

# Curriculum Vitae

Claudia D'Ambrosio

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CNRS Chargée de Recherche and Chargée d'Enseignement at:

LIX, Laboratoire d'Informatique de l'École Polytechnique  
91128 Palaiseau CEDEX, France

Office: LIX 1066 (Batiment Alan Turing, first floor)

E-mail address: [dambrosio@lix.polytechnique.fr](mailto:dambrosio@lix.polytechnique.fr)

Office phone n.: +33.1.77.57.80.06

## Personal Information and Education

July 2018: **Habilitation à Diriger des Recherches** (French diploma to supervise research, it must be obtained prior to applying to full professorships in France), Solving well-structured MINLP problems. Université Paris 13, Paris, 19 July 2018. Jury : E. Carrizosa, I.E. Grossmann, R. Misener (referees), S. Elloumi, J.B. Lasserre (examiners), F. Roupin, R. Wolfler Calvo (sponsors).

From January 2006 to April 2009: **PhD student** in “Automatic Control and Operations Research” at the Dipartimento di Elettronica, Informatica e Sistemistica (DEIS), **University of Bologna** (Italy). Thesis “Application-oriented Mixed Integer Non-Linear Programming”, advisor Prof. Andrea Lodi.

21st March 2005: **Master** degree in Computer Science Engineering at the **University of Bologna** (Italy). Thesis: “Algorithms for the Water Network Design Problem” advisor Prof. Paolo Toth, co-advisors Prof. Andrea Lodi and Dr. Cristiana Bragalli.

## Awards and Distinctions

**Nomination to CNRS bronze medal** by CoNRS Section 6, 2018 (<https://members.loria.fr/SPerdrix/files/cn6/>).

**2nd Robert Faure ROADEF prize** 2015 (this is the triennial prize of the French OR society, with three laureates at each edition).

**EURO Doctoral Dissertation Award** 2010 with the PhD Thesis “Application-oriented Mixed Integer Non-Linear Programming”, EURO Conference 2010, Lisbon (Portugal), 2010. It is the highest European recognition for a Ph.D. thesis in OR.

## Funded ongoing projects

- Principal Investigator and Supervisory Board member for CNRS, European Project (Marie Curie) “MINOA”, 2018-2021.
- Leader of the Programme Gaspard Monge pour l’Optimisation project “Shortest path problem variants for the hydro unit commitment problem”, funded by the Fondation mathématique Jacques Hadamard.
- Leader of the Project “Learning to solve Hydro Unit Commitment problems in France” sponsored by the Siebel Energy Institute seed grant, <http://www.siebelenergyinstitute.org/2016-research-grants/>.
- Participant of the Project “From resource to price: machine learning for Italian electricity network and market” sponsored by the Siebel Energy Institute seed grant, <http://www.siebelenergyinstitute.org/2016-research-grants/>.

## Funded past projects

- Leader of the Programme Gaspard Monge pour l’Optimisation project “Decomposition and feasibility restoration for Cascaded Reservoir Management”, funded by the Fondation mathématique Jacques Hadamard.
- Participant of the Programme Gaspard Monge pour l’Optimisation project “Résolution de programmes polynomiaux, approche par relaxation quadratique convexe”, funded by the Fondation mathématique Jacques Hadamard.
- Management Committee member of the COST Action TD1207 Mathematical Optimization in the Decision Support Systems for Efficient and Robust Energy Networks ([http://www.cost.eu/domains\\_actions/ict/Actions/TD1207](http://www.cost.eu/domains_actions/ict/Actions/TD1207)).
- Leader of the Programme Gaspard Monge pour l’Optimisation project “Optimality for Tough Combinatorial Hydro Valley Problems”, funded by the Fondation mathématique Jacques Hadamard (<http://www.lix.polytechnique.fr/~dambrosio/PGMO.php>).
- Participant of the European Project (Marie Curie) “MINO: Mixed Integer Nonlinear Optimization” (<http://www.mino-itn.unibo.it/>).
- Participant of the ANR jcyj project “ATOMIC: Air Traffic Optimization via Mixed Integer Computation” (<http://www.recherche.enac.fr/~cafieri/atomic.html>).

## Professional Experience

From October 2015: **senior research scientist** (formerly chargée de Recherche 1ere classe) at CNRS in the LIX, École Polytechnique (France).

From September 2014: **adjunct assistant professor** (chargée d'enseignement) at École Polytechnique (France).

From October 2011 to September 2015: **research scientist** (chargée de Recherche 2eme classe) at CNRS in the LIX, École Polytechnique (France).

From November 2010 to August 2011: **post-doc** in “Algorithms and techniques for MINLP problems with a special attention to optimization problems for unit commitment, scheduling and distribution of electric power” at the Dipartimento di Elettronica, Informatica e Sistemistica (DEIS), University of Bologna (Italy).

From May to October 2010: **post-doc** in “Mixed Integer NonLinear Programming” at the Industrial and System Engineering Department (ISyE), University of Wisconsin - Madison (U.S.A.).

From May 2009 to April 2010: 1-year **post-doc** in “Algorithms and techniques for MINLP problems with a special attention to optimization problems for unit commitment, scheduling and distribution of electric power” at the Dipartimento di Elettronica, Informatica e Sistemistica (DEIS), University of Bologna (Italy).

From May 2008 to July 2008: **consulting** for OPTIT on a project with Hera Comm on the optimization of energy cogeneration plants under the supervision of Prof. Andrea Lodi.

