of domains.

The biannual International Conferences on Graph Transformation aim at bringing together researchers and practitioners interested in the foundations and applications of graph transformation. The fifth conference, ICGT 2010, was held at the University of Twente (The Netherlands) in September/October 2010, along with several satellite events. It continued the line of conferences previously held in Barcelona (Spain) in 2002, Rome (Italy) 2004, Natal (Brazil) in 2006 and Leicester (UK) in 2008, as well as a series of six International Workshops on Graph Transformation with Applications in Computer Science from 1978 to 1998. Also, ICGT alternates with the workshop series on Application of Graph Transformation with Industrial Relevance (AGTIVE). The conference was held under the auspices of EATCS and EASST.

In response to the call for papers, 48 papers were submitted. The papers were all reviewed by at least four, and in the majority of cases five, PC members or co-reviewers. After the reviewing phase and the ensuing discussion, the committee selected 22 papers for presentation at the conference and publication in the proceedings. These papers mirror the wide-ranged ongoing research activities in the theory and application of graph transformation. They are concerned with different kinds of graph transformation approaches, their algebraic foundations, composition and analysis, the relation to logic, as well as various applications, mainly to model transformation and distributed systems. The paper submission and reviewing, as well as part of the preparation of the printed volume, were very well supported by the free conference management system EasyChair.

In addition to the presentation of technical papers the conference featured three invited speakers, a doctoral symposium and four workshops. Moreover, this year ICGT was organised as a joint event with the 17th International SPIN Workshop on Software Model Checking (SPIN), and an associated workshop on Parallel and Distributed Methods in verification and High-performance computational systems Biology (PDMC/HiBi).

*Invited Speakers.* Javier Esparza gave a joint ICGT/SPIN keynote speech, dedicated to the memory of Carl Adam Petri, in which he reviewed the path of ideas that led from the theory of true concurrency, a semantic theory about the nature of concurrent computation, to the unfolding approach to model-checking, a pragmatic technique for reducing the state-explosion problem in automatic

verification. In his invited presentation, Krzysztof Czarnecki discussed the problems involved in model synchronisation, with illustrations from industrial practice, and reported an ongoing effort to create both a theoretical framework addressing these challenges and tools based on the framework. Finally, Christoph Brandt in his presentation proposed graph transformation techniques as a formal framework to address security, risk and compliance issues in banking.

*Satellite Events.* The successful Doctoral Symposium of ICGT 2008 was repeated at this year's event, organised by Andrea Corradini and Maarten de Mol. A total of 12 young researchers had the opportunity to present their work and interact with established researchers of the graph transformation community. In addition four workshops were organized where participants of the ICGT could exchange ideas and views on some subareas of graph transformation:

- 3rd Workshop on Graph Computation Models (GCM 2010), organised by Annegret Habel, Mohamed Mosbah and Rachid Echahed;
- 4th International Workshop on Graph-Based Tools (GraBaTs 2010), organised by Juan de Lara and Dániel Varró;
- 4th Workshop on Petri Nets and Graph Transformations (PNGT 2010), organised by Claudia Ermel and Katrin Hoffmann;
- Workshop and Tutorial on Natural Computing (WTNC 2010), organised by Ion Petre, Bogdan Iancu and Andrzej Mizera.

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