

# SABRINA GAITO

*Assistant Professor*

*Curriculum Vitae*



## CURRENT POSITION

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Assistant Professor at the Department of Computer Science, University of Milan since December 31, 2002.

## RESEARCH INTERESTS

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Statistical and analytical modeling and computer simulation of complex systems:

- Complex networks: ad hoc networks and social networks.
- Human mobility models
- Biological systems
- Condensed matter: carbon-based materials

Machine Learning: theory and applications.

Data management and statistical analysis in clinical trials.

## EDUCATION

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- **Classical Education Certificate** at the Tommaseo Institute in the 1986/87 school year.
- **Degree in Physics** from University of Milan on July 8, 1996 (110/110 cum laude). Title of thesis: "Theoretical study of structural and electronic properties of small carbon schwarzites" with Prof. Giorgio Benedek.
- **Specialization in Science and Technology of Materials** at University of Milan on November 13, 1998 (70/70 cum laude). Thesis on: "Quantum Simulation of new materials based on carbon" with Prof. Giorgio Benedek.
- **Training and Research on Advanced Computing Systems Visit** at EPCC (Edinburgh Parallel Computing Centre) from 01.17.1999 to 03.07.1999.
- **Course of Technology Management** in the 1998/1999 academic year.
- **Scholarship S.A.M.I.** winner in the 1998/1999 academic year for the National Institute of Advanced Mathematics "Francesco Severi".
- **Scholarship ENEA** biennial winner: "Achievements of computer codes for scientific applications to be implemented on massively parallel computers" in 1999.
- **PhD** in Applied Mathematics and Operations Research at the University of Milan, January 31 2003. Dissertation title: "Learning to win a game" with prof. Bruno Apolloni.

- **Collaboration to Research** "Models of team games based on learning activities strategies by contenders" at the Department of Computer Science, University of Milan from 01/11/2002 to 29/12/2002.

## EDUCATIONAL ACTIVITIES

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- Lecturer of Computer networks at the Digital Communications bachelor in '11/12 academic year.
- Lecturer of the Programming Laboratory at the Digital Communications bachelor in '09/10 academic year.
- Lecturer of Statistic and Informatics at the Specialization School in General Surgery in '06/'07 – '07/'08 – '08/'09 - '09/10 academic years.
- Lecturer of the Informatics Laboratory at the Chemistry bachelor in '04/'05 - '05/'06 - '06/'07 – '07/'08 – '08/'09 academic years.
- Lecturer of the Informatics Laboratory at the Industrial Chemistry bachelor in '03/'04 – '08/'09 academic years.
- Assistant of the Probability and Mathematical Statistics Course at the Computer Science bachelor in '02/'03 - '03/'04 - '05/'06 - '06/'07 - '07/'08 – '08/'09 academic years.
- Lecturer of the Informatics Laboratory at the Professional Education bachelor in '03/'04 – '04/'05 – '05/'06 academic years.
- Lecturer of the Informatics Laboratory at the Professional Education bachelor in Dietetics and TLB in 06/'07 – '09/'10 academic years.
- Lecturer of the FSE course "Intelligent Systems for symbolic computations" in '03/'04 – '04/'05 academic years.
- Assistant at the Mathematics Laboratory for the Mathematical Analysis I course at the Material Science Department in 1998/1999 academic year.
- Exercises of the Geometry Course at the Science of Primary Education Department in 1999/2000 academic year.
- Assistant of the Superior Analysis Course at the Mathematical Department "F. Enriques" in 2000/2001 academic year.
- Exercises of the Mathematical II Course at the Architecture Department in '02/'03 academic year.

## FUNDED RESEARCH PROJECTS

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- CISCO: Understanding and using the human network to improve the Internet experience (2010-2011).
- Lombardia Region: Added value of the activation of glucose metabolism in the prognosis of lymphoma diffuse large B cell type (DLBCL): comparison with molecular variables (2010-2011).
- STMicroelectronics: Advanced statistical methods for analysis of tolerance in the design of integrated circuits (2008-2010).
- Project of national interest (ITA): Stochastic Processes in Space-Time Structure and their Applications (2003-2004).
- ORESTEIA: mOdular hybRid artEfactS wiTh adaptivE functIonAlity, UE funded in the FET-IST framework (2001-2003).
- Young researchers project (ITA): Evolutionary strategies for problems of optimization and inverse problems with high complexity (2001).
- Inferentia-DNM: Statistical methods and neural decision support in finance (2000).

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## PUBLICATIONS

## BOOKS

- Bruno Apolloni, Dario Malchiodi and Sabrina Gaito, “*Algorithmic Inference in Machine Learning*”, 2 edition, Magill, Adelaide: Advanced Knowledge International, International Series on Advanced Intelligence, Vol. 5, 2006.