From July 2007 to September 2007: working as **co-op/intern** at IBM TJ Watson Research Center (Yorktown, NY) under the supervision of Dr. Jon Lee and Dr. Andreas Wächter on the research project “Mixed Integer Nonlinear Programming”.

From 2006: **tutoring** in Operations Research (undergraduate and master level).

From 2006 to 2009: **PhD student** in “Automatic Control and Operations Research” at the Dipartimento di Elettronica, Informatica e Sistemistica (DEIS), University of Bologna (Italy).

From July 2005 to December 2005: **collaboration** with the Operations Research group of the “Dipartimento di Elettronica, Informatica e Sistemistica (DEIS)” of the University of Bologna for the development of algorithms for the Waste Management Problem (UE Project Integrated Urban Waste-Management Model (IUWMM)).

From April 2005 to June 2005: **collaboration** with the Operations Research group of the “Dipartimento di Elettronica, Informatica e Sistemistica (DEIS)” of the University of Bologna for the development of algorithms for the Capacity Planning Problem (UE Project PARTNER).

## Publications

### International Journals

1. C. D'Ambrosio, M. Fampa, J. Lee, S. Vigerske. On a Nonconvex MINLP Formulation of the Euclidean Steiner Tree Problem in n-Space: missing proofs, **Optimization Letters** (accepted).
2. L. Mencarelli, C. D'Ambrosio. Complex Portfolio Selection via Convex Mixed-Integer Quadratic Programming: A Survey, **International Transactions in Operational Research** (accepted).
3. P.-L. Poirion, S. Toubaline, C. D'Ambrosio, L. Liberti. An algorithm for bilevel programming, with applications to smart grids and social networks, **Discrete Applied Mathematics** (accepted).
4. Y. Sahraoui, P. Bendotti, C. D'Ambrosio. Real-world hydro-power unit-commitment: dealing with numerical errors and feasibility issues, **Energy** (accepted).
5. S. Cafieri, C. D'Ambrosio. Feasibility Pump algorithms for aircraft deconfliction with speed regulation, **Journal of Global Optimization**, 71, pp. 501–515, 2018.
6. C. D'Ambrosio, F. Furini, M. Monaci, E. Traversi. On the 0-1 Product Knapsack Problem, **Optimization Letters**, 2 (4), 691–712, 2018.
7. C. D'Ambrosio, S. Martello, L. Mencarelli. Relaxations and Heuristics for the General Multiple Non-linear Knapsack Problem, **Computer & Operations Research**, 93, pp. 79–89, 2018.
8. S. Toubaline, C. D'Ambrosio, L. Liberti, P.-L. Poirion, B. Schieber, H. Shachnai. Complexity and inapproximability results for the Power Edge Set problem, **Journal of Combinatorial Optimization**, 35 (3), pp. 895–905, 2018.
9. C. Buchheim, C. D'Ambrosio. Monomial-wise Optimal Separable Underestimators for Mixed-Integer Polynomial Optimization, **Journal of Global Optimization**, 67 (4), pp. 759–786, 2017.
10. V. Cacchiani, C. D'Ambrosio. A Branch-and-Bound based Heuristic Algorithm for Convex Multi-Objective MINLPs, **European Journal of Operations Research**, 260 (3), pp. 920–933, 2017.
11. C. D'Ambrosio, A. Frangioni, A. Lodi, M. Mevissen. Special issue on: Nonlinear and combinatorial methods for energy optimization. **EURO Journal on Computational Optimization**, 5(1), pp.1–3, 2017.
12. R. Taktak, C. D'Ambrosio. An Overview on Mathematical Programming Approaches for the Deterministic Unit Commitment Problem in Hydro Valleys, **Energy Systems**, 8(1), pp. 57–79, 2017.

13. C. D'Ambrosio, K.K. Vu, C. Lavor, L. Liberti, N. Maculan, New error measures and methods for realizing protein graphs from distance data, **Discrete & Computational Geometry**, 57(2), pp.371–418, 2017.
14. K.K. Vu, C. D'Ambrosio, Y. Hamadi, L. Liberti. Surrogate-based methods for black-box optimization, **International Transactions in Operational Research**, 24(3), pp. 393–424, 2017.
15. C. D'Ambrosio, G. Nannicini, G. Sartor. MILP models for the selection of a small set of well-distributed points, **Operations Research Letters**, 45, pp. 46–52, 2017.
16. P.-L. Poirion, S. Toubaline, C. D'Ambrosio, L. Liberti. The Power Edge Set problem, **Networks**, 68 (2), pp. 104–120, 2016.
17. C. D'Ambrosio, A. Lodi, S. Wiese, C. Bragalli. Mathematical Programming techniques in Water Network Optimization, **European Journal of Operations Research**, 243 (3), pp. 774–788, 2015.
18. R. Rovatti, C. D'Ambrosio, A. Lodi, S. Martello. Optimistic MILP Modeling of Non-linear Optimization Problems, **European Journal of Operations Research**, 239 (1), pp. 32–45, 2014.
19. G. Costa, C. D'Ambrosio, S. Martello. GraphsJ 3: A Modern Didactic Application for Graph Algorithms, **Journal of Computer Science**, 10 (7), pp. 1115–1119, 2014.
20. C. D'Ambrosio, A. Lodi. Mixed integer nonlinear programming tools: an updated practical overview, **Annals of Operations Research**, 204, pp. 301–320, 2013.
21. C. D'Ambrosio, A. Frangioni, L. Liberti, A. Lodi. A Storm of Feasibility Pumps for Nonconvex MINLP, **Mathematical Programming**, 136 (2), pp. 375–402, 2012.
22. C. Bragalli, C. D'Ambrosio, J. Lee, A. Lodi, P. Toth. On the Optimal Design of Water Distribution Networks: a Practical MINLP Approach, **Optimization and Engineering**, 13, pp. 219–246, 2012.
23. C. D'Ambrosio, A. Lodi. Mixed Integer Non-Linear Programming Tools: a Practical Overview, **4OR: A Quarterly Journal of Operations Research**, 9 (4), pp. 329–349, 2011.
24. C. D'Ambrosio, S. Martello. Heuristic algorithms for the general nonlinear separable knapsack problems, **Computers and Operations Research**, 38 (2), pp. 505–513, 2011.
25. C. D'Ambrosio. Application-oriented Mixed Integer Non-Linear Programming. **4OR: A Quarterly Journal of Operations Research**, 8 (3), pp. 319–322, 2010.
26. C. D'Ambrosio, A. Frangioni, L. Liberti, A. Lodi. On Interval-subgradient and No-good Cuts, **Operations Research Letters**, 38, pp. 341–345, 2010

