Scientific and professional curriculum

Liliana Ironi

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EDUCATION

Laurea in Mathematics, *Università degli Studi di Pavia.*
Thesis Title: *Esercitazioni di Algebra lineare programmate mediante elaboratore elettronico.*
Advisor: Prof. Enrico Magenes.

ACADEMIC CAREER

August 2014 —	Associate Research Fellow. *IMATI-CNR*, Pavia.
December 2001 – July 2014	Research Director. *IMATI-CNR*, Pavia.
2000 – 2001	Senior Researcher. *IMATI-CNR*, Pavia.
1988 – 2000	Senior Researcher. *IAN-CNR*, Pavia.
1976 – 1988	Researcher. *IAN-CNR*, Pavia.

CURRENT RESEARCH INTERESTS

- Formulation and simulation of models of nonlinear dynamical systems incompletely known
  - *Methods*: Differential modeling and qualitative analysis/simulation of dynamical systems incompletely known; hybrid methods for system identification; learning methods; fuzzy systems; neural networks.
  - *Application domains*: Biology (Systems and Synthetic Biology), Medicine, Material Science, Pharmacology, Agriculture.
  - *Development of computational tools*: modeling and simulation frameworks for:
    - qualitative analysis and simulation of nonlinear and temporal multi-scale dynamical systems (e.g., gene regulatory networks);
    - system identification;
    - generation of an accurate model of visco-elastic materials from rheological data.
- Automated analysis and interpretation of numerical fields
  - *Methods*: data mining; spatial aggregation; computational geometry; artificial intelligence
  - *Application domains*: Electrocardiology
  - *Development of software and tools*: classification and interpretation of electrocardiac potential maps

PAST RESEARCH INTERESTS

- Development of diagnostic model-based systems
  - *Methods*: qualitative modeling and simulation; model-based reasoning techniques, knowledge-based systems; knowledge representation formalisms; artificial intelligence techniques
  - *Application domains*: Medicine
- Development of educational software
  - *Methods*: teaching strategies, e.g. simulation, tutorial dialogues, problem-solving,etc.
  - *Application domains*: Mathematics and Physics
  - *Development of software and tools*: prototypes of educational software; tools for the development of educational software

LIST of PUBLICATIONS

Journal Papers

[J-1] G. Gazzaniga, L. Ironi, M. Italiani. An interpreter which improves COURSEWRITER flexibility and portability. *ACM Sigcue Bulletin, Computer Uses in Education*, 10, 4 (1976), 21-24.

[J-2] G. Gazzaniga, L. Ironi. Esperienze sull'impiego degli elaboratori nell'istruzione. *Quaderni d'Informatica*, IV, 1 (1977), 31-38.

[J-3] G. Gazzaniga, L. Ironi. Considerazioni sull'evoluzione del ruolo del calcolatore nel CAI - Esperienze condotte presso l'I.A.N., *Informatica*, 9, suppl. n. 3 (1979), 5-15.

[J-4] G. Gazzaniga, L. Ironi. A CAI course of exercises in Numerical Analysis, *ACM Sigcue Bulletin, Computer Uses in Education*, 14, 2 (1980), 2-12.

[J-5] L. Borghi, A. De Ambrosis, G. Gazzaniga, L. Ironi, P. Mascheretti, C.I. Massara. Studio della propagazione di una perturbazione in una corda mediante l'uso del calcolatore, *Giornale di Fisica*, 24, 1 (1983), 57-64.

[J-6] L. Borghi, A. De Ambrosis, G. Gazzaniga, L. Ironi, P. Mascheretti, C.I. Massara. Computer in physics education: An example dealing with collision phenomena, *Amer. J. Phys.*, 52, 7 (1984), 619-623.

[J-7] L. Borghi, A. De Ambrosis, G. Gazzaniga, L. Ironi, P. Mascheretti, C.I. Massara. Elastic waves in a medium: an interactive graphics package, *Computer & Education*, 9, 1 (1985), 1-7.

[J-8] A. Capelo, C. Dos Santos, G. Gazzaniga, L. Ironi. Crescita esponenziale e logistica, *L'insegnamento della Matematica e delle Scienze Integrate*, 10, 8 (1987), 795 - 838.

[J-9] A. Garbagnoli, G. Gazzaniga, L. Ironi. Un programma interattivo grafico per l'approssimazione di dati, *Informatica e Scuola*, 1, 1 (1987), 5-10.

[J-10] L. Borghi, A. De Ambrosis, G. Gazzaniga, L. Ironi, P. Mascheretti, C.I. Massara. Uso di strumenti informatici nell'insegnamento della fisica: unità didattica sulla propagazione di oscillazioni, *La Fisica nella Scuola*, XXI, 1 (1988), 5-9.

[J-11] A. Garbagnoli, G. Gazzaniga, L. Ironi. REQUAL: un programma didattico per il calcolo delle radici algebriche, *L'insegnamento della Matematica e delle Scienze integrate*, 11, 2 (1988), 166-190.

[J-12] L. Borghi, A. De Ambrosis, G. Gazzaniga, L. Ironi, P. Mascheretti, C.I. Massara. Integrating computer simulations and the physics laboratory: a unit dealing with wave propagation, *Computer & Education*, 13, 2 (1989), 179-186.

[J-13] L. Ironi, M. Stefanelli, G. Lanzola. Qualitative models in medical diagnosis, *Artificial Intelligence in Medicine*, 2, (1990), 85-101 (also in [BC-3]).

[J-14] L. Borghi, A. De Ambrosis, G. Gazzaniga, L. Ironi - P. Mascheretti, C.I. Massara. Uso della simulazione per lo studio del moto in sistemi di riferimento diversi, *La Fisica nella Scuola*, XXIV, 1, (1991), 21-26.

[J-15] L. Borghi, A. De Ambrosis, G. Gazzaniga, L. Ironi, P. Mascheretti, C.I. Massara. Practical use of simulations to study relative motion, *Computer & Education*, 16, 2 (1991), 157-166.

[J-16] A.C. Capelo, L. Ironi, S. Tentoni. A model-based system for the classification and analysis of materials, *Intelligent Systems Engineering*, 2, 3 (1993), 145-158.

[J-17] L. Ironi, M. Stefanelli. A framework for building and simulating qualitative models of compartmental systems, *Computer Methods and Programs in Biomedicine*, 42, (1994), 233-254.

[J-18] L. Ironi. The Eleventh International Workshop on Qualitative Reasoning, *AI Magazine*, 19, 2 (1998), 109-111.

[J-19] A.C. Capelo, L. Ironi, S. Tentoni. Automated mathematical modeling from experimental data: an application to material science, *IEEE Transactions on Systems, Man and Cybernetics - Part C*, 28, 3 (1998), 356-370.

[J-20] R. Bellazzi, L. Ironi, R. Guglielmann, M. Stefanelli. Qualitative models and fuzzy systems: an integrated approach for learning from data, *Artificial Intelligence in Medicine*, 14, (1998), 5-28.

[J-21] S. Rossi, M.C. Bonferoni, C. Caramella, L. Ironi, S. Tentoni. Model-based interpretation of creep profiles for the assessment of polymer-mucin interaction, *Pharmaceutical Research*, 16, 9 (1999), 1456-1463.

[J-22] R. Bellazzi, R. Guglielmann, L. Ironi. How to improve fuzzy-neural system modeling by means of qualitative simulation, *IEEE Transactions on Neural Networks*, 11, 1 (2000), 249-253.