## PAPERS IN INTERNATIONAL JOURNALS

- Gaito, S., Rossi, G. and Zignani, M., Extracting human mobility and social behaviour from location-aware traces, *Wireless Communications and Mobile Computing*, 2011, to appear.
- Sabrina Gaito, Elena Pagani, Gian Paolo Rossi, “Strangers Help Friends to Communicate in Opportunistic Networks”, *Computer Networks*, Volume 55, Issue 2, *Wireless for the Future Internet*, 1 February 2011, Pages 374-385.
- Bruno Apolloni, Simone Bassis, Sabrina Gaito, Dario Malchiodi, Italo Zoppis, “Playing monotone games to understand learning behaviours”, *Theoretical Computer Science*, Volume 411, Issue 25, 28 May 2010, Pages 2384-2405.
- Aliberti S, Blasi F, Zanaboni AM, Peyrani P, Tarsia P, Gaito S, Ramirez JA., “Duration of antibiotic therapy in hospitalized patients with community-acquired pneumonia”, *Eur Respir J.* 2009 Nov 19.
- Giuliana Mombelli, Anna M. Zanaboni, Sabrina Gaito, Cesare R. Sirtori, “Waist-to-Height Ratio Is a Highly Sensitive Index for the Metabolic Syndrome in a Mediterranean Population”, *Metabolic Syndrome and Related Disorders*. October 2009, 7(5): 477-484 (2009).
- Giuliana Mombelli, Anna M. Zanaboni, Sabrina Gaito, Cesare R. Sirtori, “Large waist circumference with normal BMI identifies a significant subset of Italian female patients with the metabolic syndrome—A high risk presentation?”, *Atherosclerosis* 1 October 2009 (volume 206 issue 2 Pages 340-342)
- B. Apolloni, S. Bassis, S. Gaito and D. Malchiodi, “Bootstrapping Complex Functions”, *Nonlinear Analysis: Hybrid Systems* 2-2 (2008), 648 – 664.
- G. Lucignani, E. Orunesu, M. Cesari, K. Marzo, M. Pacci, G. Bechi, A. Gori, S. Gaito, M. Clerici and A. Chiti, “FDG-PET imaging in HIV-infected subjects: relation with therapy and immunovirological variables”, *Eur J Nucl Med Mol Imaging* 2008, Dec. 11.
- B. Apolloni, S. Bassis, S. Gaito and D. Malchiodi, “Solving complex regression problems via Algorithmic Inference: a new family of bootstrap algorithms”, *Far East Journal of Theoretical Statistics* 22 – 2 (2007), 141 - 180.
- B. Apolloni, S. Bassis, A. Clivio, S. Gaito and D. Malchiodi, “Modeling individual's aging within a bacterial population using a pi-calculus paradigm”, *Natural Computing* 6 - 1 (2007), 33-53.
- S. Gaito, A. Greppi and G. Grossi, “Random projectios for dimensionality reduction in ICA, *International Journal of Applied Science*”, *Engineering and Technology*, 15 (2006), 154 – 158.

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- B. Apolloni, S. Bassis, S. Gaito and D. Malchiodi, “Appreciation of medical treatments by learning underlying functions with good confidence”, *Current Pharmaceutical Design* 13 – 15 (2007), 1545 - 1570.
- B. Apolloni, S. Bassis, S. Gaito, D. Malchiodi and I. Zoppis, “Controlling the losing probability in a monotone game”, *Information Sciences* 176 - 10 (2006), 1395-1416.
- B. Apolloni, S. Bassis, S. Gaito and D. Malchiodi, “Elementary team strategies in a monotone game”, *Nonlinear Analysis: Real World Applications* 64 - 2 (2006), 310-328.
- V. Rosato, M. Celino, S. Gaito and G. Benedek, “Thermodynamic behavior of a the carbon schwarzite”, *Computational Materials Science* 20, pag. 387-393 (2001).
- M. Bernasconi, S. Gaito and G. Benedek, “Clathrates as effective p-type and n-type tetrahedral carbon semiconductors”, *Phys. Rev. B* 61, pag. 12689-12692 (2000).
- V. Rosato, M. Celino, G. Benedek and S. Gaito, “Thermodynamic behavior of the carbon schwarzite fcc-(C36)2”, *Phys. Rev. B* 60, pag. 16928-16933 (1999).
- S. Gaito, L. Colombo and G. Benedek, “A Theoretical study of the smallest tetrahedral carbon schwarzites”, *Europhys. Lett.* 44, pag. 525-530 (1998).
- G. Benedek, L. Colombo, S. Gaito, E. Galvani and S. Serra, “Prediction of new sp<sup>2</sup> and sp<sup>2</sup>-sp<sup>3</sup> hollow carbon crystals”, *J. Chem. Phys.* 106, pag. 2311-2316 (1997).

