

GIANFRANCO BALBO

Curriculum Studiorum et Vitae

General Information

Gianfranco Balbo was born in Piossasco (Italy) in 1946. He received his Doctor degree in Physics from the University of Torino (Italy) in 1970, and his M.S. and Ph.D. degrees in Computer Science from Purdue University, West Lafayette, Indiana (USA), in 1975 and 1979, respectively, with a specialization in operating systems and evaluation methods for the study of their performance.

Since 1978, he has been with the Computer Science Department of the University of Torino (Italy), first as an Assistant Professor, and then as an Associate Professor. In 1990 he was nominated Full Professor of Computer Science in charge of two introductory courses on Operating System Theory and Performance Evaluation of Computer Systems.

Teaching Activity

During his career he has taught several courses on Operating Systems, Computer Architectures, Concurrent and Distributed Programming, Discrete Event Simulation, Markovian Models, and Performance Evaluation of Computer and Telecommunication Systems for the Computer Science curricula offered by the University of Torino. For the Ph.D. program in Computer Science, he has taught courses on Advanced Operating systems and Markovian Models. For the Ph.D. program in Complex Systems for Life Sciences, he has taught a course on Informatics. From 1984 to 2008, he has been member of the Faculty Committee in charge of the Ph.D. program in Computer Science of the University of Torino. From 2009 to 2016, he has been member of the Faculty Committee in charge of the Ph.D. program in Complex Systems for Life Sciences

During the month of October 1984, he has been invited by the Universitat Politecnica of Barcelona (Spain) to teach an introductory course on the methodologies for the “Quantitative Analysis of Computer Systems” and to supervise a local research group that was starting to use these techniques at that time. During the month of September 1998 he has been co-director of the International Advanced School “Performance Models for Discrete Event Systems with Synchronization: Formalisms and Analysis Techniques” that has been organized in the Summer extension of the University of Zaragoza in Jaca (Spain). During the month of May 1999 he lectured at the Summer School organized in Bertinoro (Italy) for the students of the Ph.D. programs in Computer Science offered by the Schools of Science of the Italian Universities. During the month of July 2000, he lectured at the first Summer School EEF/EURO titled “Trends in Computer Science: Formal Methods and Performance Analysis” that took place in Berg el Dal (The Netherlands). During the month of September 2003 he lectured at the Advanced Course on Petri Nets that took place in Eichstatt (Germany). During the month of May 2007 he lectured at the 7-th International School on Formal Methods for the Design of Computer, Communication and Software Systems (SFM 2007) that

took place in Bertinoro (Italy). During the month of September 2010 he has been one of the teachers of the International Summer School Advanced Course on Petri Nets that took place in Rostock (Germany).

Scientific Activity

Gianfranco Balbo is active in the international scientific community as member of the IFIP Working Group 7.3 “Computer System Modelling” and by participating in the Scientific Committees of several of the most important international conferences on Simulation, Modelling, and Performance Evaluation of Systems. He has been co-Chairman of the Scientific Committees of several international conferences. Since 1995 he is member of the Steering Committee of IPDS (International computer Performance and Dependability Symposium). From 1996 to 2002, he has been a member of the Steering Committee that coordinates the activities and the conferences in the fields of Petri net theory and applications. From 2004 to 2011 he has been a member of the Steering Committee of “QEST: International Conference on the Quantitative Evaluation of Systems”. He is also member of the Editorial Advisory Board of the International Journal of Computer Systems Science and Engineering. He has been a scientific reviewer for many international conferences and for many scientific journals among which it is possible to recall “Communications of the ACM”, “ACM Transactions on Computer Systems”, “IEEE Transactions on Computers”, “IEEE Transactions on Software Engineering”, “IEEE Transactions on Parallel and Distributed Systems”, and “Performance Evaluation”. He has also been the reviewer of many research proposals submitted to the “National Science Foundation” (USA).

In 1982 Gianfranco Balbo received a NATO Grant (renewed in 1983) that allowed him to collaborate with many foreign universities and, in particular, to spend some extensive periods as visiting researcher at the Computer Science Departments of the Universities of Minnesota (Spring 1983) and of Iowa (Summers 1985 and 1986).

During the period 2012 - 2015, Dr. Balbo has been invited as a Visiting Professor by the Faculty of Information and Communication Technology of the King Abdulaziz University (Saudi Arabia), to collaborate for the start-up of a local research activity in the field of the performance and availability evaluation of computer and communication systems.