[J-23] R. Bellazzi, R. Guglielmann, L. Ironi. Learning from biomedical time series through the integration of qualitative models and fuzzy systems, *Artificial Intelligence in Medicine*, 21, 1-3 (2001), 215-220.

[J-24] R. Bellazzi, R. Guglielmann, L. Ironi, C. Patrini. A hybrid input-output approach to model metabolic systems: an application to intracellular thiamine kinetics, *Journal of Biomedical Informatics*, 34, (2001), 221-248.

[J-25] R. Guglielmann, L.Ironi, D. Liberati, A. Vercesi. A fuzzy-neural model of the germination of Plasmopara Viticola oospores, *Notiziario sulla Protezione delle Piante*, 15, (2002), 309-314.

[J-26] L. Ironi, S. Tentoni. A Model-based approach to the assessment of physicochemical properties of drug delivery materials, *Computers & Chemical Engineering*, 27, 6 (2003), 803-812 .

[J-27] L. Travé-Massuyès, L. Ironi, P. Dague. Mathematical foundations of qualitative reasoning, *AI Magazine*, Special Issue on Qualitative Reasoning, 24 (4), (2004), 91-106.

[J-28] C. Price, L. Travé-Massuyès, R. Milne, L. Ironi, K. Forbus, B. Bredeweg, M. Lee, P. Struss, N. Snooke, P. Lucas, M. Cavazza, G. Coghill. Qualitative Futures, *The Knowledge Engineering Review*, 21 (4), (2006), 317-334.

[J-29] Liliana Ironi, Stefania Tentoni. Automated detection of qualitative spatio-temporal features in electrocardiac activation maps, *Artificial intelligence in Medicine*, 39 (2), (2007), 99-111.

[J-30] Liliana Ironi, Luigi Panzeri. A computational framework for qualitative simulation of nonlinear dynamical models of gene-regulatory networks, *BMC Bioinformatics*, 10(suppl. 12):S14 (2009).

[J-31] A. Vercesi, S.L. Toffolatti, G. Zocchi, R. Guglielmann, L. Ironi. A new approach to modelling the dynamics of oospore germination in Plasmopara Viticola, *European Journal of Plant Pathology*, 128(1), (2010), 113-126.

[J-32] Liliana Ironi, Luigi Panzeri, Erik Plahte, Valeria Simoncini. Dynamics of actively regulated gene networks, *Physica D: Nonlinear Phenomena*, 240 (2011), 779-794.

[J-33] R. Guglielmann, L. Ironi. A divide-and-conquer strategy for qualitative simulation and fuzzy identification of complex dynamical systems, *Int. Journal of Uncertainty, Fuzziness and Knowledge-Based Systems*, 19(3), (2011), 423-452.

[J-34] Liliana Ironi, Stefania Tentoni. Interplay of spatial aggregation and computational geometry in extracting features from cardiac activation data, *Computer Methods and Programs in Biomedicine*, 107(3), (2012), 456-467.

[J-35] Liliana Ironi, Ettore Lanzarone. Assigning probabilities to qualitative dynamics of gene regulatory networks, *Journal of Mathematical Biology*, Vol. 69, Issue 6 (2014) pages 1661-1692.

[J-36] Roderick Edwards, Liliana Ironi. Periodic solutions of gene networks with steep sigmoidal regulatory functions, *Physica D: Nonlinear Phenomena*, 282 (2014) 1-15.

[J-37] Liliana Ironi, Diana X. Tran. Nonlinear and temporal multiscale dynamics of gene regulatory networks: A qualitative simulator, *Mathematics and Computers in Simulation*, 125 (2016), 15-37, doi: 10.1016/j.matcom.2015.11.007.

[J-38] Liliana Ironi, Ettore Lanzarone. A model-based tool for the analysis and design of gene regulatory networks, *IEEE/ACM Transactions on Computational Biology and Bioinformatics*, Vol.15, No. 4 (2018), 1301-1314, doi: 10.1109/TCBB.2017.2716942.

[J-39] Liliana Ironi, Ettore Lanzarone. Optimal robust search for parameter values of qualitative models of gene regulatory networks, *IEEE/ACM Transactions on Computational Biology and Bioinformatics*, Vol. 19, No.2, (2022), 1050-1063, doi:10.1109/TCBB.2020.3006920.

Books

[B-1] L. Borghi, A. De Ambrosis, G. Gazzaniga, L. Ironi, P. Mascheretti, E. Massara. *Le oscillazioni e la loro propagazione*, 2 volumi, *Ed. SEI*, (1989), Torino.

[B-2] R.M. Bottino, P. Forcheri, G. Gazzaniga, L. Ironi, E. Lemut, M.T. Molfino. *Modelli di regressione lineare*, 2 volumi, *Ed. SEI*, (1989), Torino.

[B-3] L. Ironi (editor). *Qualitative Reasoning - 11th International Workshop*, Pubbl. 1036, *IAN - CNR*, (1997), 1-387.

Book Chapters

[BC-1] L. Ironi. Modelli Qualitativi. In: C. Cobelli, M. Stefanelli, V. Tagliasco (eds.), *La strutturazione del Sapere Biomedico*, Patron Editore, Bologna, (1988), 109-124.

[BC-2] L. Ironi, G. Lanzola, M. Stefanelli. A qualitative model of iron metabolism. In: J. Hunter, J. Cookson, J. Wyatt (eds.), *Proc. AIME 89 - Artificial Intelligence in Medicine*, volume 38, *Lectures Notes in Medical Informatics*, Springer (1989), 147-166.

[BC-3] L. Ironi, M. Stefanelli, G. Lanzola. Qualitative models in medical diagnosis. In: E. Keravnou (ed.), *Deep Models for Medical Knowledge Engineering*, Elsevier, (1992), 51-70.

[BC-4] A.C. Capelo, L. Ironi, S. Tentoni. An algorithm for the automated generation of rheological models. In: G.Rzevski, R.A. Adey (eds.), *Applications of Artificial Intelligence in Engineering VI*, Computational Mechanics Publications (1991), 963-979.

[BC-5] A.C. Capelo, L. Ironi, S. Tentoni. A qualitative simulation algorithm for the rheological behavior of visco-elastic materials. In: D.E. Grierson, G. Rzevski, R.A. Adey (eds.), *Applications of Artificial Intelligence in Engineering VII*, Computational Mechanics Publications (1992), 1117-1130.

[BC-6] L. Ironi, A. Cattaneo, M. Stefanelli. A tool for pathophysiological knowledge acquisition. In: S. Andreassen, R. Engelbrecht, J. Wyatt (eds.), *Artificial Intelligence in Medicine*, IOS Press (1993), 13-31.

[BC-7] L. Ironi, M. Stefanelli. Generating explanations of pathophysiological system behaviors from qualitative simulation of compartmental models. In: P. Barahona, M. Stefanelli, J. Wyatt (eds.), *Proc. AIME 95 - Artificial Intelligence in Medicine*, volume 934, *Lectures Notes in Artificial Intelligence*, Springer (1995), 115–126.

[BC-8] A.C. Capelo, L. Ironi, S. Tentoni. Qualitative interpretation of creep and relaxation experimental data. In: G. Rzevski, R.A. Adey, C. Tasso (eds.), *Applications of Artificial Intelligence in Engineering X*, Computational Mechanics Publications (1995), 129–136.

