Math. Struct. in Comp. Science (2019), *vol.* 29, *pp.* 1–2.
doi:10.1017/S0960129518000130 First published online 20 June 2018

Preface to special issue: ICTAC 2015

MARTIN LEUCKER[†], JORGE A. PÉREZ[‡], CAMILO RUEDA[§] and FRANK D. VALENCIA[§,¶]

[†]*Institute for Software Engineering and Programming Languages, University of Lübeck, Ratzeburger Allee 160, D-23562 Lübeck, Germany*
Email: leucker@isp.uni-luebeck.de
[‡]*University of Groningen, Nijenborgh 9, 9747 AG Groningen, The Netherlands*
Email: j.a.perez@rug.nl
[§]*Universidad Javeriana Cali, Calle 18 # 118-250, Cali, Colombia*
Email: crueda@javerianacali.edu.co
[¶]*CNRS & LIX, Ecole Polytechnique de Paris, 1 rue Honoré d'Estienne d'Orves, Palaiseau 91120, France*
Email: frank.valencia@lix.polytechnique.fr

Received April 2018

This issue of Mathematical Structures in Computer Science (MSCS) contains a selection of papers presented at the 12th International Colloquium on Theoretical Aspects of Computing (ICTAC 2015), which took place in Cali, Colombia, on October 29–31, 2015.

Established in 2004, the ICTAC conference series aims at bringing together practitioners and researchers from academia, industry and government to present research and to exchange ideas and experience addressing challenges in both theoretical aspects of computing and in the exploitation of theory through methods and tools for system development.

This issue contains six extended and revised versions of selected papers presented at ICTAC 2015. They cover a rather wide spectrum of topics in Theoretical Computing Science as relevant to MSCS, including conductive techniques, quantitative reasoning, semantics of programming languages and runtime verification. All papers have undergone a reviewing process in accordance with the high standards of MSCS.

The paper by Bacci, Bacci, Larsen and Mardare (Converging from Branching to Linear Metrics on Markov Chains) considers metric analogues of probabilistic trace equivalence and probabilistic bisimilarity. The authors show that the probabilistic trace metric can be characterized logically by means of Linear-time Temporal Logic (LTL). They introduce a notion of probabilistic bisimulation and a metric variant. They show that this metric can be characterized in terms of couples, analogous to the coupling characterization of the probabilistic bisimilarity metric.

The paper by Basold, Hansen, Pin and Rutten (Newton Series, Coinductively: A Comparative Study of Composition) uses a coinductive calculus of infinite streams by one of the authors to give an analysis of the algebra of weighted languages. The authors use coinduction to prove that an operator of the classical difference calculus, the Newton transform, generalizes from infinite sequences to weighted languages.

The contribution by Chapman, Uustalu and Veltri (Quotienting the Delay Monad by Weak Bisimilarity) studies the delay datatype, which is a constructive alternative to the maybe monad. In particular, the authors study the delay datatype quotiented by weak bisimilarity which, roughly speaking, ensures that two (delayed) computations are regarded as equal if they terminate with equal values whenever one of them terminates. The paper shows that the delay datatype quotiented by weak bisimilarity preserves a monad structure; their approach relies on inductive-like quotient types as proposed by Hofmann and on the axiom of countable choice.

The paper by Kesner and Ventura (A resource aware semantics for a focused intuitionistic calculus) proposes a new computational interpretation for an intuitionistic focused sequent calculus. This new interpretation is called the E-calculus and is compatible with a resource aware semantics. The authors also provide a type system for the E-calculus as well as for a calculus obtained by projecting explicit substitutions from the E-calculus.

The paper by Knight, Maubert and Schwarzentruber (Asynchronous announcements in a public channel) studies extensions to public announcement logic (PAL), a logic for expressing properties of distributed systems where entities can make public announcements. The authors develop an extension of PAL with asynchronous announcements, using two different modal operators. One critical issue addressed in this paper is how to avoid circular definitions in the semantics of the logic. The authors define two restricted cases in which circularity is avoided, study satisfiability and model checking problems, and provide associated complexity results.

Finally, the contribution by Renard, Falcone, Rollet, Jéron and Marchand (Enforcement of (Timed) Properties with Uncontrollable Events) studies runtime enforcement of properties involving uncontrollable events, which are only observable by an enforcement device and are common in many scenarios. While runtime verification aims at checking the conformance of the executions of a system under scrutiny with respect to some specification, runtime enforcement investigates how to react to a violation of specifications. The authors introduce an enforcement framework for regular untimed and timed properties with uncontrollable events; such properties are described by (timed) automata. The proposed enforcement mechanisms are shown to be sound, compliant and optimal.

We would like to thank the authors for their efforts in producing the extended versions of this journal issue. We are very grateful to the expert reviewers for their very careful reading; their suggestions and recommendations have greatly contributed to the quality of the papers here presented. We are indebted to the MSCS Editorial Office, in particular to Susie Bloor, for their help and patience in the production of this issue. Last but not least, our special thanks go to the Editor-in-Chief, Pierre-Louis Curien, for the opportunity of publishing in MSCS.

Special Issue Editors

Martin Leucker
Jorge A. Pérez
Camilo Rueda
Frank D. Valencia