27. G. Costa, C. D'Ambrosio, S. Martello. A free educational Java framework for graph algorithms, **Journal of Computer Science**, 6 (1), pp. 87-91, 2010.
28. C. D'Ambrosio, A. Lodi, S. Martello. Piecewise linear approximation of functions of two variables in MILP models, **Operations Research Letters**, 38, pp. 39-46, 2010.
29. A. Borghetti, C. D'Ambrosio, A. Lodi, S. Martello. A MILP Approach for Short-Term Hydro Scheduling and Unit Commitment with Head-Dependent Reservoir, **IEEE Transactions on Power Systems** 23 (3), pp. 1115–1124, 2008.

### Book Chapters (refereed)

1. C. Bragalli, C. D'Ambrosio, J. Lee, A. Lodi, P. Toth. Optimizing the Design of Water Distribution Networks Using Mathematical Optimization. In K.G. Murty (ed.) **Case Studies in Operations Research: applications of optimum decision making**, International Series in Operations Research & Management Science, 212, pp. 183-198, Springer-Verlag New York, 2015.
2. A. Borghetti, C. D'Ambrosio, A. Lodi, S. Martello. Optimal scheduling of a multi-unit hydro power station in a short-term time horizon. In K.G. Murty (ed.) **Case Studies in Operations Research: applications of optimum decision making**, International Series in Operations Research & Management Science, 212, pp. 167-181, Springer-Verlag New York, 2015.
3. C. D'Ambrosio, J. Lee, A. Wächter. An algorithmic framework for MINLP with separable non-convexity, J. Lee and S. Leyffer (Eds.): **Mixed-Integer Nonlinear Optimization: Algorithmic Advances and Applications**, The IMA Volumes in Mathematics and its Applications, Springer New York, 154, pp. 315-347, 2012.
4. C. D'Ambrosio, A. Lodi, S. Martello. Combinatorial Traveling Salesman Problem Algorithms, J.J. Cochran et al. (Eds.): **Wiley Encyclopedia of Operations Research and Management Science**, John Wiley and Sons, Inc., 1, pp. 738-747, 2010.

### Conferences (refereed)

1. P.-O. Banguion, C. D'Ambrosio, L. Liberti. Maximum concurrent flow with incomplete data, In **Lecture Notes in Computer Science, ISCO 2018**, to appear.
2. W. van Ackooij, C. D'Ambrosio, L. Liberti, R. Taktak, D. Thomopoulos, S. Toubaline. Shortest Path Problem variants for the Hydro Unit Commitment Problem. **Electronic Notes in Discrete Mathematics**, to appear.