[BC-9] R. Bellazzi, L. Ironi, R. Guglielmann, M. Stefanelli. Learning from data through the integration of qualitative models and fuzzy systems. In: E. Keravnou, C. Garbay, R. Baud, J. Wyatt (eds.), *Proc. AIME 97 - Artificial Intelligence in Medicine*, volume 1211, *Lecture Notes in Artificial Intelligence*, Springer (1997), 501-512.

[BC-10] R. Bellazzi, R. Guglielmann, L. Ironi. Qualitative models and fuzzy systems: an integrated approach to system identification. In: A. Bonarini, F. Masulli, G. Pasi (eds.), *Soft Computing Applications - Advances in Soft Computing*, Physica-Verlag, Berlin, (2003), 83-94.

[BC-11] L. Ironi, S. Tentoni. Towards automated electrocardiac map interpretation: an intelligent contouring tool based on Spatial Aggregation. In: M.R. Berthold, H.-J. Lenz, E. Bradley, R. Kruse (eds.), *Proc. IDA 2003 - Advances in Intelligent Data Analysis V*, volume 2810, *Lecture Notes in Computer Science*, Springer (2003), 397-408.

[BC-12] L. Ironi, S. Tentoni. Electrocardiographic Imaging: towards automated interpretation of activation maps. In: S. Miksch, J. Hunter, E. Keravnou (eds.), *Lecture Notes in Artificial Intelligence*, volume 3581, Springer (2005), 323-332.

[BC-13] R. Guglielmann, L. Ironi. Generating fuzzy models from deep knowledge: robustness and interpretability issues. In: L. Godo (ed.), *Lecture Notes in Artificial Intelligence*, Springer (2005) volume 3571, 600-612.

[BC-14] L. Ironi, L. Panzeri, E. Plahte. An algorithm for qualitative simulation of gene regulatory networks with steep sigmoidal response functions. In: K. Horimoto, G. Regensburger, M. Rosenkranz, H. Yoshida (eds.), *Lecture Notes in Computer Science*, Springer (2008) volume 5147, 110-124.

Peer Reviewed International Conference Proceedings

[C-1] G. Gazzaniga, L. Ironi. Some applications of computer aided instruction to numerical analysis and programming languages, *Computer in Education I.F.I.P.*, North-Holland (1975), 627-630.

[C-2] L. Borghi, A. De Ambrosis, G. Gazzaniga, L. Ironi, P. Mascheretti, C.I. Massara. Teaching mechanics with micro-computers: a research at the University of Pavia, *Conf. on Physics Education*, Utrecht (1985), 514-519.

[C-3] L. Ironi, G. Lanzola, M. Stefanelli. The role of qualitative models in diagnostic reasoning, *AAAI Spring Symposium on Artificial Intelligence in Medicine*, Stanford (1990), 85-89.

[C-4] A.C. Capelo, L. Ironi, S. Tentoni. A tool for the study of materials combining qualitative and quantitative models, *Avignon '92, Artificial Intelligence, Expert Systems, Natural Language*, Vol. 2 (Specialized Conferences), EC2 - Édition, Colloques & Conseil, Nanterre (1992), 689-695.

[C-5] M. Stefanelli, R. Bellazzi, C. Berzuini, L. Ironi, S. Quaglini. Towards a general architecture for medical expert systems, *AAAI Spring Symposium on Artificial Intelligence in Medicine*, Stanford (1992), 105-112.

[C-6] A.C. Capelo, L. Ironi, S. Tentoni. Automated modelling of visco-elastic materials, in D. Weld (ed.), *7 th International Workshop on Qualitative Reasoning about Physical Systems*, Orcas Island (WA) (1993), 45-56.

[C-7] L. Ironi, M. Stefanelli. QCMF: a tool for generating qualitative models from compartmental structures, in: T. Nishida, T. Tomiyama, T. Kiriyama (eds.), *8 th International Workshop on Qualitative Reasoning about Physical Systems*, Nara (Japon) (1994), 144-155.

[C-8] A.C. Capelo, L. Ironi, S. Tentoni. Exploiting qualitative reasoning in the automated modelling of visco-elastic materials, *Second International Conference on Intelligent Systems Engineering*, IEE Conference Publication 395, Hamburg (1994), 83-88.

[C-9] A.C. Capelo, L. Ironi, S. Tentoni. Automated selection of an accurate model of a visco-elastic material, in: B. Bredeweg (ed.), *9 th International Workshop on Qualitative Reasoning about Physical Systems*, Amsterdam (1995), 32-43.

[C-10] A.C. Capelo, L. Ironi, S. Tentoni. The need for qualitative reasoning in automated modeling: a case study, in: Y. Iwasaki, A.Farquhar (eds.), *Qualitative Reasoning - The Tenth International Workshop*, Stanford Sierra Camp (USA), AAAI Press (1996), 32-39.

[C-11] R. Bellazzi, L. Ironi, R. Guglielmann, M. Stefanelli. Forecasting patient's behavior: a qualitative–fuzzy approach, in: P. Borne, M. Ksouri, A. El Kamel (eds.), *CESA98, IMACS–IEEE Multiconference*, 4 (1998), 410–415.

[C-12] L. Ironi, S. Tentoni. An integrated quantitative-qualitative approach to automated modeling of visco-elastic materials from experimental data, in: R. Teti (ed.), *ICME 98 - CIRP International Seminar on Intelligent Computation in Manufacturing Engineering*, Capri, CUES-Salerno & RES Communication-Naples (1998), 381-388.

[C-13] R. Bellazzi, R. Guglielmann, L. Ironi. A qualitative-fuzzy framework for nonlinear black-box system identification, in: T. Dean (ed.), *Sixteenth International Joint Conference on Artificial Intelligence (IJCAI 99)*, Morgan Kaufmann, San Francisco, 2 (1999), 1041-1046.

[C-14] L. Ironi, S. Tentoni. Assessment of physico-chemical properties of materials using a model based system, in: R. Milne (ed.), *Qualitative and Model Based Reasoning for Complex Systems and their Control, IJCAI-99 Workshop*, Stockholm (1999), 33-41.

[C-15] R. Bellazzi, R. Guglielmann, L. Ironi. Using QR to solve quantitative modeling problems: an application to intracellular thiamine kinetics, in: J.J Flores (ed.), *Fourteenth International Workshop on Qualitative Reasoning*, Morelia (2000), 9-17.

[C-16] L. Ironi, S. Tentoni. Model-based assessment of physico-chemical properties of pharmaceutical polymers, in: R. Teti (ed.), *ICME 2000 - 2nd CIRP International Seminar on Intelligent Computation in Manufacturing Engineering*, Capri, CUES-Salerno & RES Communication-Naples (2000), 321-326.

[C-17] R. Guglielmann, L. Ironi. Strategies for improving neuro-fuzzy identification of nonlinear dynamical systems, in: L. Wang, S. Halgamuge, X. Yao (eds.), *Proc. FSKD'02*, Singapore (2002), volume 1, 59-63.

[C-18] L. Ironi, S. Tentoni. On the problem of adjacency relations in the Spatial Aggregation approach, in: P. Salles, B. Bredeweg (eds.), *Seventeenth International Workshop on Qualitative Reasoning*, Brasilia (2003), 111-118.

[C-19] R. Guglielmann, L. Ironi. The need for qualitative reasoning in fuzzy modeling: robustness and interpretability issues, in: J. de Kleer, K. Forbus (eds.), *18 th International Workshop on Qualitative Reasoning*, Evanston, (2004), 113-120.

