

# Fifth Workshop on the Globalization of Modeling Languages (GEMOC 2017)

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**Abstract**—The fifth edition of the GEMOC workshop was co-located with the MODELS 2017 conference in Austin, Texas. The workshop provided an open forum for sharing experiences, problems, and solutions related to the challenges of using multiple modeling languages in the development of complex software-based systems. During the workshop, interesting approaches were presented and discussed, ideas and opinions exchanged, and constructive feedback provided to authors of accepted papers. A major objective was to encourage more collaborations and to consolidate the community that focuses on providing solutions supporting the globalization of domain-specific modeling languages, i.e., the coordinated use of multiple languages throughout the development of complex systems. This report summarizes the presentations and discussions that took place in the 2017 edition of the workshop.

## 1. Introduction

Modern software-intensive systems are separated into different concerns to serve the needs of diverse stakeholders. These different concerns often require expertise from different domains and integration of solutions provided in specialized modeling languages and technologies. Software engineers hence must integrate the different languages and technologies. GEMOC 2017 was organized as a half-day workshop that brought together researchers and practitioners from the modeling and software language community to discuss these challenges. Following the four previous editions, its major objective again was to foster collaborations and to expand a community focusing on the challenges of globalizing modeling languages.

The GEMOC 2017 workshop was co-located with MODELS 2017 in Austin, Texas, on September 19t, 2017. In this report, we document the workshop.

In the following, section 2 outlines the workshop, including topics of interest and relevant application domains. Section 3 illustrates the paper review and selection process, as well as the workshop's structure. Section 4 summarizes the papers accepted at this workshop. Section 5 concludes with our feeling about the workshop and its community.

## 2. Workshop Overview

The fifth GEMOC workshop attracted submissions that addressed integration of engineering and formal modeling,

of continuous and discrete modeling, as well as of simulation techniques. The Call for Papers explicitly solicited contributions that described a vision for developing the necessary breakthroughs in software languages to support global software engineering, i.e., breakthroughs that lead to effective technologies supporting different forms of language integration, including language collaboration, interoperability and composability, as well as the related social coordination between developers that use different modeling languages.

The topics of interest for GEMOC 2017 include:

- Composability and interoperability of heterogeneous modeling languages
- Language integration challenges, from requirement to design, for analysis and simulation, during run-time, etc.
- Model and metamodel composition
- Language interface, viewpoint
- Heterogeneous modeling and simulation
- Language-based socio-technical coordination

Submissions describing practical and industrial experience related to the use of heterogeneous modeling languages were also encouraged. Particularly we called for research in modeling language globalization in the following application domains:

- Cyber-Physical Systems, System of Systems
- Internet of Services, Internet of Things
- Complex Adaptive Systems
- Smart City, Smart Building, Home automation
- Smart Grids, management of renewable and intermittent energy sources
- Industry 4.0 and the smart factory of the future

## 3. Workshop Organization

Frédéric Boulanger, Eugene Syriani, and Andreas Wortmann organized and chaired the program committee (PC) for this fifth edition of the GEMOC workshop. The workshop's website<sup>1</sup> and the call for papers (CfP) were made available, several months before the workshop took place. The CfP

1. <http://gemoc.org/events/gemoc2017.html>.



[BSW17] F. Boulanger, Eugene Syriani, A. Wortmann:

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In: Proceedings of MODELS 2017 Satellite Event: Workshops (ModComp, ME, EXE, COMMiTME, MRT, MULTI, GEMOC, MoDeVva, MDETools, FlexMDE, MDEbug), Posters, Doctoral Symposium, Educator Symposium, ACM Student Research Competition, and Tools and Demonstrations co-located with ACM/IEEE 20th International Conference on Model Driven Engineering Languages and Systems (MODELS 2017), 2017.

[www.se-rwth.de/publications/](http://www.se-rwth.de/publications/)

also was announced on different professional mailing lists (e.g., DBWorld, planetmde, SEWORLD).

Each of the workshop's submissions was reviewed by at least three PC members and the papers were selected based on their relevance to the workshop's topics and the reviews provided by PC members. The organizers are very thankful to all PC members for performing this important service to the GEMOC community and for the quality of their reviews. The GEMOC 2017 PC consisted of:

- Marsha Chechik (University of Toronto)
- Tony Clark (Sheffield Hallam University)
- Benoit Combemale (IRISA, Université de Rennes 1)
- Jonathan Corley (University of West Georgia)
- Julien Deantoni (UNS - I3S - INRIA Sophia Antipolis Mediterranee)
- Jeff Gray (University of Alabama)
- Jean-Marc Jézéquel (University of Rennes)
- Ralf Lämmel (Universität Koblenz-Landau)
- Marjan Mernik (University of Maribor)
- Gunter Mussbacher (McGill University)
- Florian Noyrit (CEA LIST)
- Richard Paige (University of York)
- Bernhard Rumpe (RWTH Aachen University)
- Matthias Schöttle (McGill University)
- Safouan Taha (CentraleSupélec, LRI)
- Mark Van Den Brand (Eindhoven University of Technology)
- Hans Vangheluwe (McGill University)
- Markus Voelter (Independent)

## 4. Paper Summaries

The GEMOC 2017 workshop was split into two parts: The first part started with a quick introduction about the achievements of the GEMOC initiative<sup>2</sup> followed by a keynote on co-simulation by Hans Vangheluwe. Afterwards, a session with presentations of the three accepted papers and a concluding discussion took place. The three accepted papers were as follows:

- Bridging Engineering and Formal Modeling: WebGME and Formula Integration (by Tamas Kecskes, Qishen Zhang and Janos Sztipanovits): The paper addresses the challenge of analyzing CPS system level behavior where cross-domain interaction entail employment of various heterogeneous modeling languages. The authors map this challenge to the meta-level model integration of a meta-modeling technique (WebGME) with a constraint logic programming framework (Formula) to formally specify the semantics of modeling languages and model transformations.
- CREST - A Continuous, REactive SysTems DSL (by Stefan Klikovits, Alban Linard and Didier Buchs): The introduces a software language for the modeling of continuous, reactive systems that integrates

architecture modeling and discrete messaging with continuous updates. This integration enables a hierarchical, component-based approach to closely reflect real-world CPS.

- Modeling co-simulation : a first experiment (by Renan Leroux, Ileana Ober, Marc Pantel and Jean-Michel Bruel): This paper describes the challenges of integration for co-simulation through a case study and proposes a modeling approach to address these challenge. The modeling approach is based on two main concepts: a master algorithm that orchestrates the individual simulations and a rollback mechanism that enables adjusting the step sizes of the various simulations.

## 5. Conclusion

The fifth edition again brought together an audience with research interests in different globalization concerns and fostered interesting discussions between the participants. The ongoing research that was reported in the workshop and the discussions that took place are a good indication that the community around the challenges in modeling language integration is expanding.

## Acknowledgments

GEMOC 2017 was supported by the GEMOC initiative<sup>2</sup>, which promotes research that aims to develop the necessary breakthroughs in software languages to support global software engineering. We also thank all of the workshop authors, all members of the PC for their reviews, and all participants (new and past participants) who help make the community active!

2. <http://gemoc.org>