3. W. van Ackooij, C. D'Ambrosio, R. Taktak. Decomposition and feasibility restoration for cascaded reservoir management, A. Sforza and C. Sterle (Eds.),: **Optimization and Decision Science: Methodologies and Applications: ODS, Sorrento, Italy, September 4-7, 2017**, Springer International Publishing, pp. 629–637.
4. C. D'Ambrosio, L. Liberti. Distance geometry in linearizable norms. In **Lecture Notes in Computer Science**, vol. 10589, Geometric Science of Information: Third International Conference, **GSI 2017**, Paris, France, November 7-9, 2017, Proceedings, F. Nielsen and F. Barbaresco eds., Springer International Publishing, pp. 830–837, 2017.
5. L. Liberti, C. D'Ambrosio. The Isomap algorithm in distance geometry. In **Leibniz International Proceedings in Informatics (LIPIcs)**, vol. 75, 16th International Symposium on Experimental Algorithms (SEA 2017), Costas S. Iliopoulos and Solon P. Pissis and Simon J. Puglisi and Rajeev Raman eds., Schloss Dagstuhl–Leibniz-Zentrum fuer Informatik, pp. 5:1–5:13, 2017. ISBN = 978-3-95977-036-1, ISSN = 1868-8969,
6. O. Wang, L. Liberti, C. D'Ambrosio, C. De Sainte Marie, C. Ke. Controlling the average behaviour of business rules programs. In **Lecture Notes in Computer Science**, vol. 9718, Rule Technologies. Research, Tools, and Applications: 10th International Symposium, **RuleML 2016** Proceedings, J. J. Alferes et al. eds., Springer International Publishing, pp. 83–96, 2016.
7. S. Toubaline, P.-L. Poirion, C. D'Ambrosio, L. Liberti. Observing the state of a smart grid using bilevel programming. In **Lecture Notes in Computer Science**, vol. 9486, Combinatorial Optimization and Applications **COCOA 2015**, Z. Lu et al. eds., Springer International Publishing, pp. 364–376, 2015.
8. L. Liberti, C. D'Ambrosio, P.-L. Poirion, S. Toubaline, Measuring smart grids, Proceedings of **AIRO 2015**: pp. 11-20, 2015.
9. C. D'Ambrosio, M. Fampa, J. Lee, S. Vigerske. On a Nonconvex MINLP Formulation of the Euclidean Steiner Tree Problem in n-Space, **Lecture Notes in Computer Science**, vol. 9125, International Symposium on Experimental Algorithms **SEA 2015**, E. Bampis ed., pp. 122–133, 2015.
10. C. Lizon, C. D'Ambrosio, L. Liberti, M. Le Ravalec and D. Sinoquet. A Mixed-integer Nonlinear Optimization Approach for Well Placement and Geometry. In **Proceedings of ECMOR XIV - 14th European conference on the mathematics of oil recovery**, Catania, Italy, pp. 1838–1848, 2014.
11. C. Buchheim, C. D'Ambrosio. Box-Constrained Mixed-Integer Polynomial Optimization Using Separable Underestimators, **Lecture Notes in Computer Science** vol. 8494, Integer Programming and Combinatorial Optimization Conference - **IPCO 2014**, J. Lee and J. Vygen eds., Springer International Publishing, pp. 198–209, 2014.

12. C. D'Ambrosio, J.T. Linderoth, J. Luedtke. Valid Inequalities for the Pooling Problem with Binary Variables, **Lecture Notes in Computer Science** vol. 6655, Integer Programming and Combinatorial Optimization Conference - **IPCO 2011**, O. Gunluk and G.J. Woeginger eds., Springer-Verlag, pp. 117-129, 2011.
13. C. D'Ambrosio, A. Frangioni, L. Liberti, A. Lodi. Experiments with a Feasibility Pump Approach for Non-Convex MINLPs, **Lecture Notes in Computer Science** vol. 6049, 9th International Symposium on Experimental Algorithms - **SEA 2010**, P. Festa ed., Springer-Verlag, pp. 350 - 360, 2010.
14. C. D'Ambrosio, J. Lee, A. Wächter. A global-optimization algorithm for mixed-integer nonlinear programs having separable non-convexity, A. Fiat and P. Sanders (Eds.): **ESA 2009** (17th Annual European Symposium. Copenhagen, Denmark, September 2009), **Lecture Notes in Computer Science** 5757, pp. 107-118, Springer-Verlag Berlin Heidelberg, 2009.
15. C. Bragalli, C. D'Ambrosio, J. Lee, A. Lodi, P. Toth. An MINLP solution method for a Water Network Problem, Y. Azar and T. Erlebach (Eds.): Algorithms - **ESA 2006** (14th Annual European Symposium. Zurich, Switzerland, September 2006), **Lecture Notes in Computer Science**, pp. 696-707. Springer, 2006.

### Short papers in Conference (refereed)

1. L. Mencarelli, C. D'Ambrosio, A. Di Zio, S. Martello, Heuristics for the General Multiple Non-linear Knapsack Problem. **Electronic Notes in Discrete Mathematics**, 55, pp. 69–72, 2016.
2. C. D'Ambrosio, A. Frangioni, C. Gentile. Strengthening Convex Relaxations of Mixed Integer Non Linear Programming Problems with Separable Non Convexities. In Proceedings of **Global Optimization Workshop 2016** (GOW'16), Braga, Portugal, pp. 49–52, 2016.
3. C. D'Ambrosio, J. Linderoth, J. Luedtke, J. Schweiger. Strong Convex Nonlinear Relaxations of the Pooling Problem, **Oberwolfach workshop** on “Mixed-integer Nonlinear Optimization: A Hatchery for Modern Mathematics”, MFO, Oberwolfach, pp. 2715–2716, October 2015.
4. C. Lizon, C. D'Ambrosio, L. Liberti. Méthode non linéaire mixte en variables entières et réelles pour le placement et la géométrie des puits en ingénierie de réservoir. In **Proceedings of Journées Polyèdres et Optimisation Combinatoire** (JPOC9), Le Havre, France, 2015.
5. P.-L. Poirion, S. Toubaline, C. D'Ambrosio, L. Liberti. Localization on smart grids. In **Proceedings of Mathematical and Applied Global Optimization** (GOW'14), Global Optimization Workshop 2014, Malaga, Spain, pp. 101-103, 2014.
6. C. D'Ambrosio, K. Vu Khac, C. Lavor, L. Liberti, N. Maculan. Computational experience on Distance Geometry Problems. In **Proceedings of**



**Mathematical and Applied Global Optimization (GOW'14)**, Global Optimization Workshop 2014, Malaga, Spain, pp. 97-100, 2014.

