

Sixth Italian Conference On

THEORETICAL COMPUTER SCIENCE

Editors

Pierpaolo Degano

Ugo Vaccaro

Giuseppe Pirillo

World Scientific

— Sixth Italian Conference On —

**THEORETICAL
COMPUTER SCIENCE**

BIBLIOTHEQUE DU CERIST

Also published by World Scientific:

4th Italian Conference on Theoretical Computer Science

Editor: A Marchetti-Spaccamela et al.

5th Italian Conference on Theoretical Computer Science

Editor: Alfredo De Santis

— Sixth Italian Conference On —

THEORETICAL COMPUTER SCIENCE

Prato, Italy

November 9–11, 1998

Editors

Pierpaolo Degano

Università di Pisa, Italy

Ugo Vaccaro

Università di Salerno, Italy

Giuseppe Pirillo

IAMI CNR Sezione di Firenze, Italy



World Scientific

Singapore • New Jersey • London • Hong Kong

Published by

World Scientific Publishing Co. Pte. Ltd.

P O Box 128, Farrer Road, Singapore 912805

USA office: Suite 1B, 1060 Main Street, River Edge, NJ 07661

UK office: 57 Shelton Street, Covent Garden, London WC2H 9HE

British Library Cataloguing-in-Publication Data

A catalogue record for this book is available from the British Library.

1483

SIXTH ITALIAN CONFERENCE ON THEORETICAL COMPUTER SCIENCE

Copyright © 1998 by World Scientific Publishing Co. Pte. Ltd.

All rights reserved. This book, or parts thereof, may not be reproduced in any form or by any means, electronic or mechanical, including photocopying, recording or any information storage and retrieval system now known or to be invented, without written permission from the Publisher.

For photocopying of material in this volume, please pay a copying fee through the Copyright Clearance Center, Inc., 222 Rosewood Drive, Danvers, MA 01923, USA. In this case permission to photocopy is not required from the publisher.

ISBN 981-02-3655-7

This book is printed on acid-free paper.

Printed in Singapore by Uto-Print

Foreword

The Italian Conference on Theoretical Computer Science (ICTCS '98) is the annual conference of the *Italian Chapter of the European Association for Theoretical Computer Science* (IC-EATCS). The Conference aims at enabling computer scientists, especially the young researchers to enter our community and to exchange theoretical ideas and results, as well as theoretical based practical experiences and tools in computer science.

This is the sixth Italian Conference on Theoretical Computer Science, and its main topics include computability, automata, formal languages, term rewriting, analysis and design of algorithms, computational geometry, computational complexity, symbolic and algebraic computation, cryptography and security, data types and data structures, semantics of programming languages, program specification and verification, foundations of logic programming, parallel and distributed computation, theory of concurrency.

ICTCS '98 was held in Prato, Italy, November 9–11, 1998. Previous conferences took place in Pisa (1972), Mantova (1974 and 1989), L'Aquila (1992), and Ravello (1995); the next one will be held in 2001, as the Italian Conferences take place every three years.

The Program Committee selected 32 papers out of 50 submissions, 49 of them in electronic format. Their authors are from 10 countries, from all over the world. Each submission has been sent to three Program Committee members, assisted by their own referees.

The selection meeting took place in Pisa, June 25, 1998. To permit a deeper evaluation of the papers, the Program Committee split in two parts for a preliminary discussion, according to the two tracks of the Journal of Theoretical Computer Science; this reflects the main division in research topics within the community, while making evident its unifying aspects. Then, all the papers were evaluated again and all the decisions were taken altogether.

We would like to warmly thank all the persons who submitted their work to the conference, the Program Committee members and their referees for their invaluable contribution.

We would also like to thank M. Barra, A. De Bonis, P. Cattaneo, S. Fermandino, A. A. Rescigno, and V. Scarano for their help.

ICTCS '98 is organized by IAMI – CNR (Firenze), by the Dipartimento di Informatica – Università di Pisa and by the Dipartimento di Informatica e Applicazioni – Università di Salerno. We are pleased to acknowledge a support from: the Italian Chapter of EATCS, the Dipartimento di Informatica – Università di Pisa, the Dipartimento di Informatica e Applicazioni “Renato M. Capocelli” – Università di Salerno, the Italian National Council of Research (Comitato Nazionale per le Scienze Matematiche, GNIM-CNR, and Comitato Nazionale per le Scienze di Ingegneria e Architettura), the Conservatorio San Niccolò in Prato, the Comune and the Provincia of Prato, the CAP Express of Prato, the Cassa di Risparmio of Prato.

Invited Lecturers

A. Apostolico, Purdue University and Università di Padova
 L. Cardelli, Microsoft Research, Cambridge (UK)
 M. Dezani-Ciancaglini, Università di Torino
 A. Fiat, Tel Aviv University

Program Committee

S. Balsamo, Udine	A. Bertoni, Milano
P. Ciancarini, Bologna	B. Codenotti, Pisa
P. Degano, Pisa (Co-Chair)	•G. Italiano, Venezia
•R. Gorrieri, Bologna	•A. Marchetti-Spaccamela, Roma
G. Levi, Pisa	L. Pagli, Pisa
S. Ronchi della Rocca, Torino	A. Restivo, Palermo
•G. Rosolini, Genova	U. Vaccaro, Salerno (Co-Chair)
M. Venturini Zilli, Roma	

