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Tools and Algorithms for the Construction and Analysis of Systems

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Proceedings

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Preface

This volume contains the proceedings of the 10th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS 2004). TACAS 2004 took place in Barcelona, Spain, from March 29th to April 2nd, as part of the 7th European Joint Conferences on Theory and Practice of Software (ETAPS 2004), whose aims, organization, and history are detailed in a foreword by the ETAPS Steering Committee Chair, José Luiz Fiadeiro.

TACAS is a forum for researchers, developers, and users interested in rigorously based tools for the construction and analysis of systems. The conference serves to bridge the gaps between different communities including, but not limited to, those devoted to formal methods, software and hardware verification, static analysis, programming languages, software engineering, real-time systems, and communication protocols that share common interests in, and techniques for, tool development. In particular, by providing a venue for the discussion of common problems, heuristics, algorithms, data structures, and methodologies, TACAS aims to support researchers in their quest to improve the utility, reliability, flexibility, and efficiency of tools for building systems.

TACAS seeks theoretical papers with a clear link to tool construction, papers describing relevant algorithms and practical aspects of their implementation, papers giving descriptions of tools and associated methodologies, and case studies with a conceptual message.

The specific topics covered by the conference include, but are not limited to, the following:

- specification and verification techniques,
- theorem-proving and model-checking,
- system construction and transformation techniques,
- static and run-time analysis,
- compositional and refinement-based methodologies,
- testing and test-case generation,
- analytical techniques for real-time, hybrid, and safety-critical systems,
- tool environments and tool architectures,
- applications and case studies.

TACAS accepts two types of contribution: research papers and tool demonstration papers. Research papers are full-length papers covering one or more of the topics above, including tool development and case studies from the perspective of scientific research. Research papers are evaluated by the TACAS Program Committee. Tool demonstration papers are shorter papers that give an overview of a particular tool and its application. To stress the importance of tool demonstrations for TACAS, these papers are evaluated and selected by a specific member of the TACAS Program Committee who holds the title of Tool Chair.

In the years since it joined the ETAPS conference federation, TACAS has been the largest of the ETAPS member conferences in terms of number of submissions and papers accepted. TACAS 2004 received a record number of submissions: 145 research papers and 17 tool demonstration papers were submitted.

From the submitted papers, 37 research papers and 6 tool demo papers were accepted, yielding an overall acceptance ratio of 26%. Together with 2003 this represents the most competitive acceptance rate to date for TACAS (the acceptance rate has never exceeded 36% since TACAS joined ETAPS in 1999).

To carry out the difficult task of selecting a program from the large number of submissions in a fair and competent manner, we were fortunate to have highly qualified program committee members from diverse geographic and research areas. Each submission was evaluated by at least three reviewers. After a four-week reviewing process, the program selection was carried out in a two-week online program committee meeting. We believe the result of the committee deliberations was a very strong scientific program. As this year's invited speaker, the program committee selected Antti Valmari, who presented work on program verification by means of state spaces.

In conclusion, successfully organizing and implementing TACAS 2004 as represented by the proceedings recorded in this volume required significant effort by many different people during the past two years. Although it is impossible to mention everyone who contributed to TACAS 2004 by name, we would like to extend our sincere thanks to the following people: Bernhard Steffen, who served as the Tool Chair, the program committee members and additional referees, who performed admirably in spite of the high workload assigned to them, Martin Karusseit (MetaFrame, Germany), for his constant and prompt support in dealing with the online conference management system, Andrey Rybalchenko (MPI für Informatik, Germany), who carried out the hard work of preparing the LNCS proceedings, Kjeld Høyer Mortensen (University of Aarhus, Denmark), for his help in preparing the TACAS 2004 website (www.daimi.au.dk/˜cpn/tacas04), the TACAS Steering Committee, for inviting us to chair TACAS 2004, the ETAPS 2004 Organizing Committee, including the committee chair Fernando Orejas, and the ETAPS Steering Committee Chair José Luiz Fiadeiro for his patient guidance and prompting over the course of many months.

January 2004 Kurt Jensen and Andreas Podelski

Referees

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Byron Cook
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Yoav Rodeh
Oliver Ruething
Theo C. Ruys
Claus Schroeter
Stefan Schwoon
Helmut Seidl
Mihaela Sighireanu
Oleg Sokolsky
Alin Stefanescu
Michael Theobald
Stavros Tripakis
Yaroslav Usenko
Helmut Veith
Uwe Waldmann
Karen Yorav
Wieslaw Zielonka
Eli Singerman
Machiel van der Bijl

Table of Contents

Theorem Proving

Probabilistic Model Checking

Testing

Tools

Explicite State/Petri Nets

Scheduling

Constraint Solving

Timed Systems

Case Studies

Software

Temporal Logic

Abstraction

Automata Techniques

Foreword

ETAPS 2004 was the seventh instance of the European Joint Conferences on Theory and Practice of Software. ETAPS is an annual federated conference that was established in 1998 by combining a number of existing and new conferences. This year it comprised five conferences (FOSSACS, FASE, ESOP, CC, TACAS), 23 satellite workshops, 1 tutorial, and 7 invited lectures (not including those that are specific to the satellite events).

