

Frederick Ducatelle's Curriculum Vitae

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Personal details

Name: Frederick Ducatelle
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Switzerland
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Homepage: <http://www.idsia.ch/~frederick>
Date of birth: 12-NOV-1977
Place of birth: Gent
Nationality: Belgian
Civil status: Married

Education

- 2002-2007 **PhD in Computer Science** at Istituto Dalle Molle di Studi sull'Intelligenza Artificiale (IDSIA), at the Università della Svizzera Italiana (USI), in Lugano, Switzerland
Dissertation: *Adaptive Routing in Ad Hoc Wireless Multi-hop Networks*
Committee: Prof. L.M. Gambardella, Prof. Dr. P. Thiran, Prof. Dr. A. Carzaniga, Prof. Dr. A. Murphy
Remark: Received the **Best Paper Award at PPSN VIII**
- 2006-2006 **Internship at Deutsche Telekom Labs** in Berlin, Germany. Aim: Implementing probabilistic routing under Linux for the Magnets mesh testbed
- 2000-2001 **Master of Science in Artificial Intelligence**
Institute: University of Edinburgh
Results: Distinction (82% on taught part, 96% on the dissertation)
Modules: Programming in Java, Genetic Algorithms, Intelligent Sensing and Control, AI Programming, Learning from Data 1 and 2, Practical Reasoning Methodologies and Probabilistic Modelling and Reasoning
Dissertation: *Ant Colony Optimisation for Bin Packing and Cutting Stock Problems*
Supervisor: Dr. John Levine
Remark: Received the **Xerox Prize for best dissertation**
- 1995-2000 **Master in Commercial Engineering in Management Informatics**
Institute: Catholic University of Leuven in Belgium
Result final year: Magna cum laude
Main topics: Economics, Advanced Mathematics, Physics, Statistics, Operations Research, Production and Inventory Management, Database Management, Computer Networks, System Analysis, Software Engineering, Corporate Finance, Macroeconomic Analysis, Simulation Theory and Applications, Operating Systems, Knowledge Based Systems, Economics of Information Systems, ...
Dissertation: *Een datamining project in de praktijk* (in Dutch) – Including a data mining project for NURTouristic, a major company in the Belgian travel industry.
Supervisor: Prof. Dr. Jacques Vandenbulcke
- 1998-1999 **Erasmus stay** at the University of Edinburgh
- 1989-1995 **High school diploma** at the Onze-Lieve-Vrouwe College Oudenaarde
Result final year: 82%
Main topics: Latin and Maths

Work Experience

- 09/2007-... **Postdoctoral researcher** at the Istituto Dalle Molle di Studi sull'Intelligenza Artificiale in Lugano, Switzerland. Topic: **swarm robotics**.
- 04/2006-07/2006 **Internship at Deutsche Telekom Labs** in Berlin, Germany. Topic: making a Linux implementation of **probabilistic routing** for the MagNets mesh testbed.
- 11/2002-09/2007 **PhD researcher** at Istituto Dalle Molle di Studi sull'Intelligenza Artificiale in Lugano, Switzerland. Topic: **adaptive routing** in ad hoc networks.
- 10/2001-02/2002 **Research Assistant** at the University of Edinburgh, UK. Topic: preparing a **data mining course**, for Prof. Dr. Chris Williams
- 10/1999-01/2000 **Internship at NURTouristic**, Gent, Belgium. Topic: working out a **data mining project** in the tourist sector
- August 1998 Student job at the helpdesk of Alcatel Micro-electronics

Research Topics

- Ant Colony Optimization for combinatorial optimization, in particular for Bin Packing and Cutting Stock Problems.
- Survivable routing in IP-over-WDM networks in the context of the Swiss Hasler Foundation project DICS-1830 "Failure Location, Restoration and Resilience in Optical and Ad-Hoc Networks".
- Routing in Mobile Ad Hoc Networks, in particular using algorithms based on the Ant Colony Optimization framework, in the context of the project "BISON: Biology-Inspired techniques for Self Organization in dynamic Networks" of the FET unit of the European Commission.
- Collective and swarm robotics, in the FET OPEN project Swamanoïd, which aims to create a collective system consisting of heterogeneous, dynamically connected, small autonomous robots.

