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# Computer Aided Systems Theory – EUROCAST 2013

14th International Conference  
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Revised Selected Papers, Part I



Springer

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# Preface

The University of Linz, organized the first CAST workshop in April 1988, promoted and chaired by Franz R. Pichler, dealing with computer theoretical and practical tools for problems in system science. This meeting demonstrated the acceptance of the concepts by the scientific and technical community. Next, Roberto Moreno-Díaz, of the University of Las Palmas de Gran Canaria joined Franz Pichler, motivated and encouraged by Werner Schimanovich of the University of Vienna (present Honorary Chairman of Eurocast), and they organized the first international meeting on CAST, (Las Palmas February 1989), under the name EUROCAST 1989, which again proved to be a very successful gathering of systems theorists, computer scientists and engineers from most of 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 Europe location, later being decided to host them 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), Las Palmas (2007), Las Palmas (2011), in addition to an extra-European CAST Conference in Ottawa in 1994. Selected papers from these meetings were published in Springer's *Lecture Notes in Computer Science* series as volume nos. 410, 585, 763, 1030, 1333, 1798, 2178, 2809, 3643, 4739, 5717, 6927, 6928, and in several special issues of *Cybernetics and Systems: An International Journal*. EUROCAST and CAST meetings are definitely consolidated, as shown by the number and quality of the contributions over the years.

EUROCAST 2013 took place in the Elder Museum of Science and Technology of Las Palmas, during February 6–11. It continued the approach tested in the last conferences as an international computer-related conference with a true interdisciplinary character, in accordance to the nature of modern systems science. There were different specialized workshops devoted to:

1. Modeling Biological Systems, chaired by Nobile and Di Crescenzo (Salerno)
2. Mobile and Autonomous Transportation Systems, chaired by De Pedro (Madrid)
3. Systems Theory and Applications, chaired by Pichler (Linz) and Moreno-Díaz (Las Palmas)
4. Intelligent Information Processing, chaired by Freire (A Coruña)
5. Computer Vision, Sensing and Image Processing, chaired by F. Llorca (Madrid)
6. Computer-Based Methods and Virtual Reality for Clinical and Academic Medicine, chaired by Rozenblit (Tucson) and Klempous (Wroclaw)

7. Computer-Aided System Optimization, chaired by Lunglmayr (Klagenfurt) and Jungwirth (Wels)
8. Modelling and Control of Mechatronics Systems, chaired by Schlacher and Scheidl (Linz)
9. Theory and Applications of Metaheuristic Algorithms, chaired by Affenzeller and Jacak (Hagenberg) and Raidl (Vienna)
10. Model-Based System Design, Verification and Simulation, chaired by Ceska (Brno)
11. Computerized Medical Imaging and Visualization, chaired by Ortega, Barreiro, Penedo (A Coruña), Mosquera (Compostela)
12. Digital Signal Processing Methods and Applications chaired by Astola (Tampere), Moraga (Dortmund) and Stankovic (Nis)
13. Modeling and Control of Robots, chaired by Bremer and Gattringer (Linz)
14. Process Modeling and Simulation, chaired by Grossmann and Rinderle Ma (Vienna)
15. Mobile Computing Platforms and Technologies, chaired by Rene Mayrhofer, Clemens Holzmann (Austria)
16. Traffic Behavior, Modeling and Optimization, chaired by Avineri (Bristol), Galán-Moreno, Rubio-Royo and Sánchez-Medina (Las Palmas)
17. Marine Robotics and Applications, chaired by Pascoal (Lisbon), Rajan (California) and
18. Systems Applications

The first two workshops of this edition were dedicated to the memory of two very distinguished scientists and important collaborators and contributors to Eurocast for many years, who unfortunately passed away after the last Eurocast. The first, to the memory of Prof. Luigi Ricciardi, of the University of Naples, a leading world scientist in biomathematics, who had been a continuous collaborator together with his group in Eurocast since 1993. He established, promoted and was Chairman of the Workshop on Modelling Biological Systems, which is now chaired by his advanced disciples.

The second workshop was devoted to the memory of Prof. Ricardo García Rosa, of the CSIC, Madrid, eminent authority in automation and control, leader in autonomous vehicles. His group presented an impacting successful demonstration in Eurocast 2007. He, his wife, Teresa de Pedro, and his group had been participants and collaborators of Eurocast since Krems (1991). The couple Ricardo Teresa established and chaired the important Workshop on Mobile and Autonomous Transportations, which is now firmly continued by Teresa.

In this conference, as in prior ones, most of the credit from success is due to the chairs of the workshops. They and the sessions chairs, with the counseling of the International Advisory Committee, selected from 201 initially presented papers, after oral presentations and subsequent corrections, the 131 revised papers included in these volumes.

In addition to the chairs of the workshops, the organizers must express their gratitude to all contributors and participants. In particular, to the invited speakers: Prof. Rudolf Kalman, presently at Zurich (Switzerland), well-known world reference in systems and signals theory, who delivered a master lecture on “A New Direction in Systems Theory: Results on Identification from Invariant Theory”; second, to Prof. Kurt Schlacher from Linz University (Austria), one of the European leaders of IFAC, an authority in mechatronics, who presented the lecture “Control Theory and Practice in Mechatronics.” And third, to Prof. Antonio di Crescenzo, presently at the University of Salerno (Italy), outstanding disciple of the late Prof. Ricciardi and enjoying international recognition in biocomputing, who presented the lecture in the memory of his master, entitled “Randomness and Dynamic Systems.”

Also, we would like to acknowledge the essential collaboration of the general administrator of the Elder Museum of Science and Technology, D. José Miranda, and to the staff of the museum. Special thanks are due to the staff of Springer in Heidelberg for their valuable support in the publication of these volumes.



**A group of Eurocast 2013 attendants visiting Casa de Colón Museum**



**From left, Prof. and Mrs. Kalman, Prof. and Mrs. Píchler, and Prof. Moreno-Díaz at the Casa de Colón Museum, Eurocast 2013**

October 2013

Roberto Moreno-Díaz  
Franz Pichler  
Alexis Quesada-Arencia

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