[C-20] C.J. Price, L. Travé-Massuyès, R. Milne, L. Ironi, B. Bredeweg, M.H. Lee, P. Struss. N. Snooke, P. Lucas, M. Cavazza. Qualitative Futures, in: B. Rinner, M. Hofbaur, F. Wotawa (eds.), *19 th International Workshop on Qualitative Reasoning*, Graz (2005), 29-37.

[C-21] L. Ironi, S. Tentoni. Activation time imaging of ventricular excitation: a qualitative spatio-temporal feature detector, in: B. Rinner, M. Hofbaur, F. Wotawa (eds.), *19 th International Workshop on Qualitative Reasoning (QR2005)*, Graz (2005), 16 - 22.

[C-22] Raffaella Guglielmann, Liliana Ironi. Qualitative-fuzzy system identification of complex dynamical systems, in: Proc. 2007 IEEE Conference on Fuzzy Systems, London 23-26 July 2007, 716-721.

[C-23] L. Ironi, L. Panzeri. Qualitative simulation of nonlinear dynamical models of gene-regulatory networks, in: Elizabeth Bradley, Louise Travé-Massuyès (eds.), *22nd International Workshop on Qualitative Reasoning*, Boulder, USA, 24-26 June 2008, pp. 58-67.

[C-24] L. Ironi, S. Tentoni. An innovative approach to automatically detect and interpret salient spatiotemporal features of a numeric field: a case study in Electrocardiographic Imaging, in: T.E. Simos, G. Maroulis (Eds.), *Int. Conf. on Computational Methods in Science end Engineering* (ICCMSE 2008), American Institute of Physics Conference Proceedings 1148 (2009) 142-145.

[C-25] L. Ironi, S. Tentoni. Automated detection of electrocardiographic diagnostic features through an interplay between Spatial Aggregation and Computational Geometry, in: J. Zabkar, I. Bratko (Eds.), *Proc. 23rd International Workshop on Qualitative Reasoning*, Ljubljana, Slovenia, 22-24 June 2009, 54-61.

[C-26] R. Guglielmann, L. Ironi. A divide-and-conquer strategy for qualitative simulation of complex dynamical systems, in: J. de Kleer, K.D. Forbus (Eds.), *Proc. 24th International Workshop on Qualitative Reasoning*, Portland (Oregon), August 2010, 10-17.

[C-27] L. Ironi, S. Tentoni. An automated tool for the detection of electrocardiographic diagnostic features based on Spatial Aggregation and Computational Geometry, *Proc. of the 2nd International Workshop on Medical Image Analysis and Description for Diagnosis Systems* (in conjunction with BIOSTEC 2011), Rome, January 2011, 3-12.

[C-28] L. Ironi, D.X. Tran. Model-based design of synthetic networks, in: F. Ortuno, I. Rojas Eds., *Proc. of the 2nd International Work-Conference on Bioinformatics and Biomedical Engineering*, Granada 2014, Vol.2, 977-988.

Other papers

[O-1] G. Gazzaniga, L. Ironi. Esercitazioni di algebra lineare e di analisi numerica programmate mediante elaboratore elettronico, Pubbl. 85, *I.A.N.-C.N.R.* (1974), 1-92.

[O-2] G. Gazzaniga, L. Ironi, M. Italiani. Un sistema di software per l'istruzione assistita da calcolatore, *Atti Congresso A.I.C.A.*, Genova (1975), 333-338.

[O-3] G. Graziano, L. Ironi. Su un modello matematico della meccanica respiratoria, *Atti Convegno L'Uso dei Modelli nella Diagnostica Medica*, Pavia (1976), 815-819.

[O-4] G. Gazzaniga, L. Ironi. Il sistema LANCAI per l'istruzione assistita da calcolatore, Pubbl. 135, *I.A.N.-C.N.R.* (1976), 1-95.

[O-5] L. Ironi, M. Italiani, L. Sartori. SIGDS: Un sistema interattivo per la gestione di dati sperimentali, Pubbl. 210, *I.A.N.-C.N.R.* (1979), 1-34.

[O-6] G. Gazzaniga, L. Ironi. LANFIT: Un package grafico interattivo per l'approssimazione di dati sperimentali, *Atti II Incontro Naz. Applicazione degli Elaboratori nella Didattica*, Sorrento (1980), 1-11.

[O-7] G. Gazzaniga, L. Ironi. Una revisione del corso LANFORT: un corso CAI di introduzione al FORTRAN, Pubbl. 232, *I.A.N.-C.N.R.* (1980), 1-41.

[O-8] A.M. Dovier, P. Forcheri, G. Gazzaniga, L. Ironi, M.T. Molfino, G. Olimpo, O. Pedemonte, E. Provera, E. Sassi, G. Verrone. AED nell'insegnamento delle materie tecnico-scientifiche: una proposta di orientamento alla scelta dei prodotti presenti sul mercato, *Atti Congresso AICA*, Pavia (1981), 3, 1223-1239.

[O-9] L. Borghi, A. De Ambrosis, G. Gazzaniga, L. Ironi, P. Mascheretti, C.I. Massara. Uso del calcolatore nello studio di fenomeni d'urto, *Atti Congresso AICA*, Padova (1982), 91-97.

[O-10] G. Gazzaniga, L. Ironi. Uso dell'elaboratore per la costruzione di dialoghi tutoriali, Lezioni tenute al *Seminario Residenziale Estivo su Applicazione degli Elaboratori nella Didattica*, Lecce, Pubbl. 389, *I.A.N.-C.N.R.* (1982), 1-70.

[O-11] L. Borghi, A. De Ambrosis, G. Gazzaniga, L. Ironi, P. Mascheretti, C.I. Massara. Esperienze sull'uso dell'elaboratore nell'insegnamento di alcuni argomenti di meccanica presso l'Università di Pavia, *Atti Conv. su L'Università e l'Evoluzione delle Tecnologie Informatiche*, C.I.L.E.A., Milano (1983), 16.1-16.5.

[O-12] L. Borghi, A. De Ambrosis, G. Gazzaniga, L. Ironi, P. Mascheretti, C.I. Massara. L'uso dell'elaboratore nella didattica della Fisica: risultati di una collaborazione tra ricercatori nel campo delle AED e della didattica della fisica, *Atti Giornata di lavoro su: Il ruolo dell'elaboratore nella didattica della fisica*, Pavia (1983), 11-22.

[O-13] G. Gazzaniga, L. Ironi. L'uso dell'elaboratore nella didattica della Matematica e della Fisica: l'esperienza condotta presso l'Istituto di Analisi Numerica del C.N.R., *Proc. Atti Convegno Internazionale "Informatica e Nuove Tecnologie per l'Educazione e la Formazione"*, Bologna (1985), 281-286.

[O-14] L. Borghi, A. De Ambrosis, G. Gazzaniga, L. Ironi, P. Mascheretti, C.I. Massara. Il computer e lo studio del moto in sistemi di riferimento diversi, *Atti DIDAMATICA '88 - Informatica per la didattica*, Milano (1988), 379-382.

[O-15] L. Ironi. Qualitative models and Applications to Medical Diagnosis, *Proc. of the 9th France-URSS-Italy Joint Symposium in Computational Mathematics and Applications*, INRIA-Sophia Antipolis (1991), 139-157 (relazione invitata).

[O-16] L. Ironi. Qualitative models in medical reasoning, *Proc. of the International Conference on Medical Physics & Biomedical Engineering*, Nicosia, Cipro (1994), vol.2, 408-411, (intervento invitato alla Tavola Rotonda "Artificial Intelligence in Medicine").

