– Leonora Bianchi –

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Home Address
Via Bellini 1
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Professional Address
Dalle Molle Institute for Artificial Intelligence (IDSIA)
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Personal information

Date and place of birth: 19.07.1974, Como, Italy.

Gender: female.

Marital status: married with Fabrizio Oliverio, two children.

Nationality: Italian.

Current position

Employed part-time (50%) as a Post-doc researcher at IDSIA, with research, teaching, and Ph.D./-Master students supervision activities. The research focus is on combinatorial optimization, optimization problems where uncertainty plays an important role, and design of efficient heuristic algorithms and metaheuristics such as Ant Colony Opimization, Tabu Search, Simulated Annealing and Evolutionary Computation. Teaching is done at the University of Applied Sciences of Italian Switzerland (SUPSI) and at the University of Lugano (USI).

Education

June 2006	Ph.D., Université Libre de Bruxelles. Title of the thesis: "Ant Colony Optimization and Local Search for the Probabilistic Traveling Problem: A Case Study in Stochastic Combinatorial Optimization". Thesis supervisors: Marco Dorigo (Université Libre de Bruxelles) and Luca Maria Gambardella (IDSIA)
May 2003	Diplome d'Etudes Approfondies (DEA), Université Libre de Bruxelles. Title of the thesis: "New Approaches for Solving the Probabilistic Traveling Salesman Problem".
March 1999	Laurea in Fisica (M.S., Physics), Università degli Studi dell'Insubria, Como, Italy. Mark: 110/110 cum laude. Title of the thesis: "Dynamics of the Asymmetric Extremely Diluted Ashkin -Teller Neural Network".

Professional experience

July 2006 – present	*Post-doc researcher* at the Istituto Dalle Molle di Studi sull'Intelligenza Artificiale (IDSIA), Switzerland. Conducting research on optimization algorithms applied to stochastic optimization problems.
May 2002	*Research visit* at IRIDIA, Université Libre de Bruxelles. Collaborating with IRIDIA researchers on common ongoing research topics.
May 2000 – June 2006	*Ph.D. student* at the Istituto Dalle Molle di Studi sull'Intelligenza Artificiale (IDSIA), Switzerland. Conducting research on optimization algorithms based on heuristics and metaheuristics applied to stochastic vehicle routing problems.
December 1999 – April 2000	*Consultant* of the Optimization Group at Fideuram Capital, Milan, Italy. Performing Financial Risk Analysis.
April 1999 – December 1999	*Consultant* at National Sanitary Organization, Air Quality Department, Milan, Italy. Studying possible applications of neural networks to the forecasting of ozone concentrations in urban environment.

Teaching

Courses at SUPSI

2008-2009	Bachelor laboratory on *Algorithms and Data Structures*
2003-2007	Bachelor course on *Numerical Analysis and Algorithms*
2003-2004	Bachelor laboratory on *Java and Algorithms*
2001-2002 and 2003-2004	Bachelor course on *Foundations of Computer Science*

Courses at USI

In preparation for November 2008	Master course on *Heuristics for Stochastic Optimization*. This is part of the Master in Intelligent Systems course *Heuristics* held by Prof. Luca Maria Gambardella.

Ph.D. students supervision

2008 – Dennis Weyland. Topic: *New sampling-based metaheuristics for stochastic vehicle routing problems.*

Master students supervision

2005 F. Figueiredo and M. Pedrazzi. Project: *Algoritmo a formiche per ottimizzazione di percorsi con domanda stocastica.*
2002 C. Salvador. *Ottimizzazione di percorsi con domanda stocastica.*
2001 L. Moghini. *Euristiche per il problema del commesso viaggiatore probabilistico.*

Research projects participation

2006 – 2007 *Routing Problems with Objective Function of Increasing Complexity.*
A Swiss National Foundation project about solving routing problems with stochastic and dynamic information. The focus was both on the modeling approaches and on the design of efficient algorithms, particularly heuristics and metaheuristics.

2001 – 2004 *Metaheuristics Network.*
A project founded by the European Commission, whose main goal is to deepen the understanding of the working principles of metaheuristics through theoretical and experimental research so that they can be applied more effectively to the solution of important practical combinatorial optimization problems.

2000 – 2001 *On-line Fleet Management.*
A Swiss National Foundation project concerning the application of metaheuristics and local search to manage fleets of vehicles in dynamic environments.

Grants obtained (participation to the writing of the proposal)

2008 – 2011 *New sampling-based metaheuristics for stochastic vehicle routing problems.*
A Swiss National Foundation project about developing advanced algorithms based on Monte Carlo sampling for solving problems where the objective function is stochastic and/or for which an analytic expression is not available. The appointment is a for a Ph.D. student for three years.

2006 – 2007 *Routing Problems with Objective Function of Increasing Complexity.*
A Swiss National Foundation project about solving routing problems with stochastic and dynamic information. The focus is both on the modeling approaches and on the design of efficient algorithms, particularly heuristics and metaheuristics. The appointment was for a post-doc researcher employed part-time (50%) for two years.

Publications

Journal papers

L. Bianchi, M. Dorigo, L. M. Gambardella, and W. J. Gutjahr. A survey on metaheuristics for stochastic combinatorial optimization. Accepted for publication at Natural Computing, and published "online first". ISSN 1567-7818 (Print) 1572-9796 (Online) DOI 10.1007/s11047-008-9098-4.