#### PAPERS IN CONFERENCE PROCEEDINGS

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- Gaito, S., Rossi, G. and Zignani, M., From mobility data to social attitudes: a complex network approach, In *Proceedings of the NEMO Workshop* 2011, Athens, Greece, September 9.
- Quadri, S., Maggiorini, D., Gaito, S., Rossi, G., On the Scalability of Delay-Tolerant Routing Protocols in Urban Environment, In *Proceedings of the 4rd IFIP Wireless Days Conference* 2011, Niagara Falls, Canada, November.
- Zignani, M., Gaito, S., Extracting human mobility patterns from GPS-based traces, In *Proceedings of the 3rd IFIP Wireless Days Conference* 2010 Venice, Italy, October 20-22.
- Sala, A., Zheng, H., Zhao, B. Y., Gaito, S., and Rossi, G. Brief announcement: revisiting the power-law degree distribution for social graph analysis. In *Proceeding of the 29th ACM SIGACT-SIGOPS Symposium on Principles of Distributed Computing* (Zurich, Switzerland, July 25 - 28, 2010). PODC '10. ACM, New York, NY, 400-401 (2010).
- Gaito, S., Pagani, E., and Rossi, G. . Opportunistic forwarding in workplaces. In *Proceedings of the 2nd ACM Workshop on online Social Networks* (Barcelona, Spain, August 17 - 17, 2009). WOSN '09. ACM, New York, NY, 55-60 (2009).
- Sabrina Gaito, Dario Maggiorini, Elena Pagani, Gian Paolo Rossi, “Distance Vector Routing for Public Transportation Vehicular Networks: Performance Evaluation on a Real Topology”. In Proc. 2nd IFIP Wireless Days, Paris (France), Dec. 15-17 2009.

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- Sabrina Gaito, Elena Pagani, Gian Paolo Rossi, "Fine-Grained Tracking of Human Mobility in Dense Scenarios". In 6th Annual IEEE Communications Society Conference on Sensor, Mesh and Ad Hoc Communications and Networks (SECON) - Poster Session, pp. 40-42, Roma (Italy), June 22-26 2009.
- S. Gaito, G. Grossi, F. Pedersini and G. Rossi, "Experimental Validation of a 2-Level Social Mobility Model in Opportunistic Networks", IFIP Wireless Day Conference (IFIP '08), IEEE press 2008.
- S. Gaito, G. Grossi, F. Pedersini, "A two-levels Social Mobility Model for trace generation" in 9th ACM international symposium on Mobile ad hoc networking and computing (MobiHoc '08), 457-458. ACM, 2008.
- S. Gaito, G. Grossi, "Extending Mixture Random Pruning to Nonpolynomial Contrast Functions in FastICA", Proceedings of the 7th IEEE International Symposium on Signal Processing and Information Technology (ISSPIT 2007), Cairo, Egypt, December 15-18, 334-338, 2007.
- S. Gaito, G. Grossi, "Speeding up FastICA by Mixture Random Pruning, in Independent Component Analysis and Blind Signal Separation", 7th International Conference, ICA 2007, London, UK, September 9-12, 2007, Proceedings, Series: Lecture Notes in Computer Science , Vol. 4666, 185-192, 2007.
- B. Apolloni, S. Bassis, S. Gaito and D. Malchiodi, "Tight Bounds for SVM Classification Error" in M. Zhao and Z. Shui (Eds.), Proceedings - 2005 International Conference on Neural Network & Brain (ICNN&B'05), IEEE Press, 5-8, 2005.
- B. Apolloni, S. Bassis, A. Clivio, S. Gaito and D. Malchiodi, "An evolutionary hypothesis of bacterial populations" in B. Apolloni, M. Marinaro, G. Nicosia and R. Tagliaferri (Eds.), Proceedings of WIRN Springer, Lecture Notes in Computer Science 3931, 214-230, 2005.
- B. Apolloni, S. Bassis, S. Gaito, D. Malchiodi and A. Minora, "Computing confidence intervals for the risk of a SVM classifier through algorithmic inference" in B. Apolloni, M. Marinaro and R. Tagliaferri (Eds.), Biological and Artificial Intelligence Environments, Springer, 225-234, 2005.
- B. Apolloni, S. Bassis, S. Gaito, D. Iannizzi and D. Malchiodi, "Learning continuous functions through a new linear regression method" in B. Apolloni, M. Marinaro and R. Tagliaferri (Eds.), Biological and Artificial Intelligence Environments, Springer, 235-243, 2005.
- B. Apolloni, S. Bassis, S. Gaito and D. Malchiodi, "Appreciation of medical treatments through confidence intervals" in E. Biganzoli, P. Boracchi, P. Duca and E. Ifeachor (Eds.), Proceedings of the 1st European Workshop on the Assessment of Diagnostic Performance, RCE Edizioni (ISBN 88-8399-084-6), 2005.
- B. Apolloni, S. Bassis, A. Brega, S. Gaito, D. Malchiodi and A. M. Zanaboni, "A man-machine human interface for a special device of the pervasive computing world" in A. Kameas and N. Streitz (Eds.), Proceedings of DC Tales: Tales of the Disappearing Computer, Santorini Greece, June 1-4, 2003, CTI Press (ISBN 960-406-461-4), 263-267, 2003.
- B. Apolloni, S. Bassis, A. Brega, S. Gaito, D. Malchiodi, . and A. M. Zanaboni, "Monitoring of car driving awareness from biosignals" in B. Apolloni, M. Marinaro and R. Tagliaferri (Eds.), Neural Nets: 14th Italian Workshop on Neural Nets, WIRN VIETRI 2003, Vietri sul Mare, Italy, June 4-7, 2003, Springer, Lecture Notes in Computer Science 2859 (ISBN 3-540-20227-7), 269-277, 2003.

