



## Preface to the VECoS 2020 & 2021 special issue of ISSE

Kamel Barkaoui<sup>1</sup> · Belgacem Ben Hedia<sup>2</sup>

Published online: 26 December 2023

© The Author(s), under exclusive licence to Springer-Verlag London Ltd., part of Springer Nature 2023

This special issue contains extended versions of selected papers from the 14th and 15th editions of the International Conference on Verification and Evaluation of Computer and Communication Systems (VECoS 2020/21).

VECoS 2021 was scheduled to take place in November 2021 at the Institute of Software, Chinese Academy of Sciences in Beijing (co-located with FM 2021), and VECoS 2020 in October 2020 in Xi'an University of Science and Technology (XUST). However, due to the COVID-19 epidemic, these two editions held as virtual conferences.

The aim of the VECoS conference is to bring together researchers and practitioners in the areas of verification, control, performance, and dependability evaluation in order to discuss the state of the art and challenges in modern computer and communication systems in which functional and extra-functional properties are strongly interrelated. Thus, the main motivation for VECoS is to encourage cross-fertilization between various formal verification and evaluation approaches, methods, and techniques, and especially those developed for concurrent and distributed hardware/software systems.

This issue comprises four papers (selected from the 26 accepted and presented papers) covering various aspects of computer and communication systems: specification, testing, verification, and evaluation.

- The paper “*Model-based Design of Resilient Systems Using Quantitative Risk Assessment*” by Mediouni et al. [1] This paper proposes a formal model-based approach for designing resilient systems incrementally by iterative and sound model transformations. A quantitative risk assessment and validation of system robustness is given by using

statistical model-checking (SMC). The authors also illustrate in detail the application of the proposed approach on an excerpt of a real-life autonomous robotics case study and report on the implementation and results obtained with the SBIP framework.

- The paper “*Coverage Visualization and Analysis of Net Inscriptions in Coloured Petri Net Models*” by Ahishakiye et al. [2]. In this paper, the authors establish a link between coverage analysis and net inscriptions of Coloured Petri Nets (CPN) models by considering Modified Condition/Decision Coverage (MC/DC), a generalization of branch coverage for SML decisions. They implemented the approach in a library for CPN tools comprised of an annotation and instrumentation mechanism and a post-processing tool. The proposed solution is evaluated on 11 CPN models from the literature, and coverage analysis results are presented
- The paper “*Contract-Based Specification of Mode-Dependent Timing Behavior*” by Koopmann et al. [3]. In this paper, the authors develop a contract-based specification formalism for cyber-physical safely critical systems modeled in terms of individual components with strict timing specifications expressed in terms of Assume/Guarantee (A/G) contracts and evaluated with a timing analysis while shifting between operating modes. An example of an Adaptive Cruise Control system with collision avoidance incorporating mode-dependent behavior is provided to illustrate the expressiveness of the proposed formalism.
- The paper “*A Certified Access Control Policy Language: TEpla*” by Amir Eaman et al. [4]. The paper introduces a formally defined language called TEpla amenable to express unambiguous and accurate specification of access control policies for systems with critical resources. TEpla also provides additional language constructs that allow security administrators to encode different security goals in policies as user-defined predicates. The semantics of the proposed language focuses on various types of ordering relations on policies, query, decisions, necessary to

✉ Kamel Barkaoui  
kamel.barkaoui@cnam.fr

Belgacem Ben Hedia  
belgacem.ben-hedia@cea.fr

<sup>1</sup> Cedric - CNAM, Paris, France

<sup>2</sup> LIST - CEA, Paris, France

decide if certain accesses are granted and allows to mathematically reason on its main properties and to prove them using the Coq proof-assistant.

We would like to thank all the authors of these papers for their contributions and the reviewers that we have solicited for their thorough evaluations. We are particularly grateful to the ISSE editor-in-chief Mike Hinchey and the editorial assistant Chitra Vijayaraghavan for their help and reactivity throughout the preparation of the issue.

## References

1. Mediouni BL, Dragomir I, Nouri A et al (2023) Model-based design of resilient systems using quantitative risk assessment. *Innov Syst Softw Eng.* <https://doi.org/10.1007/s11334-023-00527-0>
2. Ahishakiye F, Jarabo JIR, Kristensen LM et al (2023) Coverage visualization and analysis of net inscriptions in coloured petri net models. *Innov Syst Softw Eng.* <https://doi.org/10.1007/s11334-023-00528-z>
3. Kröger J, Koopmann B, Stierand I et al (2023) Contract-based specification of mode-dependent timing behavior. *Innov Syst Softw Eng.* <https://doi.org/10.1007/s11334-023-00531-4>
4. Eaman A, Felty A (2023) A certified access control policy language: TEpla. *Innov Syst Softw Eng.* <https://doi.org/10.1007/s11334-023-00534-1>

**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.