Members marked with a • did not participate in the selection meeting

List of Referees

D. Ancona	A. Asperti	V. Auletta	S. Berardi
F. Bergadano	M. Bernardo	A. Bernasconi	L. Birkedal
C. Bodei	H. Bodlaender	M. Bonuccelli	M. Boreale
M. Bravetti	A. Brogi	N. Busi	F. Cardone
G. L. Cattani	A. Ciabattoni	S. Cimato	A. Clementi
A. Corradini	L. Cosimo	A. Cresti	G. D'Agostino
C. De Felice	R. De Nicola	A. De Santis	M. Dezani
P. Di Gianantonio	M. Di Ianni	L. Donatiello	M. Falaschi
G. Ferrari	M. Finelli	M. Fiore	R. Focardi
D. Frigioni	F. Gadducci	L. Gargano	I. Gerace
G. Ghelli	P. Giannini	P. G. Franciosa	M. Goldwurm
P. Inverardi	S. Kasangian	A. Labelle	G. Lenzi
M. Leoncini	F. Luccio	V. Manca	M. Martelli
F. Martinelli	S. Martini	C. Mascolo	A. Masini
G. Mauri	C. Mereghetti	U. Montanari	A. Montanari
C. Montangero	A. Monti	M. Naor	M. Napoli
A. Negro	P. Odifreddi	N. Olivetti	A. Pedrotti
M. Parente	G. Persiano	A. Pettorossi	A. Piperno
M. Pistore	G. Resta	S. Ruggieri	F. Scozzari
R. Silvestri	D. Turi	S. Varricchio	P. Volpe
G. Zavattaro			

Contents

Böhm's Theorem for Böhm's Trees (<i>Invited Talk</i>)	1
<i>M. Dezani-Ciancaglini, B. Intrigila, M. Venturini-Zilli</i>	
Concrete Syntax for Intuitionistic Light Affine Logic with Polymorphic Type Assignment	24
<i>L. Roversi</i>	
A Type Assignment System for the Game Semantics	37
<i>P. Di Gianantonio, G. Franco</i>	
A Game Semantics Foundation for Logic Programming	48
<i>R. Di Cosmo, J.-V. Loddo, S. Nicolet</i>	
Tight Bounds on Broadcasting with Dynamic Faults	52
<i>G. De Marco, A. A. Rescigno</i>	
A New Modular Division Algorithm and Applications	65
<i>M. S. Sedjelmaci, C. Lavault</i>	
Fast Single Precision Evaluation of Sign of Determinants	77
<i>F. d'Amore, P. G. Franciosa</i>	
From Bandwidth k to Pathwidth k	90
<i>A. Proskurowski, J. A. Telle</i>	
Maintaining dynamic graph properties deterministically	102
<i>M. Marzolla</i>	
Rooted Spanning Trees with Small Weight and Average Length	114
<i>G. Frederickson, R. Solis-Oba</i>	
A Symbolic Semantics for Abstract Model Checking	126
<i>F. Levi</i>	
A Fixpoint-Based Axiom System for <i>ACTL</i>	129
<i>G. Lenzi</i>	

Proof Systems with Cut Elimination for $MTL^{\leq \omega}$	141
<i>F. Montagna, G. M. Pinna, E. B. P. Tiezzi</i>	
A Natural Deduction Style Proof System for Propositional μ -Calculus and its Formalization in Inductive Type Theories	153
<i>M. Miculan</i>	
Ambient Décor (<i>Invited Talk</i>)	166
<i>L. Cardelli, A. D. Gordon</i>	
Implementing Tile Systems: some Examples from Process Calculi	168
<i>R. Bruni, J. Meseguer, U. Montanari</i>	
Some Concurrency Models in a Categorical Framework	180
<i>C. Bodei</i>	
Enabling and General Distributions in Stochastic Process Algebras	192
<i>C. Priami</i>	
Functional and Performance Modeling and Analysis of Token Ring using EMPA	204
<i>M. Bernardo, M. Bravetti</i>	
Threshold Circuits for some Matrix Operations. Consequences on Regular and Probabilistic Languages	216
<i>C. Mereghetti, B. Palano</i>	
Query Searching with Lies	228
<i>F. Cicalese</i>	
Quantum NP is Hard for PH	241
<i>S. Fenner, F. Green, S. Homer, R. Pruim</i>	
Downward Collapse from a Weaker Hypothesis	253
<i>E. Hemaspaandra, L. A. Hemaspaandra, H. Hempel</i>	
On the Polynomial Representation of Boolean Functions over $GF(2)$	265
<i>A. Bernasconi</i>	
Spectral Techniques for Depth-3 Threshold Circuits	277
<i>G. Cattaneo, A. Leporati, G. Mauri</i>	

New Constructions for Visual Cryptography	290
<i>C. Blundo, A. De Bonis</i>	
Languages for Description and Analysis of Authentication Protocols . . .	304
<i>F. Martinelli</i>	
Using Entity Locations for the Analysis of Authentication Protocols . . .	316
<i>R. Focardi</i>	
Analysis of Normal Logic Programs	328
<i>F. Fages, R. Gori</i>	
An Experiment in Domain Refinement: Type Domains and Type Repre- sentations for Logic Programs	331
<i>F. Spoto</i>	
Call-Correct Specialisation of Logic Programs	335
<i>A. Bossi, S. Rossi</i>	
Factorizing Codes and Krasner Factorizations	347
<i>C. De Felice, R. Zizza</i>	
Transition Diagram System and Normal Form Algorithms	359
<i>D. Giammarresi, D. Wood</i>	
On the Extension of Fine and Wilf's Periodicity Theorem to Linear Automata	371
<i>G. Melideo, C. Pasquarelli, S. Varricchio</i>	
Author Index	384