Publications

International Journals

- Babaoglu, O., Canright, G., Deutsch, A., Di Caro, G., Ducatelle, F., Gambardella, L. M., Ganguly, N., Jelasity, M., Montemanni, R., Montresor, A., and Urnes, T. (2006). Design Patterns from Biology for Distributed Computing. *ACM Transactions on Autonomous and Adaptive Systems (TAAS)*, Volume 1, Number 1, September 2006.
- Di Caro, G., Ducatelle, F., Gambardella, L. M., and Rizzoli A. (2006). Building Blocks from Biology for the Design of Algorithms for the Management of Modern Dynamic Networks. *ERCIM News*, Number 64, January 2006.
- Di Caro, G., Ducatelle, F. and Gambardella, L. M. (2005). AntHocNet: An Adaptive Nature-Inspired Algorithm for Routing in Mobile Ad Hoc Networks. *European Transactions on Telecommunications (ETT), Special Issue on Self Organization in Mobile Networking*, Volume 16, Number 5, Pages 443-455, September-October 2005.
- Ducatelle, F. and Gambardella, L. M. (2005). Survivable Routing in IP-over-WDM Networks: An Efficient and Scalable Local Search Algorithm. *Optical Switching and Networking*, Volume 2, Pages 86-99, September 2005.
- Ducatelle, F., Di Caro, G. and Gambardella, L. M. (2005). Using Ant Agents to Combine Reactive and Proactive Strategies for Routing in Mobile Ad Hoc Networks. *International Journal of Computational Intelligence and Applications (IJCIA), Special Issue on Nature-Inspired Approaches to Networks and Telecommunications*, Volume 5, Number 2, Pages 169-184, June 2005.
- Levine, J. and Ducatelle, F. (2004). Ant Colony Optimisation and Local Search for Bin Packing and Cutting Stock Problems. *Journal of the Operational Research Society, Special Issue on Local Search*, Volume 55, Number 7, Pages 705-716, July 2004.

National Journals

- Di Caro G., Ducatelle F. and Gambardella L. M. (2005). Project description: BISON: Biology-Inspired techniques for Self-Organization in dynamic Networks. *Zeitschrift Künstliche Intelligenz, Special Issue on Swarm Intelligence*, November, 2005.

Book Chapters

- Di Caro G., Ducatelle F. and Gambardella L. M. (2009). Routage dans les réseaux mobiles ad hoc en environnement urbain (in French). In: *Fourmis artificielles, des bases algorithmiques aux concepts et réalisations avancés*, eds. N. Monmarché, F. Guinand and P. Siarry, Edition HERMES-LAVOISIER, To appear in 2009.
- Di Caro G., Ducatelle F. and Gambardella L. M. (2008). Theory and practice of Ant Colony Optimization for routing in dynamic telecommunications networks. In: *Reflecting Interfaces: The Complex Coevolution of Information Technology Ecosystems*, eds. N. Sala, F. Orsucci, Idea Group Inc., April 2008.
- Ducatelle F., Gambardella L. M., Kurant M., Nguyen H. X. and Thiran P. (2006). Algorithms for failure detection in large IP-over-Fiber and Wireless Ad Hoc Networks. In: *Dependable Systems: Software, Computing, Networks*, eds. J. Kohlas, B. Meyer, A. Schiper, Lecture Notes in Computer Science 4028, Springer, 2006.