7. C. D'Ambrosio, S. Martello. A heuristic algorithm for the general nonlinear separable knapsack problem. In **Proceedings of European Workshop on Mixed Integer Nonlinear Programming**. Marseille, France, pp. 115-117, 2010.
8. C. D'Ambrosio, A. Frangioni, L. Liberti, A. Lodi. Feasibility Pump(s) for Non-Convex Mixed-Integer NonLinear Programs. In **Proceedings of European Workshop on Mixed Integer Nonlinear Programming**. Marseille, France, pp. 25-26, 2010.

### Technical Reports and Working Papers

1. C. D'Ambrosio, J. Lee, L. Liberti, M. Ovsjanikov. Extrapolating curvature lines in rough concept sketches using mixed-integer nonlinear optimization (submitted).
2. J. Luedtke, C. D'Ambrosio, J. Linderoth, J. Schweiger. Strong Convex Nonlinear Relaxations of the Pooling Problem: Extreme Points, ZIB Report 18-13.
3. J. Luedtke, C. D'Ambrosio, J. Linderoth, J. Schweiger. Strong Convex Nonlinear Relaxations of the Pooling Problem, ZIB Report 18-12 (submitted).
4. M. Stéfanon, P. Drobinski, J. Badosa, S. Concettini, A. Creti, C. D'Ambrosio, D. Thomopoulos, P. Tankov. Scenario for wind-solar energy mix in Italy from regional climate simulations (submitted).
5. C. D'Ambrosio, L. Liberti, P.-L. Poirion, K. Vu. Random projections for trust-region subproblems with applications to derivative-free optimization (submitted).
6. C. D'Ambrosio, A. Frangioni, C. Gentile. Strengthening the Sequential Convex MINLP Technique by Perspective Reformulations, IASI-CNR, Report n. 17-01 (under review).

### Divulgateion articles

1. C. D'Ambrosio. Non Convex Mixed Integer Non Linear Programming, Bulletin de la ROADEF, 36, pp. 4-7, 2016.

### Theses

- C. D'Ambrosio. Application-oriented Mixed Integer Non-Linear Programming, PhD Thesis (April 2009). Under the supervision of Prof. Andrea Lodi (University of Bologna).
- C. D'Ambrosio. Algorithms for the Water Network Design Problem, Master Thesis (March 2005). Under the supervision of Dr. Cristiana Bragalli, Prof. Andrea Lodi, Prof. Paolo Toth (University of Bologna).

- C. D'Ambrosio. Query with Preferences: the Best Operator, Bachelor Thesis (December 2002). Under the supervision of Prof. Paolo Ciaccia (University of Bologna).

## Plenary Talks

1. C. D'Ambrosio, Challenging Problems in Energy Optimization: the Hydro Unit Commitment, OMS2017, Havana, Cuba, December 2017.
2. C. D'Ambrosio, Challenging Problems in Energy in Optimization: the Hydro Unit Commitment, SBPO2017, Blumenau, Brasil, August 2017.
3. C. D'Ambrosio, Using Bilevel Programming to Monitor Smart Grids, Workshop on Nonlinear Optimization Algorithms and Industrial Applications, Toronto, Canada, June 2016.
4. C. D'Ambrosio, On Black-Box Mixed Integer Non Linear Programming, MIP, Mixed Integer Programming Workshop 2016, Miami, FL, USA, May 2016.
5. C. D'Ambrosio, Strong Convex Nonlinear Relaxations of the Pooling Problem, Oberwolfach workshop on "Mixed-integer Nonlinear Optimization: A Hatchery for Modern Mathematics", MFO, Oberwolfach, October 2015.
6. C. D'Ambrosio, Optimization based on mixed integer nonlinear programming (MINLP) method, Workshop "Modelling Smart Grids: A New Challenge for Stochastics and Optimization", University of Prague, Czech Republic, September 2015.
7. C. D'Ambrosio, Global optimization for MINLPs with separable nonconvexities: convex relaxations and perspective reformulations, 2nd Sevilla Workshop on "Mixed Integer Nonlinear Programming: Theory, algorithms and applications", University of Seville, Spain, March 2015.
8. C. D'Ambrosio. MINO/COST training school, University of Tilburg, The Netherlands, March 2015.
9. C. D'Ambrosio, On the Mathematical Models and Methods for the Hydro Unit Commitment Challenges, COST Workshop on Mathematical Models and Methods for Energy Optimization (CWM<sup>3</sup>EO), September 2014.
10. C. D'Ambrosio, 5th Porto Meeting on Mathematics for Industry, April 2014. Three talks:
  - Basic notions of Mixed Integer Non-Linear Programming
  - MINLP applications, part I: Hydro Unit Commitment and Pooling Problem
  - MINLP applications, part II: Water Network Design and some applications of black-box optimization
11. C. D'Ambrosio, Mathematical Programming Approaches for Water Network Design, Journée Optimisation des Réseaux, November 2013.

12. C. D'Ambrosio, Real-world Mixed Integer NonLinear Programming applications: MILP and MINLP approaches, NATCOR Combinatorial Optimization course, Southampton, UK, September 2011.
13. C. D'Ambrosio, Optimistic MILP Modeling of Non-linear Optimization Problems, MIP, Mixed Integer Programming Workshop 2011, Waterloo, ON, Canada, June 2011 (Invited by Prof. Ted Ralphs).
14. C. D'Ambrosio, A Tutorial on Convex Mixed-Integer Nonlinear Programming, 3rd LANCS Workshop on Discrete and Non-Linear Optimisation. Lancaster, UK, April 2011. (Invited by Prof. Adam Letchford.)
15. C. D'Ambrosio, A feasibility pump for non-convex MINLPs, 2nd LANCS Workshop on Discrete and Non-Linear Optimisation. Southampton, UK, March 2010. (Invited by Prof. Adam Letchford.)
16. C. D'Ambrosio, A Feasibility Pump Heuristic for Non-Convex MINLPs, Spring Workshop on Computational Issues in Mixed Integer Nonlinear Programming. Bordeaux, France, March 2009. (Invited by Prof. Andrew J. Miller.)

