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Foreword

ETAPS 2007 is the tenth instance of the European Joint Conferences on Theory and Practice of Software, and thus a cause for celebration.

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 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.

History and Prehistory of ETAPS

ETAPS as we know it is an annual federated conference that was established in 1998 by combining five conferences [Compiler Construction (CC), European Symposium on Programming (ESOP), Fundamental Approaches to Software Engineering (FASE), Foundations of Software Science and Computation Structures (FOSSACS), Tools and Algorithms for Construction and Analysis of Systems (TACAS)] with satellite events.

All five conferences had previously existed in some form and in various colocated combinations: accordingly, the prehistory of ETAPS is complex. FOSSACS was earlier known as the Colloquium on Trees in Algebra and Programming (CAAP), being renamed for inclusion in ETAPS as its historical name no longer reflected its contents. Indeed CAAP's history goes back a long way; prior to 1981, it was known as the Colleque de Lille sur les Arbres en Algebre et en Programmation. FASE was the indirect successor of a 1985 event known as Colloquium on Software Engineering (CSE), which together with CAAP formed a joint event called TAPSOFT in odd-numbered years. Instances of TAPSOFT, all including CAAP plus at least one software engineering event, took place every two years from 1985 to 1997 inclusive. In the alternate years, CAAP took place separately from TAPSOFT.

Meanwhile, ESOP and CC were each taking place every two years from 1986. From 1988, CAAP was colocated with ESOP in even years. In 1994, CC became a "conference" rather than a "workshop" and CAAP, CC and ESOP were thereafter all colocated in even years.

TACAS, the youngest of the ETAPS conferences, was founded as an international workshop in 1995; in its first year, it was colocated with TAPSOFT. It took place each year, and became a "conference" when it formed part of ETAPS 1998. It is a telling indication of the importance of tools in the modern field of informatics that TACAS today is the largest of the ETAPS conferences.

The coming together of these five conferences was due to the vision of a small group of people who saw the potential of a combined event to be more than the sum of its parts. Under the leadership of Don Sannella, who became the first ETAPS steering committee chair, they included: Andre Arnold, Egidio Astesiano, Hartmut Ehrig, Peter Fritzson, Marie-Claude Gaudel, Tibor Gyimothy, Paul Klint, Kim Guldstrand Larsen, Peter Mosses, Alan Mycroft, Hanne Riis Nielson, Maurice Nivat, Fernando Orejas, Bernhard Steffen, Wolfgang Thomas and (alphabetically last but in fact one of the ringleaders) Reinhard Wilhelm.

ETAPS today is a loose confederation in which each event retains its own identity, with a separate programme committee and 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 1998–2006

The first ETAPS took place in Lisbon in 1998. Subsequently it visited Amsterdam, Berlin, Genova, Grenoble, Warsaw, Barcelona, Edinburgh and Vienna before arriving in Braga this year. During that time it has become established as the major conference in its field, attracting participants and authors from all over the world. The number of submissions has more than doubled, and the numbers of satellite events and attendees have also increased dramatically.

ETAPS 2007

ETAPS 2007 comprises five conferences (CC, ESOP, FASE, FOSSACS, TACAS), 18 satellite workshops (ACCAT, AVIS, Bytecode, COCV, FESCA, FinCo, GT-VMT, HAV, HFL, LDTA, MBT, MOMPES, OpenCert, QAPL, SC, SLA++P, TERMGRAPH and WITS), three tutorials, and seven invited lectures (not including those that were specific to the satellite events). We received around 630 submissions to the five conferences this year, giving an overall acceptance rate of 25%. To accommodate the unprecedented quantity and quality of submissions, we have four-way parallelism between the main conferences on Wednesday for the first time. Congratulations to all the authors who made it to the final programme! I hope that most of the other authors still found a way of participating in this exciting event and I hope you will continue submitting.

ETAPS 2007 was organized by the Departamento de Informática of the Universidade do Minho, 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)
- The Computer Science and Technology Center (CCTC, Universidade do Minho)
- Camara Municipal de Braga
- CeSIUM/GEMCC (Student Groups)

The organizing team comprised:

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ETAPS 2007 received generous sponsorship from Fundação para a Ciência e a Tecnologia (FCT), Enabler (a Wipro Company), Cisco and TAP Air Portugal.

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

Perdita Stevens (Edinburgh, Chair), Roberto Amadio (Paris), Luciano Baresi (Milan), Sophia Drossopoulou (London), Matt Dwyer (Nebraska), Hartmut Ehrig (Berlin), José Fiadeiro (Leicester), Chris Hankin (London), Laurie Hendren (McGill), Mike Hinchey (NASA Goddard), Michael Huth (London), Anna Ingólfsdóttir (Aalborg), Paola Inverardi (L'Aquila), Joost-Pieter Katoen (Aachen), Paul Klint (Amsterdam), Jens Knoop (Vienna), Shriram Krishnamurthi (Brown), Kim Larsen (Aalborg), Tiziana Margaria (Göttingen), Ugo Montanari (Pisa), Rocco de Nicola (Florence), Jakob Rehof (Dortmund), Don Sannella (Edinburgh), João Saraiva (Minho), Vladimiro Sassone (Southampton), Helmut Seidl (Munich), Daniel Varro (Budapest), Andreas Zeller (Saarbrücken).

I would like to express my sincere gratitude to all of these people and organizations, the programme committee chairs and PC members of the ETAPS conferences, the organizers of the satellite events, the speakers themselves, the many reviewers, and Springer for agreeing to publish the ETAPS proceedings. Finally, I would like to thank the organizing chair of ETAPS 2007, João Saraiva, for arranging for us to have ETAPS in the ancient city of Braga.

Edinburgh, January 2007

Perdita Stevens
ETAPS Steering Committee Chair

Preface

This volume contains 34 papers presented at ESOP 2007, the annual European Symposium on Programming, held in Braga, Portugal, in March 2007. The goal of ESOP has always been to bridge the gap between theory and practice of programming, and the conferences continue to be devoted to addressing fundamental issues in the specification, analysis, and implementation of programming languages and systems.

The volume begins with a summary of the invited talk by Andy Pitts and continues with the contributed ESOP papers. The papers deal with important issues such as models and languages for services, logics, type theories and other verification techniques, language-based security, static analysis and abstract interpretation, semantic theories for object-oriented languages, process algebraic techniques for proving systems properties, and term-rewriting theories.

The 34 papers contained in this volume were selected by the Program Committee out of 136 submissions, each reviewed by at least three researchers. The reviews were made by the Program Committee and by 181 additional referees, listed below. The accepted papers were selected during a two-week electronic discussion by the Program Committee.

Thanks go to the authors, the members of the Program Committee, and the external referees for their excellent work, to the ETAPS Steering Committee Chair Perdita Stevens and the ETAPS 2007 Local Organization chaired by João Saraiva for providing infrastructure and gentle reminders, and finally to Andrei Voronkov and the maintainers of the Easychair Conference Management Systems that was very useful in all the phases of paper handling.

January 2007 Rocco De Nicola

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