Technical Reports

[T-1] G. Gazzaniga, L. Ironi, L. Borghi, A. De Ambrosis, P. Mascheretti, C.I. Massara. Unità Didattica: Studio di urti, *Olivetti* (1985), 1-24.

[T-2] L. Ironi, S. Tentoni, M. Stefanelli. System models formulation and generation 1.0, *EC/AIM - GAMES II* (1992), 1-24.

[T-3] L. Ironi, M. Stefanelli, A. Cattaneo. System models formulation and generation 2.0, *EC/AIM - GAMES II* (1993), 1-21.

[T-4] L. Ironi, A. Cattaneo, M. Stefanelli. System models outcome analysis 1.0, *EC/AIM - GAMES II* (1993), 1-19.

[T-5] L. Ironi, M. Stefanelli. System models outcome analysis 2.0, *EC/AIM - GAMES II* (1994), 1-20.

[T-6] L. Ironi, M. Stefanelli. System models - User's guide, *EC/AIM - GAMES II* (1995), 1-48.

[T-7] L. Ironi, M. Stefanelli. QCMF: a framework for building and simulating qualitative models of pathophysiological systems - Final Report, *EC/AIM - GAMES II* (1995), 1-34.

[T-8] G. Coghill, P. Lucas, L. Ironi, R. Quiniou, I. Russell. A report on synergies with model-based technology and other AI approaches in biomedicine, *EC/IST-33540 MONET 2* (2004), 1-28.

[T-9] G. Coghill, J. Fox, L. Ironi, P. Lucas, I. Russell. Biomedical technological roadmap, *EC/IST-33540 MONET2* (2004), 1-26.

[T-10] G. Coghill, R. Guglielmann, L. Ironi, H. de Jong, R. Kuipers, P. Lucas, M.-O. Cordier, S. Tentoni, R. Quiniou. Biomedical domain status document, *EC/IST-33540 MONET2* (2005), 1-37.

[T-11] A. Vercesi, S.L. Toffolatti, P. Fremiot, M. Prandato, N. Parisi, L. Ironi, R. Guglielmann: Monitoraggio e simulazione dell'andamento epidemico di Plasmopara Viticola in Lomardia, *Quaderno della Ricerca* n. 103, Luglio 2009, Regione Lombardia, 1-40.

PROJECT RESPONSABILITY

Qualitative simulation and applications
Research project IAN-CNR e IMATI-CNR
1988-2000 (IAN-CNR); 2000-2003 (IMATI-CNR).

Qualitative modeling of physiological systems
EC/AIM (Advanced Informatics in Medicine) Framework Programme
Project: GAMES (General Architecture for Medical Expert Systems); 1989-1990.

Qualitative Physics: simulation algorithms and application
EC/COMETT II Framework Programme
Project: MATARI (Mathematical Toolkit for Artificial Intelligence and Regulation of Macro-Systems); 1991-1993.

Knowledge representation formalisms and methods: System models
EC/AIM (Advanced Informatics in Medicine) Framework Programme
Project: GAMES II (General Architecture for Medical Expert Systems); 1992-1994.

Metodologie innovative per la formulazione automatica della legge costitutiva di un materiale visco-elastico
CNR - National Project: Applicazioni della Matematica per la Tecnologia e la Società - Matematica nelle Scienze Applicate; 1995-1996.

Modelli Qualitativi e Quantitativi di Sistemi Dinamici
CNR - Special Project: CASIS: Cooperazione tra Agenti in un Sistema Informativo Sanitario; 1996-1998.

MO*del-based and qualitative reasoning system* NET*work*
EC/ESPRIT The Framework IV Network of Excellence
Project: MONET; 1997-2000.

Metodi avanzati per la modellizzazione di sistemi a scala multipla e/o a conoscenza incompleta
CNR - Modeling and Simulation of Complex Systems: Research Unit ICT.P11.010; 2006- –.

Monitoraggio e simulazione delle epidemie di Plasmopara Viticola in Lombardia
Research Project REGIONE LOMBARDIA; 2006-2009.

Modelli matematici di reti di regolazione biologica
CNR - Bioinformatics Project: Research Unit INT.P02.002.003; 2007- – .

Modellizzazione di sistemi dinamici in presenza di conoscenza incompleta
CNR- Curiosity Driven Project: Research Unit DG.RSTL.050.010; 2007.

Comportamento epidemico di Plasmopara Viticola e gestione delle strategie di intervento
Research Project REGIONE LOMBARDIA; 2009-2011.

Modelli matematici, simulazione e algoritmi efficienti per le scienze interomiche, trattamento di dati multidimensionali ed elaborazione parallela per applicazioni in Systems e/o Synthetic Biology, Drug Design e Diagnostica Medica
MIUR-CNR - Flagship Project InterOmics (PB.P05), 2012-2014.

PARTICIPATION TO RESEARCH PROJECTS

Studio di un modello della meccanica respiratoria
Honeywell-Università di Pavia - HUSPI Project
1976-1977.

Realizzazione di un sistema interattivo per la gestione di dati sperimentali
Honeywell-Università di Pavia - HUSPI Project
1978-1979.

Introduzione delle scienze e tecnologie dell'informazione nella formazione generale e di base
CEDE-M.P.I - Nazional Project I.R.I.S. (Iniziative e Ricerche per l'Informatica nella Scuola)
1983-1986.

Software didattico per la matematica
CNR - Strategic Project: *Tecnologie ed Innovazioni Didattiche*
1985-1986.

Applicazioni dell'Intelligenza Artificiale nella Didattica
CNR - Strategic Project: *Software: ricerche di base ed applicazioni*
1986-1987.

Software didattico per la matematica
CNR - Strategic Project: *Matematica computazionale - Formazione nella matematica computazionale*
1987-1988.

Sviluppo di sistemi esperti a carattere particolarmente innovativo per specifiche aree
CNR - National Project: *Sistemi Informatici e Calcolo Parallelo - Sistemi di supporto al lavoro intellettuale*
1988-1990.

Analisi quantitativa e qualitativa di segnali
CNR - Progetto Strategico: *Applicazioni della Matematica per la Tecnologia e la Società - Analisi di dati segnali e forme*
1994.

Simulazione quantitativa e qualitativa di modelli matematici per sistemi fisiologici
CNR - Strategic Project: *Applicazioni della Matematica per la Tecnologia e la Società - Metodi matematici per la Chimica, la Medicina, la Biologia*
1994.

Metodologie innovative per la modellizzazione di problemi applicativi governati da equazioni differenziali
CNR - Strategic Project: *Modelli e Metodi per la Matematica e l'Ingegneria*
1996.

Simulazione quantitativa e/o qualitativa di modelli matematici di processi metabolici ed elettrofisiologici
CNR - Strategic Project: *Metodi e modelli matematici nello studio dei fenomeni biologici - Elettrofisiologia e processi metabolici e biochimici*
1998-2000.

- Model-based systems and qualitative reasoning
EC/IST Framework Programme, Network of Excellence
Project: MONET2
2001-2004.

PARTICIPATION to COMMITTEES and WORKING GROUPS

Member of Working Groups

1983	Committee UMI/AICA for editing the report: *Calcolatori per la Scuola - Indicazioni per la scelta e l'uso dei calcolatori nella didattica della Matematica* - Supplemento al Notiziario UMI, novembre 1983.
1997-2000	Research Coordination Committee, Programma EC/ESPRIT, The Framework IV Network of Excellence, project MONET.
2001-2004	Working group *Biomedical task group*, Programma EC/IST, Network of Excellence MONET2 (Technical Reports [T-8], [T-9], [T-10]).