## Seminars

1. C. D'Ambrosio, Classical formulations and strong valid inequalities for the pooling problem, Séminaire Parisien d'Optimisation at Institut Henri Poincaré (France), February 2017.
2. C. D'Ambrosio, Smart Grids Observability using Bilevel Programming, CORE O.R. Seminars at Université Catholique de Louvain (Belgium), April 2016.
3. C. D'Ambrosio, On the standard pooling problem and strong valid inequalities, CPSE Seminar Series at Imperial College (UK), February 2016.
4. C. D'Ambrosio, The pooling problem: classical formulations and stronger relaxations, IBM TJ Watson Research Center (USA), November 2015.
5. C. D'Ambrosio, The pooling problem: classical formulations and strong valid inequalities, GERAD, École Polytechnique de Montreal (Canada), November 2015.
6. C. D'Ambrosio, A Tutorial on the Methods and Practice of Mixed Integer Nonlinear Programming, Université de Liège (Belgium), March 2015.
7. C. D'Ambrosio, The importance of being... separable!, University of California Davis, USA, November 2014.
8. C. D'Ambrosio, A branch-and-bound method for box constrained integer polynomial optimization, LIPN, Paris 13, December 2013.
9. C. D'Ambrosio, A branch-and-bound method for box constrained integer polynomial optimization, Integer Programming for Lunch, IBM TJ Watson Research Center, USA, October 2013.

10. C. D'Ambrosio, Mixed Integer Linear Programming, EDF R&D, Clamart, France, September 2013 (2 lectures plus 2 exercises sessions).
11. C. D'Ambrosio, Fundamentals of the Theory and Practice of Mixed Integer Nonlinear Programming, Università Politecnica delle Marche, Ancona, June 2013.
12. C. D'Ambrosio, Branch-and-bound method for box-constrained polynomial optimization, Université catholique de Louvain, Louvain-la-Neuve, June 2013.
13. C. D'Ambrosio, Linear approximation techniques for mixed integer nonlinear programming: methods and a real-world application, Singapore University of Technology and Design, Singapore, January 2013.
14. C. D'Ambrosio, From Hydro Scheduling and UC with Head-Dependent Reservoir to Linear Approximation Techniques for Nonlinear Functions, EDF R&D, Clamart, France, December 2012.
15. C. D'Ambrosio, Optimality for Tough Combinatorial Hydro Valley Problems, PGMO Seminars, Palaiseau, France, November 2012
16. C. D'Ambrosio, Feasibility Pump, heuristic methods for nonconvex Mixed Integer Nonlinear Programming problems, Technische Universität Dortmund, Germany, April 2012.
17. C. D'Ambrosio, Pooling problem with binary variables: mixed integer programming relaxations and valid inequalities, LIF, Marseille, France, February 2012.
18. C. D'Ambrosio, Mixed integer nonlinear programming: heuristic and exact methods, INRIA, Bordeaux, France, March 2011.
19. C. D'Ambrosio, Linear approximation techniques for mixed integer nonlinear programming: methods and a real-world application, INRIA, Bordeaux, France, January 2011.
20. C. D'Ambrosio, Water Network Design: An MINLP approach, COPTA Talks. University of Wisconsin - Madison, USA, June 2010.
21. C. D'Ambrosio, Water Network Design by Mixed Integer Nonlinear Programming, University of Heidelberg, Germany, December 2009.
22. C. D'Ambrosio, Methods and Algorithms for Solving Non-Convex MINLP Problems, IBM T.J. Watson Research Center. Yorktown Heights, USA, September 2007.

## Conference Talks

1. C. D'Ambrosio, A. Frangioni, C. Gentile. Strengthening Convex Relaxations of Mixed Integer Non Linear Programming Problems with Separable Non Convexities. GOW'16, Braga, Portugal, September 2016.

