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This special issue contains six extended versions of papers presented at the 17th International Conference on Graph Transformation (ICGT 2024), held in Enschede, NL, on 10–11 July 2024. The conference was part of STAF 2024 (Software Technologies: Applications and Foundations) and was held under the auspices of the European Association for Theoretical Computer Science (EATCS), the European Association of Software Science and Technology (EASST), and the IFIP Working Group 1.3, Foundations of Systems Specification.

The ICGT series aims to foster the exchange and collaboration of researchers from diverse backgrounds working with graphs and graph transformation, either by contributing to their theoretical foundations or by applying established formalisms to classical or novel domains. The series serves as a well-established scientific publication outlet as well as a platform to promote inter- and intra-disciplinary research and to stimulate new ideas.

Graphs and graph-like structures are widely used as a formalism for specification and modelling across all areas of computer science, as well as in many fields of computational research and engineering. Relevant examples include software architectures, pointer structures, state-space and control/data-flow graphs, UML and other domain-specific models, network layouts, cyber-physical system topologies, quantum computing, and molecular structures. These graphs often undergo dynamic changes, such as reconfiguration, evolution, and other behaviours, which can be captured through rule-based graph manipulation. As such, graphs and graph transformation constitute a fundamental and universal modelling paradigm, enabling formal reasoning and analysis, ranging from verifying properties of interest to uncovering entirely new insights.

The papers in this special issue were selected from the highest-ranked contributions presented at ICGT 2024, which were themselves chosen through a competitive peer-review process that accepted 10 research papers, one tool presentation paper and two short papers from an initial 21 submissions. Compared to the papers published in the conference proceedings, the papers in this issue have been extended with full proofs, case studies, and additional results. Their topics reflect the broad scope of ICGT 2024, including theoretical approaches to graph transformation, logic and verification, model transformation, and applications of graph transformation in emerging domains.

The six papers selected for this special issue underwent an additional rigorous review process, in accordance with LMCS standards:

- *Causal Graph Dynamics and Kan Extensions* by Luidnel Maignan and Antoine Spicher ([https://doi.org/10.46298/lmcs-22\(1:16\)2026](https://doi.org/10.46298/lmcs-22(1:16)2026));
- *Localized RETE for Incremental Graph Queries with Nested Graph Conditions* by Matthias Barkowsky and Holger Giese ([https://doi.org/10.46298/lmcs-22\(1:4\)2026](https://doi.org/10.46298/lmcs-22(1:4)2026));
- *Rule-Based Graph Programs Matching the Time Complexity of Imperative Algorithms* by Ziad Ismaili Alaoui and Detlef Plump ([https://doi.org/10.46298/lmcs-22\(2:20\)2026](https://doi.org/10.46298/lmcs-22(2:20)2026));
- *Taint Analysis for Graph APIs Focusing on Broken Access Control* by Leen Lambers, Lucas Sakizloglou, Taisiya Khakharova, and Fernando Orejas ([https://doi.org/10.46298/lmcs-22\(1:18\)2026](https://doi.org/10.46298/lmcs-22(1:18)2026));
- *Termination of Graph Transformation Systems via Generalized Weighted Type Graphs* by Jörg Endrullis and Roy Overbeek ([https://doi.org/10.46298/lmcs-22\(1:15\)2026](https://doi.org/10.46298/lmcs-22(1:15)2026));
- *Using weakest application conditions to rank graph transformations for graph repair* by Lars Fritsche, Alexander Lauer, Maximilian Kratz, Andy Schürr, and Gabriele Taentzer ([https://doi.org/10.46298/lmcs-22\(1:10\)2026](https://doi.org/10.46298/lmcs-22(1:10)2026)).

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Russ Harmer and Jens Kosiol  
Guest editors of the ICGT'24 special issue