Member of Committees for Scholarships and Awards

1. Scholarships at IAN-CNR, Pavia (Bando n. 201.19.1 del 30-11-94 - Cod. n. 12.01.03, B.U. del CNR n. 8 del 5/12/94).
2. *1999 Artificial Intelligence Awards*, Associazione Italiana per l'Intelligenza Artificiale.
3. *2001 Artificial Intelligence Dissertation Award*, ECCAI (European Coordinating Committee for Artificial Intelligence).

Member of Evaluation or Review Panels

1. Reviewer for the Project funding 2008-2012 *WWTF Vienna Science and Technology Fund.*
2. Ex-Post Reviewer for the project *WWTF Vienna Science and Technology Fund* MA06-016 "Fuzzy Logic: from Mathematics to Medical applications", 2013.
3. Evaluator for FP7-People 2007 OIF-EIF-IIF, panel MAT/ENG.
4. Evaluator for FP7-People 2008 OIF-EIF-IIF, panel MAT/ENG.
5. Evaluator for FP7-People 2009 OIF-EIF-IIF - panel MAT/ENG.

6. Peer reviewer and rapporteur for PRIN-MIUR 2016.

Member of Committees for hiring/evaluating researchers within CNR

1. CNR Application 364.88 "Scienze informatiche e ingegneria dell'informazione" for senior researchers (9 positions out of 90 applicants), 2010-2011.
2. CNR Application 364.142 Profile: Researcher, Scientific Area "Medical Sciences", Cod. MI100/1 (1 position out of 16 applicants), 2013.

Member of Master and PhD Committees

1. PhD in Computer Science. Thesis defense by Marc Lafon, Université Toulouse III, Paul Sabatier, U.F.R. Mathématiques, Informatique et Gestion, 3 maggio 2000. Thesis title: Modélisation de la propagation de l'information cérébrale par graphes causaux qualitatifs.
2. PhD in Computer Science. Thesis defense by Ivalya Vatcheva, University of Twente, 31 agosto 2001. Thesis title: Computer-supported experiment selection for model discrimination.
3. Master in Mathematics. Thesis defense by Eric Faxall, University of Victoria, 28 July 2011. Thesis title: A contraction argument for two-dimensional spiking models.
4. PhD in Bioingeneering and Bioinformatics - Università degli Studi di Pavia, PhD Programme Committee since 2012.

Editorial Activities

1. Editor "Eleventh International Workshop on Qualitative Reasoning" (1997).
2. Invited Editor for a Special Issue of " Artificial Intelligence in Medicine" on "Qualitative Reasoning in Medicine", Elsevier Science B.V. (1999).
3. Member of the Editorial Board of The Open Artificial Intelligence Journal (since 2009).
4. Referee per:
   - Artificial Intelligence;
   - Artificial Intelligence in Medicine;
   - Computer Methods and Programs in Biomedicine;
   - Fuzzy Sets and Systems Journal;
   - IEEE Transactions on Neural Networks;
   - IEEE Tran. Systems, Man, and Cybernetics;
   - IEEE/ACM Transactions on Computational Biology and Bioinformatics;
   - Computers in Biology and Medicine;
   - Neural Networks;
   - The Knowledge Engineering Review;
   - AIcom
   - 18-volume Encyclopedia of Physical Science and Technology, Academic Press
   - The Open Artificial Intelligence Journal;
   - Central European Journal of Biology;
   - International Journal of Uncertainty, Fuzziness and Knowledge-based Systems;

- Environmental Modelling & Software;
- Chaos;
- The Journal of Computers;
- Physica D - Nonlinear Phenomena;
- BMC Systems Biology;
- Journal of Mathematical Biology;
- IJCAI-97 (Int. Joint Conference on Artificial Intelligence);
- IJCAI-01
- IJCAI-03
- IJCAI-05
- ECAI-06
- ECAI-08.

INVITED TALKS

A - Conferences, Symposia, and Workshops

1. INRIA - Sophia Antipolis, 9^{th} France-URSS-Italy Joint Symposium in Computational Mathematics and Applications, 27 September 1991. Title: *Qualitative Models and Applications to Medical Diagnosis.*
2. Academy of Sciences of Russia, Institute of Numerical Mathematics, Mosca, 10^{th} French-Italian-Russian Joint Symposium on Numerical Mathematics and Applications, 6 July 1993. Title: *Automated modelling of visco-elastic-materials.*
3. 1^{st} International Conference on Medical Physics and Biomedical Engineering, 7 May 1994, Cipro (panelist at the Round Table *Artificial Intelligence in Medicine*).
4. XI International Conference on Computing in Clinical Laboratories, Sitges (Spain), 3 November 1995. Title: *Qualitative dynamic models in medical reasoning.*
5. Inverse Problems Workshop Series I, UCLA - IPAM, Los Angeles, 23 October 2003. Title: *A hybrid approach to nonlinear metabolic system identification: a case study.*
6. CAIMS*SCMAI 2007, Banff (Alberta-Canada), May 23 2007. Title: *Dynamics of gene-regulatory networks: towards a computational framework for qualitative simulation.*
7. Joint Conference IGM-CNR/DGM-Università di Pavia, 19 February 2009. Title: *Modellizzazione e simulazione di fenomeni biologici a conoscenza incompleta.*
8. SIAM Conference on Dynamical Systems - Minisymposium "Flows structured by multiple fixed points: from Glass networks to heteroclinic channels" Snowbird (Utah), 23 May 2011. Title: *Nonlinear dynamics of Gene Regulatory Networks: an automated analyser.*
9. Mathematical Biology Workshop (ICIAM Satellite Workshop) and IGTC Summit, 14-16 July 2011, Victoria (Canada). Title: *Qualitative simulation of nonlinear dynamics of gene regulatory networks.*
10. Annual meeting and conference of The Society of Mathematical Biology - Minisymposium "Modeling gene regulatory networks", 28 July 2012, Knoxville (Tenessee). Title: *Qualitative simulation of the nonlinear dynamics of gene regulatory networks.*
11. 8^{th} SICC International Tutorial Workshop "Topics in Nonlinear Dynamics" - Bifurcations in piecewise-smooth systems: perspectives, methodologies and open problems, Urbino, 13 September 2013. Title: *Nonlinear dynamics of Gene Regulatory Networks: qualitative analysis and simulation.*

12. 8^{th} Workshop SDS 2014 "Structural Dynamical Systems: Computational Aspects" - Monopoli, June 2014. Title:*Nonlinear multi-scale dynamics of gene regulatory networks*

B - Schools

1. 7a Scuola di Bioingegneria del CNR, Bressanone, 4 October 1988. Title: *Modelli qualitativi.*
2. Course Ec/Comett II - Matari, Pavia, 28 September 1992. Title: *Qualitative Simulation.*
3. Monet Summer School - Ec/Esprit, Bertinoro, 18 May 2000. Title: *Qualitative Reasoning and Medical Applications.*
4. Monet Summer School - Ec/Esprit, Bertinoro, 19 May 2000. Title: *Qualitative Reasoning and Mathematical Modelling.*

