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Computer Aided Systems Theory – EUROCAST 2011

13th International Conference
Las Palmas de Gran Canaria, Spain
February 6-11, 2011
Revised Selected Papers, Part I

Volume Editors

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ISSN 0302-9743

e-ISSN 1611-3349

ISBN 978-3-642-27548-7

e-ISBN 978-3-642-27549-4

DOI 10.1007/978-3-642-27549-4

Springer Heidelberg Dordrecht London New York

Library of Congress Control Number: 2011945104

CR Subject Classification (1998): H.1.1, J.1, I.4, I.5.4, I.5, J.2, C.2.1, J.6

LNCS Sublibrary: SL 1 – Theoretical Computer Science and General Issues

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Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Preface

Franz Pichler organized at the University of Linz the first CAST (Computer-Aided Systems Theory) Workshop in April 1988, which had the acceptance of prominent systems scientists. 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 1989. This first EUROCAST was a 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, later being decided to celebrate 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), and Las Palmas (2009), in addition to an extra-European CAST conference in Ottawa in 1994. Selected papers from those meetings were published by Springer as *Lecture Notes in Computer Science* nos. 410, 585, 763, 1030, 1333, 1798, 2178, 2809, 3643, 4739, and 5717, 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 2011 took place in the Elder Museum of Science and Technology of Las Palmas, Canary Islands, during February 6-11, following the approach tested at previous conferences. It was 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 Applications, chaired by Pichler (Linz) and Moreno Díaz (Las Palmas); Computation and Simulation in Modelling Biological Systems, chaired by Ricciardi (Napoli); Intelligent Information Processing, chaired by Freire (A Coruña); Traffic Behavior, Modelling and Optimization, chaired by Galán-Moreno, Rubio-Royo and Sánchez-Medina (Las Palmas); Computer Vision and Image Processing, chaired by Sotelo (Madrid); Mobile and Autonomous Transportation Systems, chaired by García-Rosa and De Pedro (Madrid); Computer-Aided System Optimization, chaired by Huemer and Lunglmayr (Klagenfurt); Modelling and Control of Mechatronics Systems, chaired by Schlacher and Scheidl (Linz); Heurist Problem Solving, chaired by Affenzeller and Jacak (Hagenberg) and Raidl (Vienna); Model-Based Systems Design, Simulation and Verification, chaired by Ceska (Brno); Biomimetic Software Systems, chaired by Braun (Sydney) and Klempous (Wroclaw) and Chaczko (Sydney); Computer-Based Methods for Clinical and Academic Medicine, chaired by Klempous (Wroclaw) and Rozenblit (Tucson); Mobile Computing Platforms and Technologies,

chaired by Mayrhofer and Holzmann (Linz); and Modelling and Design of Complex Digital Systems by Signal Processing Methods, chaired by Astola (Tampere), Stankovic (Nis) and Moraga (Asturias, Dortmund). The Chairs of the workshops, with the advice of the International Advisory Committee, selected near 200 extended abstracts for oral presentation at the meeting.

There were three plenary invited speakers: Markus Schwaninger from St. Gallen (Modeling the Economic Crisis: System-Dynamics-Based Approach to Prevention), Jerzy Rozenblit from Tucson (Models and Techniques for Computer-Aided Surgical Training) and Luigi Ricciardi from Napoli (Uncertainty, Probability, Functionality).

With the additional help of the Session Chairs, a final selection was made of papers personally presented at the conference, final full versions of which are included in these volumes.

The conference was possible thanks to the efforts of the Chairs of the workshops in the selection and organization of all the material. The organizers must express their acknowledgement to the Director of the Elder Museum of Science and Technology, D. Fernando Pérez, and to the members of the museum. Special thanks are due to the staff of Springer in Heidelberg for their valuable support.



A group of Eurocast 2011 participants, on the Friday, 11 February afternoon post-conference excursion to the north of Gran Canaria.

June 2011

Roberto Moreno-Díaz
Franz Pichler
Alexis Quesada-Arencibia

Organization

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Instituto Universitario de Ciencias y Tecnologías Cibernéticas
Universidad de Las Palmas de Gran Canaria, Spain

Österreichische Gesellschaft für Technologie-Politik
Wien, Austria

Centro de Automática y Robótica
Consejo Superior de Investigaciones Científicas y Universidad Politécnica de Madrid

Museo Elder de la Ciencia y la Tecnología
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IN MEMORIAM



PROF. LUIGI M. RICCIARDI

Professor Luigi M. Ricciardi passed away last May 7 in Naples. He was a proud student of Eduardo Caianiello among other historical personalities in cybernetics. His own contributions to cybernetics and complex systems opened new frontiers that were to result in the fruitful works of many other researchers.

Luigi graduated in Physics in 1964 (“Laurea in Fisica”), in 1967 he obtained his Degree of “Perfezionamento in Fisica Teorica e Nucleare”, and in 1971 his “Libera Docenza” in Cybernetics and Information Theory. From 1976 to 1981 he was full professor of Cybernetics and Information Theory at the Universities of Turin and of Salerno, and from 1981 he was full professor of Probability at the Department of Mathematics and Applications of Federico II Naples University. From 1983 he was Chairman of the Graduate Program for Research Doctor in Computational and Information Sciences and Director of the Graduate School in Mathematical and Informatics Sciences. Before being awarded his full professorship in Italy, he was a Research Staff Member with the Institute of Cybernetics of the Italian National Research Council and a faculty member with the Department of Theoretical Biology of the University of Chicago. His research activities, centered on applications of the theory of stochastic processes to biomathematics and on biomathematical and computational modeling, were carried out in collaboration with scientists from different countries, particularly from Japan, mainly within the framework of international bilateral research contracts sponsored by CNR and by the Ministry of Education and Research. He therefore spent frequent periods in foreign universities and research centers as visiting professor and lecturer, in particular at the universities of Osaka and

Kyoto where he taught courses in the local graduate schools and supervised research activities of doctorate students and post-doctoral students. He authored, or co-authored, over 200 publications, mainly appearing in international journals and various books. He was an Associate Editor of *Scientiae Mathematicae Japonicae*, of the *International Journal of Cybernetics and Systems*, a member of the International Advisory Board of *Mathematica Japonica* and of *Ricerche di Matematica*, and the President of the Scientific Council of the International Institute for High Scientific Studies “Eduardo Caianiello” (IIASS). He organized and chaired numerous international workshops and was a member of the editorial board of several international journals. He was also a member of the Österreichische Studiengesellschaft für Kybernetik (honorary member), the New York Academy of Sciences (life member), and the Naples Accademia di Scienze Fisiche e Matematiche (life member).

Besides his many scientific and professional values, Luigi Ricciardi was very much esteemed for his friendly personality, good and optimistic character to the very last moment, his teaching abilities and his special capacity to attract disciples, friends and colleagues everywhere. Some of us had the good luck of enjoying his magnificent hospitality in Naples. We have all lost a great scientist, a friend and a valuable and constant collaborator with EUROCAST. EUROCAST 2011, where he brilliantly delivered his last great plenary lecture, besides chairing his usual Workshop on Biocomputing, presents this modest tribute to his memory.

June 2011

Roberto Moreno-Díaz
Franz Pichler
Alexis Quesada-Arencibia

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