L. Bianchi, M. Birattari, M. Manfrin, M. Mastrolilli, L. Paquete, O. Rossi-Doria, and T. Schiavinotto. Hybrid metaheuristics for the vehicle routing problem with stochastic demands. *Journal of Mathematical Modelling and Algorithms*, 5(1):91–110, 2006.

L. Bianchi and A. M. Campbell. Extension of the 2-p-opt and 1-shift algorithms to the heterogeneous probabilistic traveling salesman problem. *European Journal of Operational Research*, 176(1):131–144, 2007.

L. Bianchi, J. Knowles, and N. Bowler. Local search for the probabilistic traveling salesman problem: correction to the 2-p-opt and 1-shift algorithms. *European Journal of Operational Research*, 162(1):206–219, 2005.

M. Mastrolilli and L. Bianchi, Core Instances for Testing: a Case Study. *European Journal of Operational Research*, 166:51–62, 2005.

Conference papers

L. Bianchi, M. Birattari, M. Chiarandini, M. Manfrin, M. Mastrolilli, L. Paquete, O. Rossi-Doria, and T. Schiavinotto. Metaheuristics for the vehicle routing problem with stochastic demands. In X. Yao, E. Burke, J. A. Lozano, J. Smith, J. J. Merelo Guervós, J. A. Bullinaria, J. Rowe, P. Tiňo, A. Kabán, and H.-P. Schwefel, editors, *Proceedings of the 8th International Conference on Parallel Problem Solving from Nature (PPSN VIII)*, volume 3242 of *Lecture Notes in Computer Science*, pages 450–460. Springer, Berlin, Germany, 2004.

M. Mastrolilli and L. Bianchi, Core Instances for testing: A Case Study (Extended Abstract) *Proceedings of WEA 2003 - Experimental and Efficient Algorithms, Second International Workshop*. Volume 2647 of *Lecture Notes in Computer Science*, pages 209-221. Springer, Berlin, Germany, 2002.

L. Bianchi, L.M. Gambardella and M. Dorigo, Solving the Homogeneous probabilistic traveling salesman problem by the ACO metaheuristic. In *Proceedings of ANTS 2002 - From Ant Colonies to Artificial Ants: Third International Workshop on Ant Algorithms.* Volume 2463 of *Lecture Notes in Computer Science*, pages 176-187. Springer, Berlin, Germany, 2002.

L. Bianchi, L.M. Gambardella and M. Dorigo, An Ant Colony Approach to the Probabilistic Traveling Salesman Problem. In *Proceedings of PPSN VII - 7th International Conference on Parallel Problem Solving from Nature.* Volume 2439 of *Lecture Notes in Computer Science*, pages 883-892. Springer, Berlin, Germany, 2002.

Technical reports

L. Bianchi, L. M. Gambardella, and M. Dorigo. Ant colony optimization and local search for the probabilistic traveling salesman problem. Technical Report IDSIA-02-06, IDSIA - Dalle Molle Institute for Artificial Intelligence, Manno, Switzerland, 2006.

L. Bianchi, M. Dorigo, L. M. Gambardella, and W. J. Gutjahr. Metaheuristics in stochastic combinatorial optimization: a survey. Technical Report IDSIA-08-06, IDSIA - Dalle Molle Institute for Artificial Intelligence, Manno, Switzerland, 2006.

L. Bianchi and J. Knowles. Local search for the Probabilistic Traveling Salesman Problem: a proof of the incorrectness of Bertsimas' proposed 2-p-opt and 1-shift algorithms. Technical Report IDSIA-21-02, IDSIA - Dalle Molle Institute for Artificial Intelligence, Manno, Switzerland, 2002.

L. Bianchi, Notes on dynamic vehicle routing - the state of the art. Technical Report IDSIA-05-0, IDSIA - Dalle Molle Institute for Artificial Intelligence, Manno, Switzerland, 2001.

Editorial and organizational work

Technical Commitee member of *WCCI 2008 - IEEE World Congress on Computational Intelligence*, June 1-6, 2008, Hong Kong.

Program Committee member of *GECCO 2006 - Genetic and Evolutionary Computation Conference*, July 8-12, 2006, Seattle, WA, USA.

Local Organizing Committee member of *ECCO XV - XV Conference of the European Chapter on Combinatorial Optimisation* May 30 - June 1, 2002, Lugano, Switzerland.

Referee for a number of international journals, including *Computers and Operations Research, Journal of Mathematical Modelling and Algorithms, European Journal of Operational Research, IEEE Transactions on Evolutionary Computation, Neurocomputing, Journal of Combinatorial Optimization, Methodology and Computing in Applied Probability, Journal of Global Optimization, Journal of Parallel and Distributed Computing, International Journal of Neural Systems*, and *Central European Journal of Operations Research.*

Computer skills

Programming languages: C, C++, advanced level. Perl, good level. Java, html, SAS, Matlab, elementary level.

Operating systems: Linux, Macintosh and Windows. Good user level.

Editing and Data Analysis software: LaTeX, R (the R project for statistical data analysis), the most common Linux/Macintos/Windows tools, good level.

Known languages

Italian: mother tongue.

English: written and spoken, good level.

French: written and spoken, elementary level.

German: written and spoken, good base level. Deutsch-Zertifikat from the Deutsch Institute, Grundkurs 3, marks: written and spoken 28/30.

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