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- B. Apolloni, S. Bassis, S. Gaito and D. Malchiodi, “Cooperative games in a stochastic environment” in B. Apolloni, M. Marinaro and R. Tagliaferri (Eds.), *Neural Nets: 14th Italian Workshop on Neural Nets, WIRN VIETRI 2003*, Vietri sul Mare, Italy, June 4-7, 2003, Springer, Lecture Notes in Computer Science 2859 (ISBN 3-540-20227-7), 25-34, 2003.
- B. Apolloni, S. Bassis, D. Malchiodi and S. Gaito, “Cooperative games in a stochastic environment” in E. Damiani, R. Howlett, L. Jain and N. Ichalkaranje (Eds.), *Knowledge-Based Intelligent Information Engineering Systems and Allied Technologies - KES 2002 (Proceedings of KES'2002: Sixth International Conference on Knowledge-Based Intelligent Information & Engineering Systems, Crema, Italy, September 18-19, 2002)*, Vol. 82, Amsterdam: IOS Press/Ohmsha, *Frontiers in Artificial Intelligence and Applications* (ISBN 1-58603-280-1), 296-300, 2002.
- B. Apolloni, D. Malchiodi, S. Gaito and A. M. Zanaboni, “Twisting features with properties” in M. Marinaro and R. Tagliaferri (Eds.), *Neural Nets WIRN Vietri-01: Proceedings of the 12th Italian Workshop on Neural Nets, Vietri sul Mare, Salerno, Italy, 17-19 May, 2001*, Springer, *Perspectives in Neural Computing* (ISBN 1-85233-505-X), 301-312, 2002.
- G. Benedek, L. Colombo, S. Spadoni, S. Gaito and P. Milani, “Carbon Schwarzites: Properties and Growth Simulation from Fullerene Fragments”, *MRS Symposium Proceedings*, pag. 529-534 (1998).

#### BOOK CHAPTERS

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- B. Apolloni, S. Bassis, S. Gaito and D. Malchiodi, “Statistical bases for learning” in B. Apolloni and F. Kurfess (Eds.), *From synapses to rules. Discovering symbolic rules from neural processed data*, Chapter 1, New York: Kluwer Academic/Plenum Publishers (ISBN 0-306-47402), 5-40, 2002.
- B. Apolloni, S. Gaito, D. Iannizzi and D. Malchiodi, “Learning regression functions” in B. Apolloni and F. Kurfess (Eds.), *From synapses to rules. Discovering symbolic rules from neural processed data*, Chapter 3, New York: Kluwer Academic/Plenum Publishers (ISBN 0-306-47402), 61-73, 2002.
- B. Apolloni, S. Bassis, S. Gaito and D. Malchiodi, “Cooperative games in a stochastic environment” in B. Apolloni and F. Kurfess (Eds.), *From synapses to rules. Discovering symbolic rules from neural processed data*, Chapter 4, New York: Kluwer Academic/Plenum Publishers (ISBN 0-306-47402), 75-86, 2002.
- B. Apolloni, S. Gaito and D. Malchiodi, “Learning and checking confidence regions for the hazard function of biomedical data” in B. Apolloni and F. Kurfess (Eds.), *From synapses to rules. Discovering symbolic rules from neural processed data*, Chapter 13, New York: Kluwer Academic/Plenum Publishers (ISBN 0-306-47402), 251-260, 2002.
- G. Benedek, L. Colombo, S. Gaito and S. Serra, “Exotic diamonds from topology and simulation” in *The Physics of Diamond*, A. Paoletti and A. Tucciarone Eds., Proc. Int. School of Physics E. Fermi, Course CXXXV, IOS Press, Amsterdam, pag. 575-598 (1997).

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