Giuliana Annamaria Franceschinis

PERSONAL DATA

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BIO AND EDUCATION

In 1986 obtains the "Laurea in Scienze dell'Informazione" from the "Università di Torino", in 1992 obtains the PhD in Computer Science (Dottorato di Ricerca in Informatica) from the same University where in the same year becomes reserch assistant. In 1992 is visiting scholar at the Computer Science Department of the University of California at Los Angeles. Since 1998 she is a faculty at the "Università del Piemonte Orientale".
She works within the Dependability and Reliablity of the Computer Science Institute, DiSIT, Univ. del Piemonte Orientale. She has a research collaboration with the Computer Science Dept. of the Univ. di Torino. She has been member of the PhD faculty council for the joint PhD program in Computer Science of the Univ. of Torino and the Univ. of Piemonte Orientale. She is member of the "Centro di Ricerca Interdipartimentale in Medicina di Emergenza e dei Disastri e Informatica applicata alla didattica e alla pratica Medica". She has published about 100 scientific papers on peer-reviewed, international journals, International conference proceedings, Chapters in Thematic Collections and a book.

UNIVERSITY CAREER

2002-	Full Professor, Università del Piemonte Orientale
1998-2002	Associate Professor, Università del Piemonte Orientale
1991-1998	Research Assistant, Università di Torino

UNIVERSITY POSITIONS

2015-	Member of the Senate, Università del Piemonte Orientale
2013-	Responsible for the Computer Science Curricula (Laurea and Laurea Magistrale)
2007-2011	Vice-dean, Facoltà di Scienze Matematiche, Fisiche e Naturali, Università del Piemonte Orientale
2005-2007	Head of the Dipartimento di Informatica, Università del Piemonte Orientale

SCIENTIFIC POSITIONS

2011-	Member of Scientific Council of CNIT – Responsible of the CNIT Research Unit at the Università del Piemonte Orientale
2005-2011	Member of the Executive Council of CNIT (Consorzio Nazionale Interuniversitario per le Telecomunicazioni)
2011-	Member of the Scientific Council of SIe-L (Società Italiana di e-Learning)

1. Stochastic Petri Nets
2. Markov Decision Processes
3. Simulation
4. Reliability Analysis
5. Performance Evaluation

1. Stochastic Petri Nets Theory.

The research has concentrated on Generalized Stochastic Petri Net (GSPN). In particular, a new methodology has been defined, to support the modeler in correctly defining (at the net level, rather than at the state space level) of all the required parameters characterizing the underlying stochastic process (a Continuous Time Markov Chain). The structural properties of the mode, used in the correct definition of its parameters, can also be exploited to improve the efficiency of the state space based analysis techniques. These results have been implemented in the *GreatSPN* software tool.

2. High Level Stochastic Petri Nets Theory.

In this area the research has concentrated on the Stochastic Well-Formed Nets (SWN) formalism. The research line has followed two directions: the first aims to the extension of the definition and computation of the symbolic structural relations and to the extension of the methods for defining GSPN parameters to this High Level formalism; the second aims to defining new algorithms for the efficient construction of lumped stochastic processes, obtained by exploiting the behavioral symmetries of the model (even for models exhibiting local symmetric behaviours in a global asymmetric context). Finally it has been explored the possibility of applying techniques for the computation of the average number of tokens in the model places through a set of ordinary differential equations (ODE) automatically extracted from the model, while exploiting the model symmetries to reduce the size of the system of ODE to be solved.

3. Analysis of systems reliability through Fault Trees, Petri Nets and Bayesian Networks.

Systems reliability can be studied using tools of increasing expressive power and complexity: in this context a method has been defined, to combine the three above formalisms, with the aim of dealing with different types of systems and of properties within a unifying framework. The proposed method has been applied to several case studies propose by industrial partners in the framework of national and international projects. More recently new high level formalisms have been proposed for the specification of Markov Decision Processes (Markov Decision Petri Nets, Markov Decision Well Formed Nets, Non Deterministic Repairable Fault Trees). Such formalisms have been applied to the computation of optimal maintenance strategies in distributed control systems (specifically in the context of mission critical infrastructures).

4. **Development of methodologies and software tools for the qualitative and quantitative analysis of discrete event dynamic systems.**

The development of several case studies in the area of computer and communication systems has led to participation into projects and to the design and development of methodologies and sofware tools for the design and analysis of complex systems. The most recent results concern the integration of different formalisms to accurately represent the various aspects and different parts of complex systems (in particular such method has been applied to the study of the interdependency between the infrastructure for the Generation, Transmission and Distribution of the electrical power, and the computer and telecomunication infrastructure controlling it. The two main software tools that embed some of the research results just described are GreatSPN and Draw-Net.

TOP FIVE PAPERS

1. M. Beccuti, Silvano Chiaradonna, Felicita Di Giandomenico, Susanna Donatelli, Giovanna Dondossola, Giuliana Franceschinis. *Quantification of Dependencies between Electrical and Information Infrastructures.* International Journal of Critical Infrastructure Protection, Vol. 5, N. 1, March 2012, Elsevier.
2. E. Teruel, G. Franceschinis, and M. De Pierro, *Well-Defined Generalized Stochastic Petri Nets: A Net-Level Method to Specify Priorities*. EEE Transactions on Software Engineering, 29(11), 962-973. November 2003, IEEE CS Press.
3. L. Golubchik, J.C.S. Lui, T.F. Tung, A.L.H. Chou, W.-J. Lee, G. Franceschinis and C. Anglano, *Multi-path continuous media streaming: what are the benefits?* Performance Evaluation, 49(1-4), 429-450, September 2002, Elsevier.
4. G.Chiola, C.Dutheillet, G.Franceschinis, and S.Haddad. *A Symbolic Reachability Graph for Coloured Petri Nets*. Theoretical Computer Science B (Logic, semantics and theory of programming), 176 (1-2):39-65, April 1997, Elsevier.
5. M.AjmoneMarsan, G.Balbo, G.Conte, S.Donatelli, and G.Franceschinis. Modelling with Generalized Stochastic Petri Nets. John Wiley & Sons 1995. (BOOK)

FURTHER INFORMATION

Invited talks and courses in international research schools
1. Invited talk at the international conference ACM SIGSIM-PADS 2013 Montréal, Quebec, CANADA, May 2013
2. Invited talk at the 9th Winter Simulation Conference, special track on Petri nets, simulation and applications, Berlin, Germany, December 2012;
3. Invited talk at the 26th International Conference on Applications and Theory of Petri Nets, ATPN 2005, Miami, Florida, USA.
4. Invited talk at the Third workshop and Tutorial on Practical Use of Coloured Petri Nets and the CPN Tools, Aarhus, Denmark, August 2001;
5. Advanced Course on Petri Nets, Rostock, Germany, September 2010

6. *MATCH project School on Performance Models for Discrete Event Systems with Synchronizations: Formalisms and Analysis Techniques, Jaca, Spain, September 1998.*
7. Advanced Course on Petri Nets, Schloss Dagstuhl, Wadern, Germany, October 1996;

Invited professor at …
1. *Invited Professor at the Université de Savoie (Polytech'Savoie, Annecy) one month in A.A. 2009/2010 (invited by Prof. Patrice Moreaux, LISTIC)*
2. *Invited Professor at the Université de Paris Dauphine one month in july 2006 (invited by Prof. Serge Haddad, LAMSADE)*