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Selected Extended Papers of ITP 2015: Preface

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The sixth Interactive Theorem Prover (ITP) conference was held during August 24–27, 2015, in Nanjing, China. Its proceedings appeared as volume 9236 of *Lecture Notes in Computer Science*, published by Springer. The 2015 edition of ITP was special in the sense of taking place in China for the first time. It was therefore a great opportunity for more Chinese researchers and students to get acquainted with this research area. We welcomed more than 20 researchers and students from China's top universities and research institutes, including the Chinese Academy of Sciences, the University of Nanjing and the University of Science and Technology.

The present issue of the Journal of Automated Reasoning contains four articles based on papers presented at ITP 2015. The authors were invited to submit revised and extended versions of their papers, and these were subject to a rigorous peer-reviewing process.

- Besson, Blazy and Wilke's paper is a substantial effort of introducing a more realistic memory semantics for the CompCert compiler. The new semantics introduces the notion of symbolic value and normalisation to deal with uninitialised variables, which is not treated by the original ComCert semantics. They show that the new semantics is stronger (giving meaning to strictly more CLight programs) through some examples, and that it is faithful to the original semantics through a forward simulation proof. Interestingly the authors also found a bug in the original CompCert C semantics.
- Lammich's paper describes a refinement framework with which pure functional programs can be refined to faster imperative programs (using destructive datastructures). The paper describes several small examples explaining the techniques. The work is based on a separation logic together with a number of tactics for reasoning about imperative programs. It provides automatic tools to synthesis imperative programs from high level abstract programs using verified building blocks.
- Boulmé and Maréchal present work about verified static analysers in Coq. This work is based on the notion of *correctness diagrams* in order to verify the correctness of abstract interpreters. The strength of correctness diagrams is that they support a notion of stepwise refinement and the encapsulation of untrusted external oracles. The use of correctness diagrams is illustrated with a simple abstract interpreter from the domain of linearised

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polyhedra. The presented techniques are general in terms of being applicable in a wider context.

- Kunčar and Popescu's paper gives a criterion named *definitional theory* to ensure the consistency of Isabelle/HOL extended with type definition and adhoc overloading. The work includes a semantics to justify the derivation rules of Isabelle/HOL, a model construction to show the consistency of a definitional theory, and also a decidable property named *composable* which is strong enough to imply that a set of definitions does form a definitional theory. Compared with earlier efforts to show consistency of type definition and adhoc overloading in Isabelle/HOL, the results in this paper are more general (covering more cases) and more thorough (with soundness proof and model construction).

We are very grateful to the editor-in-chief, Tobias Nipkow, for the opportunity to put together this special issue. We thank the authors for their effort in revising and extending their papers, ensuring that the articles published here present significant additional contributions. We thank all staff and students who helped us to put together the ITP 2015 conference. We are also deeply saddened about the tragic death of Chunhan Wu, a colleague and friend, who suddenly died on 22 December 2016. He was crucial in the success of the conference.