C - Seminars at Universities or Research Institutes

1. Università di Napoli, Centro di Calcoli Interfacoltà, 25 May 1978. Title: *Il sistema di software per la didattica* Lancai.
2. Mathesis, Padova, 6 November 1981. Title: *Strategie d'uso degli elaboratori nella didattica.*
3. Università di Cagliari, Istituto di Fisica, 23 March 1983. Title: *Applicazioni degli elaboratori nella didattica: l'attività svolta presso l'IAN.*
4. Mathesis, Pavia, 27 April 1983. Title: *Il software didattico: la situazione italiana.*
5. Provveditorato agli Studi, Trento, 18 May 1984. Title: *Problemi legati allo sviluppo di software didattico.*
6. Università di Pavia, Dipartimento di Fisica, 16 October 1985. Title: *Introduzione dell'informatica nella didattica della matematica e della fisica: unità didattiche del progetto IRIS.*
7. University of Exeter, Department of Computer Science, 30 April 1986. Title: *Computer Uses in Education: the research project at IAN-CNR.*
8. Universitè de Paris Dauphine, CEREMADE, 7 December 1989. Title: *Algorithms for qualitative simulation.*
9. Università di Udine, Dipartimento di Matematica e Informatica, 27 May 1993. Title: *La simulazione qualitativa in ambiente diagnostico: metodi e algoritmi.*
10. University of Texas at Austin, Department of Computer Science, 8 November 1994. Title: *Automated model formulation and simulation: two case studies.*
11. University of Stanford, Department of Computer Science, Knowledge Systems Laboratory, 16 November 1994. Title: *Automated formulation of mathematical modelsof visco-elastic materials.*
12. Università di Torino, Dipartimento di Informatica, 22 January 2002. Title: *Metodi quantitativi e qualitativi per l'identificazione di sistemi fisici.*
13. Universitad de Sevilla, Departamento de Lenguajes y Sistemas Informaticos, 14 April 1999. Title: *Exploiting qualitative reasoning in dynamical system identification.*
14. CNRS - LAAS, 2 May 2005. Title: *Generating fuzzy models from qualitative models: robustness and interpretability issues.*

ORGANIZATION of SCIENTIFIC EVENTS
(**c**= programme committee; **r**= responsible; **o**= organizing committee)

1. Giornata di lavoro AICA/AED su "Problemi della trasportabilità del software didattico", 8 aprile 1980, Torino. (**c**)

2. II Incontro Nazionale sulle Applicazioni degli Elaboratori nella Didattica, 10-12 settembre 1980, Sorrento. (**c**)

3. III Incontro Nazionale sulle Applicazioni degli Elaboratori nella Didattica, 26 settembre 1981, Pavia. (**c**)

4. Giornata di lavoro AICA/AED su "Uso degli elaboratori nell'insegnamento dell'informatica nella Scuola Media Superiore", 26 novembre 1981, Bari. (**c**)

5. Seminario Residenziale Estivo su "Applicazione degli elaboratori nella didattica", 30 agosto-18 settembre 1982, Lecce. (**c**)

6. Giornata di lavoro AICA/AED su "Contenuti formativi dell'informatica di base", 9 ottobre 1982, Padova. (**c**)

7. Giornata di lavoro AICA/AED su "Il ruolo dell'elaboratore nella didattica della Fisica", 26 maggio 1983, Pavia. (**c**)

8. Giornata di lavoro AICA/AED su "AED nell'insegnamento della Matematica", 3 dicembre 1983, Genova. (**c**)

9. Corso CEE/COMETT II - MATARI su: "Qualitative Physics: Simulation algorithms and Applications", Pavia, 28 settembre - 1 ottobre 1992. (**r**)

10. 1^{st} International Conference on Medical Physics and Biomedical Engineering, 5-7 maggio 1994, Cipro. (**c**)

11. 2^{nd} International Conference on Intelligent Systems Engineering, 5-9 settembre 1994, Amburgo. (**c**)

12. AIME 95 - 5^{th} Conference on Artificial Intelligence in Medicine Europe, 25-28 giugno 1995, Pavia. (**o**)

13. 1^{st} International Workshop on Model-based Systems and Qualitative Reasoning - Perspectives for Industrial Application, ECAI 96, 12-13 agosto 1996, Budapest. (**c**)

14. Tenth International Workshop on Qualitative Reasoning, 21-24 maggio 1996, Stanford Sierra Camp (California). (**c**)

15. Eleventh International Workshop on Qualitative Reasoning, 3-6 giugno 1997, Il Palazzone, Cortona (Italy). (**r**)

16. Twelfth International Workshop on Qualitative Reasoning, 26-29 maggio 1998, SeaCrest Resort, Cape Cod (Massachussets). (**c**)

17. 2^{nd} International Workshop on Model-based Systems and Qualitative Reasoning - Perspectives for Industrial Application, ECAI 98, 24 agosto 1998, Brighton. (**o**)

18. 16^{th} International Joint Conference on Artificial Intelligence (IJCAI 99), 31 luglio-6 agosto 1999, Stoccolma. (**c**)

19. Workshop on Qualitative and Model Based Reasoning for Complex Systems and Their Control, IJCAI 99, 1 agosto 1999, Stoccolma. (**c**)

20. Sixth Congress of the Italian Association for Artificial Intelligence, 14-17 settembre 1999, Bologna. (**c**)

21. MONET Summer School - EC-Esprit su: "Model-based Systems and Qualitative Reasoning", 15-19 maggio 2000, Bertinoro. (**o**)

22. Fourteenth International Workshop on Qualitative Reasoning, 5-7 giugno 2000, Morelia (Messico). (**c**)

23. Fifteenth International Workshop on Qualitative Reasoning, 17-19 maggio 2001, San Antonio (USA). (**c**)

24. Sixteenth International Workshop on Qualitative Reasoning, 10-12 giugno 2002, Sitges (Spagna). (**c**)

25. Minisymposium "Innovative approaches to mathematical modeling of biomedical systems", 5^{th} ECMTB Conference, 2-6 luglio 2002, Milano. (**r**)

26. Seventeenth International Workshop on Qualitative Reasoning, 20-22 Agosto 2003, Brasilia (Brasile). (**c**)

27. AIME03 Workshop "Qualitative and Model-Based Reasoning in Biomedicine", 19 ottobre 2003, Protaras (Cipro). (**c**)

28. 18^{th} International Workshop on Qualitative Reasoning, 2-4 agosto 2004, Evanston (USA). (**c**)

29. 19^{th} International Workshop on Qualitative Reasoning, 18-20 maggio 2005, Graz (Austria). (**c**)

30. BIOSYS 2005, 9-10 giugno 2005, Milano. (**c**)

31. 20^{th} International Workshop on Qualitative Reasoning, 10-12 July 2006, Hanover (USA). (**c**)

32. Special Session "Fuzzy Qualitative Reasoning" FUZZ-IEEE 2007 London. (**r**)

33. 22^{nd} International Workshop on Qualitative Reasoning, 24-26 June 2008, Boulder (Colorado). (**c**)

34. NETTAB 2008, Workshop on Bioinformatic Methods for Biological Complex System Applications, 19-21 maggio, Varenna. (**c**)

35 . Minisymposium "Dynamics of gene-regulatory networks: computational issues", ECMTB 08 Conference, 29 June - 4 July 2008, Edinburgh. (**r**)

36. 23^{rd} International Workshop on Qualitative Reasoning, 22-24 June 2009, Ljubljana. (**c**)

37. International Conference on Soft Computing and Pattern Recognition (SocPaR2009), 4-7 December 2009, Malacca (Malaysia). (**c**)

38. INC-2009, Workshop on Innovations in Natural Computing, 12-13 December 2009, Cochin (India). (**c**)

39. NaBIC 09- World Congress on Nature and Biologically Inspired Computing, 9-11 December 2009, Coimbatore (India). (**c**)

