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# Computer Aided Systems Theory - EUROCAST 2009

12th International Conference  
Las Palmas de Gran Canaria, Spain  
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Revised Selected Papers

## Volume Editors

Roberto Moreno-Díaz  
Alexis Quesada-Arencibia  
Universidad de Las Palmas de Gran Canaria  
Instituto Universitario de Ciencias y Tecnologías Cibernéticas  
Campus de Tafira  
35017, Las Palmas de Gran Canaria, Spain  
E-mail: rmoreno@ciber.ulpgc.es, aquesada@dis.ulpgc.es

Franz Pichler  
Johannes Kepler University Linz  
Institute of Systems Science  
Altenbergerstrasse 69  
4040 Linz, Austria  
E-mail: pichler@cast.uni-linz.ac.at

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## Preface

The concept of CAST as Computer Aided Systems Theory was introduced by F. Pichler in the late 1980s to refer to computer theoretical and practical developments as tools for solving problems in system science. It was thought of as the third component (the other two being CAD and CAM) required to complete the path from computer and systems sciences to practical developments in science and engineering.

Franz Pichler, of the University of Linz, organized the first CAST workshop in April 1988, which demonstrated the acceptance of the concepts by the scientific and technical community. Next, the University of Las Palmas de Gran Canaria joined the University of Linz to organize the first international meeting on CAST (Las Palmas, February 1989) under the name EUROCAST'89. This proved to be a very successful gathering of systems theorists, computer scientists and engineers from most European countries, North America and Japan.

It was agreed that EUROCAST international conferences would be organized every two years, alternating between Las Palmas de Gran Canaria and a continental European location. From 2001 the conference has been held exclusively in Las Palmas. Thus, successive EUROCAST meetings took place in Krems (1991), Las Palmas (1993), Innsbruck (1995), Las Palmas (1997), Vienna (1999), Las Palmas (2001), Las Palmas (2003) Las Palmas (2005) and Las Palmas (2007), in addition to an extra-European CAST conference in Ottawa in 1994. Selected papers from those meetings were published as Springer's Lecture Notes in Computer Science volumes 410, 585, 763, 1030, 1333, 1798, 2178, 2809, 3643 and 4739 and in several special issues of *Cybernetics and Systems: an International journal*. EUROCAST and CAST meetings are definitely consolidated, as has been shown by the number and quality of the contributions over the years.

EUROCAST 2009 took place in the Elder Museum of Science and Technology of Las Palmas, February 15–20, and it continued with the approach tested at previous conferences as an international computer-related conference with a true interdisciplinary character. There were different specialized workshops which, on this occasion, were devoted to the following topics: Systems Theory and Simulation: Formal Approaches, chaired by Pichler (Linz), Moreno Díaz (Las Palmas) and Albrecht (Innsbruck); Computation and Simulation in Modelling Biological Systems, chaired by Ricciardi (Napoli); Intelligent Information Processing, chaired by Freire (A Coruña); Applied Formal Verification, chaired by Biere (Linz); Computer Vision and Image Processing, chaired by Sotelo (Madrid); Mobile and Autonomous Systems: Robots and Cars, chaired by García-Rosa and De Pedro (Madrid); Simulation Based System Optimization, chaired by Huemer (Klagenfurt) and Jungwirth (Wels); Signal Processing Methods in Systems Design and Cybernetics, chaired by Astola (Tampere), Moraga (Asturias, Dortmund) and Stankovic (Nis); Polynomial Models in Control System Design, chaired by Kucera and Hromčík (Prague); Heurist Problem Solving, chaired by Affenzeller and Jacak (Hagenberg) and Raidl (Vienna); Simulation and Formal

Methods in Systems Design and Engineering, chaired by Ceska (Brno); and Models of Co-operative Engineering Systems, chaired by Braun (Sydney) and Klempous (Wroclaw).

The 120 papers included in this volume are the result of two successive selection processes: the first for presentation at the conference, and the second for inclusion in this book. The selections were the responsibility of the chairpersons, with the counseling of the International Advisory Committee. The present volume has been divided into 12 chapters corresponding to the workshops.

The event and this volume were possible thanks to the efforts of the chairmen of the workshops in the selection and organization of all the material. The editors would like to express their acknowledgement to all contributors and participants and to the invited speakers, Heinz Schwärtzel from Munich, Miguel A. Sotelo from Madrid and Peter Kopacek from Vienna, for their readiness to collaborate. We would also like to thank the Director of the Elder Museum of Science and Technology, D. Fernando Pérez and the members of the museum. Special thanks are due to the staff of Springer in Heidelberg for their valuable support.

July 2009

Roberto Moreno-Díaz  
Franz Pichler  
Alexis Quesada-Arencia

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