2. C. D'Ambrosio, J. Linderoth, J. Luedtke, J. Schweiger. Strong Valid Inequalities for the Standard Pooling Problem, ICCOPT 2016. Tokyo, Japan, August 2016.
3. C. D'Ambrosio, J. Linderoth, J. Luedtke, A. Miller. Valid Inequalities for the Pooling Problem, ECCO 2015. Catania, Italy, May 2015.
4. C. D'Ambrosio. Presentation of the 2me Prix Robert Faure 2015, RoadeF 2015. Marseille, France, February 2015.
5. A. Conn, C. D'Ambrosio, L. Liberti, C. Lizon, D. Sinoquet, K. Vu Khac. A trust region method for solving grey-box MINLP, INFORMS 2014. San Francisco, USA, November 2014.
6. C. Buchheim, C. D'Ambrosio. A branch-and-bound method for box constrained integer polynomial optimization, IFORS 2014. Barcelona, Spain, July 2014.
7. C. Buchheim, C. D'Ambrosio. A Branch-and-Bound Method for Box-Constrained Mixed-Integer Polynomial Optimization Using Separable Underestimators, RoadeF 2014. Bordeaux, France, February 2014.
8. C. Buchheim, C. D'Ambrosio. New underestimators for box constrained integer polynomial optimization, INFORMS 2013. Minneapolis, USA, October 2013.
9. C. Buchheim, C. D'Ambrosio. A fast exact method for box constrained polynomial optimization, ECCO 2013. Paris, France, May 2013.
10. W. van Ackooij, C. D'Ambrosio, G. Doukopoulos, A. Frangioni, C. Gentile, F. Roupin, T. Simovic. Optimality for Tough Combinatorial Hydro Valley Problems, RoadeF 2013. Troyes, France, February 2013.
11. C. D'Ambrosio, A. Lodi, S. Martello, R. Rovatti. Optimistic modeling of non-linear optimization problems by mixed-integer linear programming, ISMP 2012. Berlin, Germany, August 2012.
12. C. D'Ambrosio, A. Lodi, S. Martello, R. Rovatti. Optimistically Approximating Non-linear Optimization Problems through MILP, EURO 2012. Vilnius, Lithuania, July 2012.
13. C. D'Ambrosio, A. Frangioni, L. Liberti A. Lodi. Extending Feasibility Pump to nonconvex mixed integer nonlinear programming problems, RoadeF 2012. Angers, France, April 2012.
14. C. D'Ambrosio, A. Frangioni, L. Liberti A. Lodi. Feasibility Pump algorithms for nonconvex Mixed Integer Nonlinear Programming problems, APMOD 2012. Paderborn, Germany, March 2012.
15. C. D'Ambrosio, J. Linderoth, J. Luedtke. Valid Inequalities for the Pooling problem with Binary Variables, IPCO Conference. Armonk, NY, USA., June 2011.

16. C. D'Ambrosio, J. Linderoth, J. Luedtke. Pooling problem with binary variables, SIAM Conference on Optimization. Darmstadt, Germany, May 2011.
17. C. D'Ambrosio, J. Linderoth, J. Luedtke. Valid inequalities for the pooling problem with binary variables, XV International Workshop on Combinatorial Optimization. Aussois, France, January 2011.
18. C. D'Ambrosio, J. Linderoth, J. Luedtke, A. Miller. Pooling Problems with Binary Variables, Modeling and Optimization: Theory and Application (MOPTA) Conference. Bethlehem, USA, August 2010.
19. C. D'Ambrosio. Application-oriented Mixed Integer Non-Linear Programming, 24th European Conference on Operations Research. Lisbon, Portugal, July 2010.
20. C. D'Ambrosio, S. Martello. A heuristic algorithm for the general nonlinear separable knapsack problem, European Workshop on Mixed Integer Nonlinear Programming. Marseille, France, April 2010.
21. C. D'Ambrosio, J. Lee, A. Wächter. An exact algorithm for separable non-convex MINLPs, XIV International Workshop on Combinatorial Optimization. Aussois, France, January 2010.
22. C. D'Ambrosio, A. Frangioni, L. Liberti, A. Lodi. A Feasibility Pump Algorithm for Non-Convex Mixed Integer Non-Linear Programming Problems, XL AIRO Annual Conference. Siena, Italy, September 2009. (Invited Session organized by Andrea Lodi and myself.)
23. C. D'Ambrosio, A. Lodi. Application-oriented Mixed Integer Non-Linear Programming, XL AIRO Annual Conference. Siena, Italy, September 2009.
24. C. D'Ambrosio, J. Lee, A. Wächter. A global-optimization algorithm for mixed-integer nonlinear programs having separable non-convexity, 17th Annual European Symposium on Algorithms (ESA). Copenhagen, Denmark, September 2009.
25. C. D'Ambrosio, J. Lee, A. Wächter. An Algorithmic Framework for Separable Non-convex MINLP, 20th International Symposium of Mathematical Programming (ISMP). Chicago, USA, August 2009. (Invited Session organized by Pietro Belotti.)
26. C. D'Ambrosio, A. Lodi, S. Martello. On the piecewise linear approximation of functions of two variables in MILP models, AIRO Winter 2009. Cortina d'Ampezzo, Italy, January 2009.
27. C. D'Ambrosio, M. Fischetti, A. Lodi, A. Wächter. Finding Mixed-Integer Linear Solutions through Non-Linear Programming, XXXIX AIRO Annual Conference. Ischia, Italy, September 2008.
28. A. Borghetti, C. D'Ambrosio, A. Lodi, S. Martello. MILP techniques for solving hydro scheduling and unit commitment problem, XXXIX AIRO Annual Conference. Ischia, Italy, September 2008.

29. C. D'Ambrosio, J. Lee, A. Wächter. An Algorithmic Framework for a Class of Non-Convex Minlp Problems, SIAM Conference on Optimization 2008. Boston, USA, May 2008.
30. A. Borghetti, C. D'Ambrosio, A. Lodi, S. Martello. MILP Techniques for Solving Hydro Scheduling and Unit Commitment Problems, 2nd FIMA International Conference. Champoluc, Italy, January 2008.
31. C. Bragalli, C. D'Ambrosio, J. Lee, A. Lodi, P. Toth. An MINLP solution method for a Water Network Problem, XXXVII AIRO Annual Conference. Cesena, Italy, September 2006.