40. 24^{th} International Workshop on Qualitative Reasoning, 8-10 August 2010, Portland (Oregon). (**c**)

41. International Conference on Soft Computing and Pattern Recognition (SocPaR2009), 7-10 December 2010, Cergy Pontoise (France). (**c**)

42. NaBIC 2010- World Congress on Nature and Biologically Inspired Computing, 15-17 December 2010, Kitakyushu (Japan). (**c**)

43. 11^{th} International Conference on Hybrid Intelligent Systems (HIS'11), 5-8 December 2011, Malacca (Malaysia). (**c**)

44. 25^{th} International Workshop on Qualitative Reasoning, 16-18 July 2011, Barcelona. (**c**)

45. 26^{th} International Workshop on Qualitative Reasoning, 14-16 July 2012, Institute for Creative Technologies, Marina del Rey (California). (**c**)

46. 12^{th} International Conference on Hybrid Intelligent Systems (HIS'12), 4-7 December 2012, Pune (India). (**c**)

47. International Conference on Soft Computing and Pattern Recognition (SocPaR2012), 10-13 December 2012, Universiti Brunei Darussalam, Brunei. (**c**)

48. 12^{th} International Conference on Intelligent Systems Design and Applications (ISDA 2012), 27-29 November, Kochi (India). (**c**)

49. 27^{th} International Workshop on Qualitative Reasoning, August 27-30, 2013, Bremen. (**c**)

50. 13^{th} International Conference on Hybrid Intelligent Systems (HIS'13), 4-6 December 2013, Yassmine Hamammet (Tunisia). (**c**)

51. International Conference on Soft Computing and Pattern Recognition (SocPaR2013), 15-18 December 2013, Hanoi (Vietnam). (**c**)

52. 13^{th} International Conference on Intelligent Systems Design and Applications (ISDA 2013), 8-10 December 2013, Universiti Putra Malaysia (Malaysia). (**c**)

53. 3rd International Conference on Intelligent Machines May 1-4, 2014 Hammamet, Tunisia. (**c**)

54. ECC-2014 First Euro-China Conference on Intelligent Data Analysis and Applications, June 13-15, 2014, Shenzhen, China. (**c**)

55. 28^{th} International Workshop on Qualitative Reasoning, August 10-12, 2015, Minneapolis, (USA). (**c**)

56. 15^{th} International Conference on Intelligent Systems Design and Applications (ISDA 2015), 8-10 December 14-16, 2015, Marrakesh (Marocco). (**c**)

57. 6^{th} International Conference on Innovation in Bio-Inspired Computing and Applications (IBICA 2015), 16-18 December 2015, Kochi (India). (**c**)

58. 7^{th} International Conference on Innovation in Bio-Inspired Computing and Applications (IBICA 2016), 17-20 November 2016, Paris (France). (**c**)

59. International Conference on Soft Computing and Pattern Recognition (SocPaR2016), 19-21 December 2016, Vellore (India). (**c**)

60. 29^{th} International Workshop on Qualitative Reasoning, 11 July, 2016, New York, (USA). (**c**)

61 30^{th} International Workshop on Qualitative Reasoning, 20 August, Melbourne,2017, Australia. (**c**)

62 31^{th} International Workshop on Qualitative Reasoning, 15 July, Stockholm, 2018, (**c**)

63 32^{th} International Workshop on Qualitative Reasoning, 11 August, Macao, China, 2019, (**c**)

64 33^{th} International Workshop on Qualitative Reasoning, 8 June, Santiago de Compostela, 2020, (**c**)

65 34^{th} International Workshop on Qualitative Reasoning, 19 August, Montreal, Canada, 2021, (**c**)

TEACHING

Undergraduate and M.SC. level

Teaching Assistant 1974,1975
Facoltà di Scienze MM. FF. NN. dell'Università di Pavia, Pavia. Course Title: Teoria ed Applicazione delle Macchine Calcolatrici.

Lecturer 1987,1988,1989
Università Cattolica del Sacro Cuore - Facoltà di Agraria, Piacenza. Course Title: Matematica.

Advisor/Co-advisor
Several Laurea Thesis in Mathematics and Engineering.

Co-advisor
Laurea Thesis in Philosophy (1995); Laurea Thesis in Pharmaceutical Chemistry (1998).

Follow-up training courses

Lecturer September 1982
Università di Lecce - Summer School, Lecce. Course Title: Applicazione degli elaboratori nella didattica.

Lecturer May 1984
IRRSAE Lombardia - Training programme for Secondary School teachers, Pavia. Course Title: Strategie d'uso dell'elaboratore nella didattica.

Lecturer May 1995
Università di Pavia - Training programme Secondary School teachers in Mathematics Teaching, Pavia. Course Title: Rappresentazione della conoscenza mediante modelli qualitativi.

PhD level

Lecturer June 1987
Università di Pavia, Dipartimento di Informatica e Sistemistica - Dottorato di Ricerca in Bioingegneria, Course Title: Rappresentazione della conoscenza con modelli qualitativi.

Student Advising

PhD students November 2000

Raffaella Guglielmann,*PhD in Matematica Computazionale e Ricerca Operativa - XII Ciclo, Università degli Studi di Milano.* Thesis Title: A new methodology for nonlinear dynamical system identification.

January 2011

Luigi Panzeri, *PhD in Matematica e Statistica - XXII Ciclo, Università degli Studi di Pavia.* Thesis Title: Qualitative analysis and simulation of nonlinear dynamical models of gene regulatory networks.

Post-doc fellows October 2012-October 2014

Diana X Tran, Research on *Modeling and simulation of the nonlinear dynamics of gene regulatory networks*.

BREVETTI DI MARCHIO E DIRITTI D'AUTORE

Deposito di Brevetti di Marchio caratterizzanti software(O= contratto CNR-Olivetti S.p.A.; S= contratto CNR-SEI)

1. CENTURTO
   4/4/84 N.18899 C/84 (O)
2. OBLURTO
   4/4/84 N.18900 C/84 (O)
3. INURTO
   4/4/84 N.18901 C/84 (O)
4. VICOR
   4/4/84 N.18902 C/84 (O)
5. PROPERBA
   4/4/84 N.18903 C/84 (O)
6. WAVES
   17/4/87 N.19263 C/87 (S)
7. MODREG
   24/4/87 N.18566 C/87 (S)

Deposito di Diritti d'Autore

1. Le oscillazioni e la loro propagazione - Guida Docente e Guida Studente (2 volumi).
   N. 294526 22/12/1987 Prot. 6026.
2. Modelli di Regressione Lineare - Guida Studente.
   N. 291921 11/8/1987 Prot. 3421.
3. Modelli di Regressione Lineare - Guida Docente.
   N. 291922 11/8/1987 Prot. 3422.

ATTIVITÀ DI CONSULENZA

1. Rapporto di consulenza con la Società Ing. C. Olivetti & C. S.p.A. dal 1-7-1984 al 30-6-1985 su ricerche inerenti lo sviluppo di software didattico.

2. Rapporto di consulenza con la Società DATAMAT - Ingegneria dei Sistemi S.p.A. dal 1-10-99 al 31-12-99 per il trasferimento di know-how su: metodi di analisi qualitativa, sistemi fuzzy, reti neurali.

ATTIVITÀ DI SERVIZIO

1. Membro del Consiglio Scientifico dell'IAN-CNR dal 1-7-1988 al 17-3-1996;

2. Responsabile dei contatti dell'IMATI con la Regione Lombardia nell'ambito di erogazione di servizi per la Misura Intec Voucher dal 2005.