International Conferences

- Di Caro G., Ducatelle F. and Gambardella L. M. (2009). Wireless communications for distributed navigation in robot swarms. Proceedings of the Sixth European Workshop on the application of Nature-inspired techniques to Telecommunication Networks and other Connected Systems (EvoCOMNET2009), Tübingen, Germany, April 2009.
- Ducatelle F., Di Caro G. and Gambardella L. M. (2008). Robot Navigation in a Networked Swarm. Proceedings of the International Conference on Intelligent Robotics and Applications (2008ICIRA), Wuhan, China, October 2008.
- Ducatelle F., Di Caro G. and Gambardella L. M. (2008). A New Approach for Integrating Proactive and Reactive Routing in Mobile Ad Hoc Networks. Proceedings of the fifth IEEE International Conference on Mobile Ad Hoc and Sensor Systems (MASS), Atlanta, Georgia, USA, September-October 2008.
- Ducatelle F., Di Caro G. and Gambardella L. M. (2008). An evaluation of two swarm intelligence MANET routing algorithms in an urban environment. Proceedings of the IEEE Swarm Intelligence Symposium (SIS), St. Louis, Missouri, USA, September 2008.
- Di Caro G., Ducatelle F. and Gambardella L. M. (2008). A simulation study of routing performance in realistic urban scenarios for MANETs. Proceedings of the sixth International Workshop on Ant Colony Optimization and Swarm Intelligence (ANTS2008), Brussels, Belgium, September 2008.
- Ducatelle F., Roth M. and Gambardella L. M. (2007). Design of a user space software suite for probabilistic routing in ad-hoc networks. Proceedings of the Fourth European Workshop on the application of Nature-inspired techniques to Telecommunication Networks and other Connected Systems (EvoCOMNET2007) (poster presentation), Valencia, Spain, April 2007.
- Ducatelle F., Di Caro G. and Gambardella L. M. (2006). An analysis of the different components of the AntHocNet routing algorithm. Proceedings of the Fifth International Workshop on Ant Colony Optimization and Swarm Intelligence (ANTS2006), Brussels, Belgium, September 2006.
- Di Caro G., Ducatelle F. and Gambardella L. M. (2006). AI Approaches for Next Generation Telecommunication Networks. Extended abstract. The 50th Anniversary Summit of Artificial Intelligence, Monte Verita, Switzerland, July 2006.
- Babaoglu O., Canright G., Deutsch A., Di Caro G., Ducatelle F., Gambardella L. M., Ganguly N., Jelasity M., Montemanni R. and Montresor A. (2005). Design Patterns from Biology for Distributed Computing. Proceedings of the European Conference on Complex Systems (ECCS), Paris, France, November 2005.
- Carrillo L., Guadal C., Marzo J.-L., Di Caro G., Ducatelle F. and Gambardella L. M. (2005). Differentiated Quality of Service scheme based on the use of multiple classes of ant-like mobile agents. Student Workshop at the CoNEXT Conference, Toulouse, France, October, 2005.
- Di Caro G., Ducatelle F. and Gambardella L. M. (2005). Swarm Intelligence for Routing in Mobile Ad Hoc Networks. Proceedings of the 2005 IEEE Swarm Intelligence Symposium (SIS), Pasadena, CA, USA, June 2005.

- Ducatelle, F., Di Caro, G. and Gambardella, L. M. (2005). Ant Agents for Hybrid Multipath Routing in Mobile Ad Hoc Networks. Proceedings of the Second Annual Conference on Wireless On demand Network Systems and Services (WONS 2005), St. Moritz, Switzerland, January 2005.
- Ducatelle, F. and Gambardella, L. M. (2004). FastSurv: A New Efficient Local Search Algorithm for Survivable Routing in WDM Networks. Proceedings of the IEEE Global Communications Conference (GLOBECOM), Dallas, TX, USA, November 2004.
- Ducatelle, F. and Gambardella, L. M. (2004). A Scalable Algorithm for Survivable Routing in IP-over-WDM Networks. Proceedings of BroadNets 2004 - First Annual International Conference on Broadband Networks, San Jose, CA, USA, October 2004.
- Di Caro, G., Ducatelle, F. and Gambardella, L. M. (2004). AntHocNet: an Ant-Based Hybrid Routing Algorithm for Mobile Ad Hoc Networks. Proceedings of the 8th International Conference on Parallel Problem Solving from Nature (PPSN VIII), Birmingham, UK, September 2004. *Remark*: This paper received the **PPSN VIII Best Paper Award**.
- Levine, J. and Ducatelle, F. (2003). Ants Can Solve Difficult Bin Packing Problems. Proceedings of the 1st Multidisciplinary International Conference on Scheduling: Theory and Applications (MISTA 2003), Nottingham, UK, August 2003.
- Ducatelle, F. and Levine, J. (2001). Ant Colony Optimisation for Bin Packing and Cutting Stock Problems. Proceedings of the UK Workshop on Computational Intelligence (UKCI-01), Edinburgh, September 2001.

Dissertations

- Ducatelle, F., Adaptive *Routing in Ad Hoc Wireless Multi-hop Networks*, PhD thesis, Università della Svizzera Italiana, Istituto Dalle Molle di Studi sull'Intelligenza Artificiale, 2007.
- Ducatelle, F., *Ant Colony Optimisation for Bin Packing and Cutting Stock Problems*, *Master of Science in Artificial Intelligence*, University of Edinburgh, 2001.
- Ducatelle, F., *Een datamining project in de praktijk* (in Dutch), *Master in Commercial Engineering in Management Informatics*, Catholic University of Leuven, 2000.

