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Tools and Algorithms for the Construction and Analysis of Systems

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on Theory and Practice of Software, ETAPS 2000
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Proceedings

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Foreword

ETAPS 2000 was the third 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), five satellite workshops (CBS, CMCS, CoFI, GRATRA, INT), seven invited lectures, a panel discussion, and ten tutorials.

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 which 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 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. The program of ETAPS 2000 included a public business meeting where participants had the opportunity to learn about the present and future organization of ETAPS and to express their opinions about what is bad, what is good, and what might be improved.

ETAPS 2000 was hosted by the Technical University of Berlin and was efficiently organized by the following team:

Bernd Mahr (General Chair)
Hartmut Ehrig (Program Coordination)
Peter Pepper (Organization)
Stefan Jähnichen (Finances)
Radu Popescu-Zeletin (Industrial Relations)

with the assistance of BWO Marketing Service GmbH. The publicity was superbly handled by Doris Fähndrich of the TU Berlin with assistance from the ETAPS publicity chair, Andreas Podelski. Overall planning for ETAPS conferences is the responsibility of the ETAPS steering committee, whose current membership is:

Egidio Astesiano (Genova), Jan Bergstra (Amsterdam), Pierpaolo Degano (Pisa), Hartmut Ehrig (Berlin), José Fiadeiro (Lisbon), Marie-Claude Gaudel (Paris), Susanne Graf (Grenoble), Furio Honsell (Udine), Heinrich Hußmann (Dresden), Stefan Jähnichen (Berlin), Paul Klint (Amsterdam), Tom Maibaum (London), Tiziana Margaria (Dortmund), Ugo Montanari (Pisa), Hanne Riis Nielson (Aarhus), Fernando Orejas (Barcelona), Andreas Podelski (Saarbrücken), David Sands (Göteborg), Don Sannella (Edinburgh), Gert Smolka (Saarbrücken), Bernhard Steffen (Dortmund), Wolfgang Thomas (Aachen), Jerzy Tiuryn (Warsaw), David Watt (Glasgow), Reinhard Wilhelm (Saarbrücken)

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the Institute for Communication and Software Technology of TU Berlin
the European Association for Programming Languages and Systems
the European Association for Theoretical Computer Science
the European Association for Software Development Science
the "High-Level Scientific Conferences" component of the European Commission's Fifth Framework Programme

I would like to express my sincere gratitude to all of these people and organizations, the program committee 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.

January 2000

Donald Sannella
ETAPS Steering Committee Chairman

Preface

This volume contains the proceedings of the 6th TACAS, International Conference on **T**ools and **A**lgorithms for the **C**onstruction and **A**nalysis of **S**ystems. TACAS took place at the Technical University of Berlin, March 27–31, 2000, as a part of the third European Joint Conferences on Theory and Practice of Software (ETAPS) whose aims and organization are detailed in a separate foreword by Don Sannella.

Previous TACAS meetings were held in 1999 (Amsterdam), 1998 (Lisbon), 1997 (Twente), 1996 (Passau), and 1995 (Aarhus). Since 1998 TACAS has been a conference and part of ETAPS. All previous TACAS proceedings have been published as volumes in Springerr-Verlag's Lecture Notes in Computer Science series.

It is the goal of TACAS to provide a forum for researchers, developers, and users interested in the development and application of tools for the specification, verification, analysis, and construction of software and hardware systems. In particular, it aims to promote the exchange of ideas between different communities of theoreticians, tool builders, tool users, and system designers of various specialized areas that traditionally had little interaction. In this respect, TACAS reflects the overall goal of ETAPS from a tool oriented perspective. In effect, the scope of TACAS intersects with those of all other ETAPS events, which address more traditional areas of interest.

As a consequence, in addition to the standard criteria for acceptability, contributions have also been selected on the basis of their conceptual significance in the neighbouring areas. This comprises the comparison of concepts and methods, their degree of support via interactive or fully automatic tools, and case studies revealing the application profiles of the considered methods and tools.

In order to emphasize the practical importance of tools, TACAS encourages tool presentations on equal footing with traditional scientific papers, treating them as "first class citizens". In practice, this means that they have the same space in the proceedings and a full slot in the plenary conference session. Of course, during the conference there were also demonstrations of tools not announced in the official program.
These proceedings contain

- **an invited lecture** by Pierre Wolper and Bernhard Boigelot from the University of Liège "*On the Construction of Automata from Linear Arithmetic Constraints*".
- 33 **regular contributions**, covering a wide range of topics and being all relevant to the development of tools. They have been selected from 107 submissions, which is the largest number of submission TACAS has had so far.
- the text of two **short tool demonstrations** which were reviewed by the ETAPS steering committee.

TACAS was hosted by the Technical University of Berlin, and being part of ETAPS, it shared the excellent organization described by Don Sannella in the foreword. TACAS will be continued next year as a part of ETAPS at Genova and in 2002 in Grenoble.
Finally, we would like to thank the program committee and all the referees for their assistance in selecting the papers, Don Sannella for mastering the coordination of the whole ETAPS, and last but not least, the local organizers in Berlin.

January 2000

Susanne Graf
Michael Schwartzbach

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