Research Activity

His research interests are in the area of performance evaluation of computer systems, queueing network models, stochastic Petri nets, and queueing theory. After working on the computational algorithms for the solution of product form queueing networks, he started to use Stochastic Petri Nets for the analysis of the performance of parallel computers. In 1984, together with M. Ajmone-Marsan and G. Conte, he proposed the Generalized Stochastic Petri Net (GSPN) formalism which, supported by the Great-SPN software package, quickly became one of the most popular modelling languages for the specification and analysis of performance models of computer and communication systems, and of flexible manufacturing systems as well. Recently he has extended his research interests to the modelling aspects of Systems Biology which is turning out to be a very promising area of application of Stochastic Petri Nets and of the mathemat-

ical methods associated with this formalism.

Gianfranco Balbo is the leader of a research group of the University of Torino which has been active in several national and international research projects such as the national project on “Parallel Architectures” sponsored by the Italian National Research Council, the international projects sponsored by the European Community “IMSE: Integrated Modelling Support Environment”, “Parallel Computer Action”, “QMIPS: Quantitative Modelling in Parallel Systems”, “MATCH: Modelling and Analysis of Time Constrained and Hierarchical Systems”, “TIRAN: Tailorable Fault Tolerance Frameworks for Embedded Applications”, and “CRUTIAL: Critical Utility Infrastructural Resilience” and the project “TOPNET: a Tool for the Simulation of Communication Networks” sponsored by the European Space Agency.

The results of his researches are contained in more than 90 papers published in the proceedings of important national and international conferences and in several scientific international journals. He is co-author of the books “Computational Algorithms for Closed Queueing Networks”, “Performance Models of Multiprocessor Systems”. and “Modelling with Generalized Stochastic Petri Nets”, edited by Elsevier North-Holland, MIT Press and Wiley, respectively. Most of his publications have been repeatedly cited at the international level by other researchers so that Gianfranco Balbo has been included in the list of the most cited researchers in Computer Science (<http://hcr3.isiknowledge.com/formSearch.cgi>).

Organization Activity

From November 1989 to October 1995 he has been Director of the Computer Science Department of the University of Torino. From October 1999 to December 2005 he has been President and Managing Director of the “Virtual Reality & Multi Media Park S.p.A.” which is a public company in charge of fostering the activity of a new technology park that has been established in Torino with the goal of promoting the application of Virtual Reality and Multimedia technologies in training, research and production. From November 2001 to December 2011, Gianfranco Balbo has been vice-rector of the University of Torino in charge of its Information Systems. From January 2006 to December 2014 he has been involved with the Scientific Committee of the Consortium for the Information System of the Piemonte Region (CSI Piemonte) first as a member and later as President. From January 2007 to December 2012, Gianfranco Balbo has been member of the International Advisory Board of the “Computational Biology Research Center” of Microsoft Research Center and University of Trento.

Awards and Affiliations

Dr. Balbo is a member of the Academy of Sciences of Torino, and a member of the Association for Computing Machinery (ACM). Dr. Balbo has been nominated “Comendatore” of the Italian Republic in 2014 by the President of the Italian Republic to recognize and honor his scientific achievements.

List of Publications

Journals

- [1] M. Ajmone Marsan, G. Balbo, A. Bobbio, G. Chiola, G. Conte, and A. Cumani. The effect of execution policies on the semantics and analysis of stochastic petri nets. *IEEE TRANSACTIONS ON SOFTWARE ENGINEERING*, 15:832–846, July 1989.
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- [7] M. Ajmone Marsan, G. Balbo, G. Conte, and F. Gregoretti. Modeling bus contention and memory interference in a multiprocessor system. *IEEE TRANSACTIONS ON COMPUTERS*, C-32 (1):60–72, January 1983.
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- [14] G. Balbo, S.C. Bruell, and S. Ghanta. The solution of homogeneous queueing networks with many job classes. *THE JOURNAL OF SYSTEMS AND SOFTWARE*, 6 (1-2):41–53, May 1986.
- [15] G. Balbo, S.C. Bruell, and S. Ghanta. Combining queueing network and generalized stochastic petri nets for the solution of complex models of system behavior. *IEEE TRANSACTIONS ON COMPUTERS*, 37 (10):1251–1268, October 1988.
- [16] G. Balbo, G. Chiola, S.C. Bruell, and P. Chen. An example of modelling and evaluation of a concurrent program using coloured stochastic petri nets: Lamport’s fast mutual exclusion algorithm. *IEEE TRANSACTIONS ON PARALLEL AND DISTRIBUTED SYSTEMS*, 3 (2):221–240, March 1992.
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