Lecture Notes in Computer Science 2618

Edited by G. Goos, J. Hartmanis, and J. van Leeuwen

Springer
Berlin
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Pierpaolo Degano (Ed.)

Programming Languages and Systems

12th European Symposium on Programming, ESOP 2003
Held as Part of the Joint European Conferences
on Theory and Practice of Software, ETAPS 2003
Warsaw, Poland, April 7-11, 2003
Proceedings

Springer

Volume Editor

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Cataloging-in-Publication Data applied for

A catalog record for this book is available from the Library of Congress.

Bibliographic information published by Die Deutsche Bibliothek.
Die Deutsche Bibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data is available in the Internet at <http://dnb.ddb.de>.

CR Subject Classification (1998): D.3, D.1-2, F.3-4, E.1

ISSN 0302-9743
ISBN 3-540-00886-1 Springer-Verlag Berlin Heidelberg New York

Springer-Verlag Berlin Heidelberg New York
a member of BertelsmannSpringer Science+Business Media GmbH

http://www.springer.de

Typesetting: Camera-ready by author, data conversion by PTP-Berlin GmbH
Printed on acid-free paper SPIN: 10872938 06/3142 5 4 3 2 1 0

Foreword

ETAPS 2003 was the sixth 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), 14 satellite workshops (AVIS, CMCS, COCV, FAMAS, Feyerabend, FICS, LDTA, RSKD, SC, TACoS, UniGra, USE, WITS and WOOD), eight invited lectures (not including those that are specific to the satellite events), and several tutorials. We received a record number of submissions to the five conferences this year: over 500, making acceptance rates fall below 30% for every of them. Congratulations to all the authors who made it to 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.

A special event was held to honor the 65th birthday of Prof. Wlad Turski, one of the pioneers of our young science. The deaths of some of our "fathers" in the summer of 2002 — Dahl, Dijkstra and Nygaard — reminded us that Software Science and Technology is, perhaps, no longer that young. Against this sobering background, it is a treat to celebrate one of our most prominent scientists and his lifetime of achievements. It gives me particular personal pleasure that we are able to do this for Wlad during my term as chairman of ETAPS.

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.

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 2003 was organized by Warsaw University, Institute of Informatics, in cooperation with the Foundation for Information Technology Development, as well as:

- European Association for Theoretical Computer Science (EATCS);
- European Association for Programming Languages and Systems (EAPLS);
- European Association of Software Science and Technology (EASST); and

– ACM SIGACT, SIGSOFT and SIGPLAN.

The organizing team comprised:

Mikołaj Bojańczyk, Jacek Chrząszcz, Piotr Chrząstowski-Wachtel, Grzegorz Grudziński, Kazimierz Grygiel, Piotr Hoffman, Janusz Jabłonowski, Mirosław Kowaluk, Marcin Kubica (publicity), Sławomir Leszczyński (www), Wojciech Moczydłowski, Damian Niwiński (satellite events), Aleksy Schubert, Hanna Sokołowska, Piotr Stańczyk, Krzysztof Szafran, Marcin Szczuka, Łukasz Sznuk, Andrzej Tarlecki (co-chair), Jerzy Tiuryn, Jerzy Tyszkiewicz (book exhibition), Paweł Urzyczyn (co-chair), Daria Walukiewicz-Chrząszcz, Artur Zawłocki.

ETAPS 2003 received support from:[1]

– Warsaw University
– European Commission, High-Level Scientific Conferences and Information Society Technologies
– US Navy Office of Naval Research International Field Office,
– European Office of Aerospace Research and Development, US Air Force
– Microsoft Research

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

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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 Springer-Verlag for agreeing to publish the ETAPS proceedings. The final votes of thanks must go, however, to Andrzej Tarlecki and Paweł Urzyczyn. They accepted the risk of organizing what is the first edition of ETAPS in Eastern Europe, at a time of economic uncertainty, but with great courage and determination. They deserve our greatest applause.

Leicester, January 2003

José Luiz Fiadeiro
ETAPS Steering Committee Chair

[1] The contents of this volume do not necessarily reflect the positions or the policies of these organizations and no official endorsement should be inferred.

Preface

This volume contains the 27 papers presented at ESOP 2003, the 12th European Symposium on Programming, which took place in Warsaw, Poland, April 5–13, 2003. The ESOP series began in 1986 with the goal of bridging the gap between theory and practice. The conferences are devoted to fundamental issues in the specification, analysis and implementation of programming languages and systems.

The call for ESOP 2003 encouraged papers addressing the topics traditionally covered by ESOP (but not limited to):

- programming paradigms and their integration;
- semantics;
- calculi of computation;
- security;
- advanced type systems;
- program analysis and transformation;
- practical algorithms based on theoretical developments.

The volume begins with two invited contributions, both in the area of security. The first belongs to ETAPS as a whole, and accompanies its "unifying invited lecture" entitled *Computer Security from a Programming Language and Static Analysis Perspective*, delivered by Xavier Leroy. The second contribution is *What Makes a Cryptographic Protocol Secure? The Evolution of Requirements Specification in Formal Cryptographic Protocol Analysis*, by the ESOP invited speaker Catherine Meadows. The remaining 25 papers were selected by the Programme Committee from the 99 submissions.

Each submission was reviewed by at least three referees, and papers were selected in the latter stages of a one-week electronic discussion phase. I would like to sincerely thank all members of the ESOP 2003 Programme Committee for the excellent job they did in the very difficult selection process, always carried on in a kind, agreeable atmosphere. Also, I would like to thank all the subreferees for their invaluable contribution. I am also grateful to Michele Curti for the help with the conference management software. Finally, many thanks to the ETAPS Organising Committee, chaired by Andrzej Tarlecki and Pawel Urzyczyn, and to the Steering Committee of ETAPS, in particular to José Luiz Fiadeiro, for their efficient coordination of all the activities leading up to ESOP 2003.

Pisa, January 2003 Pierpaolo Degano

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