

# Preface

This volume contains the papers presented at ICTAC 2015: The 12th International Colloquium on Theoretical Aspects of Computing held during October 29–31, 2015, in Cali, Colombia.

The International Colloquia on Theoretical Aspects of Computing (ICTAC) is a series of annual events founded in 2003 by the United Nations University International Institute for Software Technology. Its purpose is to bring together practitioners and researchers from academia, industry, and government to present research results and exchange experience and ideas. Beyond these scholarly goals, another main purpose is to promote cooperation in research and education between participants and their institutions from developing and industrial regions.

The city of Cali, where this year's ICTAC took place, is the third largest city of Colombia and the seat of six major universities of the country. The Universidad Javeriana-Cali, host of the colloquium, has built a reputation on theoretical computer science through the works of Avispa, a research team founded in the Cali-based universities of Javeriana and Universidad del Valle, with active members in the universities of Cork (Ireland), École Polytechnique-Paris (France), Oxford (UK), and Groningen (The Netherlands). The latter three institutions were co-organizers of this year's colloquium, which was also sponsored by Microsoft Research Center, Inria, CNRS, CLEI, and the Colombian Computation Society.

We were honored to have seven distinguished guests as invited speakers:

- Jean-Raymond Abrial (consultant, France)
- Volker Diekert (University of Stuttgart, Germany)
- César Muñoz (NASA Langley, USA)
- Catuscia Palamidessi (Inria and École Polytechnique, France)
- Davide Sangiorgi (Inria and University of Bologna, Italy)
- Moshe Vardi (Rice University, USA)
- Glynn Winskel (University of Cambridge, UK)

Jean-Raymond Abrial's talk undertook the study of a proof of a well-known theorem in planar graphs to motivate the new discipline of mathematical engineering. Volker Diekert discussed different monitor constructions for checking safety properties of complex systems. César A. Muñoz's talk concerned the application of formal methods to the safety analysis of air traffic management systems. He described the detect and avoid (DAA) capability to address the challenge of NASA's Unmanned Aircraft Systems Integration project. Catuscia Palamidessi's talk discussed the problem of protecting the privacy of the user when dealing with location-based services. Davide Sangiorgi presented his work on refinements of co-inductive proof methods for functional and process languages. He discussed the contraction technique that refines Milner's unique solution of equations to reason about bisimilarity. Glynn Winskel discussed his work on optimal probabilistic strategies for distributed games. Moshe

Vardi's talk described the rise and fall of mathematical logic in computer science and then analyzed the quiet revolution in logic that has given rise again to modern applications of logic to computing.

ICTAC 2015 received 93 submissions from 30 different countries. Each submission was reviewed by at least three members of the Program Committee, along with help from external reviewers. Out of these 93 submissions, 25 full-length papers were accepted. The committee also accepted two short papers and three tool papers. This corresponds approximately to a 1/3 acceptance ratio.

Apart from the paper presentations and invited talks, ICTAC 2015 continued the tradition of previous ICTAC conferences in holding a four-course school on three important topics in theoretical aspects of computing: formal methods and verification, formal models of concurrency, and security in concurrency. These courses were: "Formal Modeling" given by Jean-Raymond Abrial (France), "Formal Verification Techniques," by Martin Leucker (University of Lübeck, Germany), "Security and Information Flow," by Kostas Chatzikokolakis (CNRS-École Polytechnique, France), and "Models for Concurrency" by Pawel Sobocinski (University of Southampton, UK). In addition, co-located for the first time with ICTAC, we hosted the 11th International Workshop on Developments in Computational Models (DCM 2015) chaired by César A. Muñoz (NASA) and Jorge A. Pérez (University of Groningen).

We thank all the authors for submitting their papers to the conference, and the Program Committee members and external reviewers for their excellent work in the review, discussion, and selection process. We are indebted to all the members of the Organizing Committee for their hard work in all phases of the conference. We also acknowledge our gratitude to the Steering Committee for their constant support.

We are also indebted to EasyChair that greatly simplified the assignment and reviewing of the submissions as well as the production of the material for the proceedings. Finally, we thank Springer for their cooperation in publishing the proceedings.

August 2015

Martin Leucker  
Camilo Rueda  
Frank D. Valencia

Theoretical Aspects of Computing - ICTAC 2015  
12th International Colloquium, Cali, Colombia, October  
29-31, 2015, Proceedings  
Leucker, M.; Rueda, C.; Valencia, F.D. (Eds.)  
2015, XXIV, 620 p. 142 illus. in color., Softcover  
ISBN: 978-3-319-25149-3