Honours

- **Xerox Prize for best dissertation** Ducatelle, F., Ant Colony Optimisation for Bin Packing and Cutting Stock Problems, *Master of Science in Artificial Intelligence*, University of Edinburgh, 2001.
- **Best Paper Award** Di Caro, G., Ducatelle, F. and Gambardella, L. M. (2004). AntHocNet: an Ant-Based Hybrid Routing Algorithm for Mobile Ad Hoc Networks. Proceedings of the 8th International Conference on Parallel Problem Solving from Nature (PPSN VIII), Birmingham, UK, September 2004.

Projects

- 2007-2008 “Routing Problems with Objective Functions of Increasing complexity”, a Swiss national Science Foundation project.
- 2006-2010 “Swarmanoid: Towards Humanoid Robotic Swarms”, a Future and Emerging technologies (FET-OPEN) project funded by the European Commission.
- 2002-2006 “BISON: Biology-Inspired techniques for Self Organization in dynamic Networks”, a FET (Future and Emerging Technologies Program), IST project funded by the European Commission.
- 2002-2005 “Failure Location, Restoration and Resilience in Optical and Ad-Hoc Networks”, a Swiss Hasler Foundation DICS project.
- 1999-2000 Data mining project for NURTouristic, a major company in the Belgian travel industry.

Conference Organization and Guest Editor

- Swarm Intelligence Symposium 2008: Special session on Swarm Intelligence for Wireless Ad Hoc Networks
- Special Issue of the Swarm Intelligence Journal: Swarm Intelligence for Telecommunication Networks. To appear in 2009.

Referee Activities

Journals

- IEEE Communications Magazine
- IEEE Computer Communications
- IEEE Transactions on Vehicular Technology
- IEEE Transactions on Evolutionary Computation
- ACM Transactions on Autonomous and Adaptive Systems
- Wireless Networks
- Swarm Intelligence
- Kluwer Journal of Mathematical Modelling and Algorithms
- International Journal of Applied Mathematics and Computer Science
- Wireless Networks
- Arabian Journal for Science and Engineering

Conferences, Program Committee

- CEC 2009, IEEE Congress on Evolutionary Computation
- EvoCOMNET 2009, the 6th European Workshop on the application of Nature-inspired techniques to Telecommunication Networks and other Connected Systems
- EvoCOMNET 2008, the 5th European Workshop on the application of Nature-inspired techniques to Telecommunication Networks and other Connected Systems
- EvoCOMNET 2007, the 4th European Workshop on the application of Nature-inspired techniques to Telecommunication Networks and other Connected Systems

Conferences, other referee activities

- SIS 2008: IEEE Swarm Intelligence Symposium, St. Louis, Missouri, USA, 2008.
- WCNC 2007: IEEE Wireless Communications and Networking Conference
- IJCAI 2007: International Joint Conference on Artificial Intelligence
- ANTS 2006: Sixth International Workshop on Ant Colony Optimization and Swarm Intelligence, Brussels, Belgium, 2006
- ANTS 2004: Fourth International Workshop on Ant Colony Optimization and Swarm Intelligence, Brussels, Belgium, 2004
- Workshop on Hybrid Metaheuristics (HM 2004) at the sixteenth European Conference on Artificial Intelligence (ECAI), Valencia, Spain, 2004
- First International Workshop on Biologically Inspired Approaches to Advanced Information Technology (BIO-ADIT), Lausanne, Switzerland, 2004
- Eighteenth International Joint Conference on Artificial Intelligence (IJCAI), Acapulco, Mexico, 2003

Teaching

- Teaching assistant for “Object Oriented Programming 2” in the bachelor program at the Scuola Universitaria Professionale della Svizzera Italiana (SUPSI), Lugano, Switzerland.

Computer skills

Programming languages: C, C++, Java, Perl, Pascal, Delphi, SQL, Prolog

Software Packages: Microsoft Office, Clementine data mining software, Weka data mining software, Latex, Arena (simulation), QualNet (computer network simulation), ...

Operating Systems: Microsoft Windows, Linux.

Languages

Dutch: Mother tongue

English: Speaking, listening, reading and writing: excellent
(Computer-based TOEFL test: 283/essay rating: 5.0)

French: Speaking, listening, reading and writing: very good

Italian: Speaking, listening and reading: good. Writing: basic

Spanish: Speaking, listening and reading: good. Writing: basic

German: Basic

Hobbies

Sports: football (soccer), squash, badminton, cycling, skiing, snowboarding, running, tennis, table tennis,
swimming, hiking, ...

Travelling, socialising, watching movies.