The events that comprise ETAPS address various aspects of the system development process, including specification, design, implementation, analysis and improvement. The languages, methodologies and tools that support these activities are all well within its scope. Different blends of theory and practice are represented, with an inclination towards theory with a practical motivation on the one hand and soundly based practice on the other. Many of the issues involved in software design apply to systems in general, including hardware systems, and the emphasis on software is not intended to be exclusive.

ETAPS is a loose confederation in which each event retains its own identity, with a separate program committee and independent proceedings. Its format is open-ended, allowing it to grow and evolve as time goes by. Contributed talks and system demonstrations are in synchronized parallel sessions, with invited lectures in plenary sessions. Two of the invited lectures are reserved for "unifying" talks on topics of interest to the whole range of ETAPS attendees. The aim of cramming all this activity into a single one-week meeting is to create a strong magnet for academic and industrial researchers working on topics within its scope, giving them the opportunity to learn about research in related areas, and thereby to foster new and existing links between work in areas that were formerly addressed in separate meetings.

ETAPS 2004 was organized by the LSI Department of the Catalonia Technical University (UPC), in cooperation with:

European Association for Theoretical Computer Science (EATCS)
European Association for Programming Languages and Systems (EAPLS)
European Association of Software Science and Technology (EASST)
ACM SIGACT, SIGSOFT and SIGPLAN

The organizing team comprised

Jordi Cortadella (Satellite Events), Nikos Mylonakis, Robert Nieuwenhuis, Fernando Orejas (Chair), Edelmira Pasarella, Sonia Perez, Elvira Pino, Albert Rubio

and had the assistance of TILESA OPC.
ETAPS 2004 received generous sponsorship from:

> UPC, Spanish Ministry of Science and Technology (MCYT), Catalan Department for Universities, Research and Information Society (DURSI), IBM, Intel.

Overall planning for ETAPS conferences is the responsibility of its Steering Committee, whose current membership is:

> Ratislav Bodik (Berkeley), Maura Cerioli (Genoa), Evelyn Duesterwald (IBM, Yorktown Heights), Hartmut Ehrig (Berlin), José Fiadeiro (Leicester), Marie-Claude Gaudel (Paris), Andy Gordon (Microsoft Research, Cambridge), Roberto Gorrieri (Bologna), Nicolas Halbwachs (Grenoble), Gûrel Hedin (Lund), Kurt Jensen (Aarhus), Paul Klint (Amsterdam), Tiziana Margaria (Dortmund), Ugo Montanari (Pisa), Hanne Riis Nielson (Copenhagen), Fernando Orejas (Barcelona), Mauro Pezzè (Milan), Andreas Podelski (Saarbrücken), Mooly Sagiv (Tel Aviv), Don Sannella (Edinburgh), Vladimiro Sassone (Sussex), David Schmidt (Kansas), Bernhard Steffen (Dortmund), Perdita Stevens (Edinburgh), Andrzej Tarlecki (Warsaw), Igor Walukiewicz (Bordeaux), Michel Wermelinger (Lisbon)

I would like to express my sincere gratitude to all of these people and organizations, the program committee chairs and PC members of the ETAPS conferences, the organizers of the satellite events, the speakers themselves, and finally Springer-Verlag for agreeing to publish the ETAPS proceedings. This year, the number of submissions approached 600, making acceptance rates fall to 25%. I congratulate the authors who made it into the final program! I hope that all the other authors still found a way of participating in this exciting event and I hope you will continue submitting.

In 2005, ETAPS will be organized by Don Sannella in Edinburgh. You will be welcomed by another “local”: my successor as ETAPS Steering Committee Chair – Perdita Stevens. My wish is that she will enjoy coordinating the next three editions of ETAPS as much as I have. It is not an easy job, in spite of what Don assured me when I succeeded him! But it is definitely a very rewarding one. One cannot help but feel proud of seeing submission and participation records being broken one year after the other, and that the technical program reached the levels of quality that we have been witnessing. At the same time, interacting with the organizers has been a particularly rich experience. Having organized the very first edition of ETAPS in Lisbon in 1998, I knew what they were going through, and I can tell you that each of them put his/her heart, soul, and an incredible amount of effort into the organization. The result, as we all know, was brilliant on all counts! Therefore, my last words are to thank Susanne Graf (2002), Andrzej Tarlecki and Paweł Urzyczyn (2003), and Fernando Orejas (2004) for the privilege of having worked with them.

Leicester, January 2004

José Luiz Fiadeiro
ETAPS Steering Committee Chairman