## Posters

1. Wim van Ackooij, Claudia D'Ambrosio, Grace Doukopoulos, Antonio Frangioni, Claudio Gentile, Frederic Roupin, Youcef Sahraoui, and Tomas Simovic. Optimality for Tough Combinatorial Hydro Valley Problems. PGMO Opening Conference, Palaiseau, France, October 2013.
2. Wim van Ackooij, Claudia D'Ambrosio, Grace Doukopoulos, Antonio Frangioni, Claudio Gentile, Frederic Roupin, and Tomas Simovic. Optimality for Tough Combinatorial Hydro Valley Problems. PGMO Opening Conference, Palaiseau, France, September 2012.
3. C. D'Ambrosio, A. Frangioni, L. Liberti, A. Lodi. On Interval-subgradient and No-good Cuts. MIP 2010 Workshop on Mixed Integer Programming. Atlanta, USA, July 2010.
4. C. Bragalli, C. D'Ambrosio, J. Lee, A. Lodi, P. Toth. Water Network Design by MINLP. IMA Workshop on Mixed-Integer Nonlinear Optimization: Algorithmic Advances and Applications. Minneapolis, USA, November 2008.
5. C. D'Ambrosio, M. Fischetti, A. Lodi, A. Wächter. Non-Linear Programming based heuristic for Mixed-Integer Linear Programming. MIP 2008 Workshop on Mixed Integer Programming. New York, USA, August 2008.

## Editorial Activities

Associate Editor of **Optimization Methods & Software** (since September 2016).

Associate Editor of **Optimization and Engineering** (since July 2016).

Guest Editor of **EJOC (EURO Journal on Computational Optimization)** for a special issue on "Nonlinear and Combinatorial Methods for Energy Optimization".

Associate Editor of **4OR – A Quarterly Journal of Operations Research** jointly published by the Belgian, French, and Italian Operations Research Societies (since June 2014).

## Professional Duties

Scientific committee member at EUROPT Workshop 2018, Almeria, Spain (07/2018).

Organizer of the Energy stream at ISMP 2018, Bordeaux, France (07/2018).

Poster Award Committee member at MIP Workshop 2017, Montréal, Canada (06/2017).

President of the Ph.D. awarding committee of Faisal WAHID, École Polytechnique (06/2017).

Recruitment committee member for a Assistant Professor position at the Paris Dauphine (05/2017).

Recruitment committee member for an adjunct assistant professor position (chargée d'enseignement) at École Polytechnique (04/2017).

Scientific committee co-chair of the Mathematical Optimization in the Decision Support Systems for Efficient and Robust Energy Networks Final Conference 29/31 March 2017 Modena (Italy).

Recruitment committee member for a Professor position at the ENSTA (2016).

Head of Program "Optimisation", École Polytechnique (since academic year 2015-2016).

Chef d'équipe (team leader) of the SYSMO team, LIX, École Polytechnique (2014-2017).

Project Board Member of TREND-X, Transdisciplinary analysis of Renewable Energies at École Polytechnique (since December 2014).

Organizing committee member of MINO/COST PhD School 2016.

Recruitment committee member for a Maitre de Conference position at the Laboratoire Jean Kuntzmann, Grenoble (2015).

Member of the Ph.D. awarding committee of Sellé Touré, Université de Grenoble (October 2014).

Recruitment committee member for a Maitre de Conference position at CNAM (2014).

Committee member of the Award for the Best EJOR Paper (EABEP) 2014.

Scientific committee member of ROADEF 2014.

Co-chair of the COST Workshop on Mixed Integer NonLinear Programming (CWMINLP) 2013.



Selection committee member for the LIX-Qualcomm-Carnot postdoc 2013-14.

Organizer of the Mixed-Integer Non Linear Programming stream at the EURO-INFORMS 2013.

Organizer of Mixed Integer Programming (MIP) workshop 2012.

Organizer of the Mixed-Integer Non Linear Programming stream at the EURO 2012.

Organizer of many sessions at the AIRO Annual Conference.

## Scientific Community Contribution

Contributor of open-source solver ROSE (COIN-OR).

Contributor of open-source solver BONMIN (COIN-OR).

## Teaching Experience

Responsible for the course: **Big Data** (INF442), École Polytechnique, France for the academic years 2017-2018.

Assistant for the course: **Big Data** (INF442), École Polytechnique, France for the academic years 2014-2015, 2015-2016, 2016-2017.

Co-responsible for the course: **Initiation to Research**, Master Parisien de Recherche Opérationnelle, France for the academic year 2013-2014, 2014-2015, 2015-2016, 2016-2017.

Lecturer and responsible for the course: **Advanced Mathematical Programming** (PMA), Master Parisien de Recherche Opérationnelle, France for the academic year 2012-2013, 2013-2014, 2014-2015, 2015-2016, 2016-2017.

Assistant for the course: **Constraint Programming and Mathematical Programming** (INF580), École Polytechnique, France for the academic year 2013-2014, 2014-2015.

Lecturer for the course: **Introduction to C++** (INF585), École Polytechnique, France for the academic year 2012-2013.

Lecturer for the course: **Optimization in Health Care** of the Master in Ingegneria Clinica, COFIMP, Bologna (together with Professor Silvano Martello) for the academic years 2008-2009/2009-2010/2010-2011.

Tutor for the course: **Operations Research M** with Professor Silvano Martello

at the Faculty of the Engineering of the University of Bologna (Italy) for the academic year 2009-2010/2010-2011.

Tutor for the course: **Fundamentals of Operations Research L-A** with Professor Silvano Martello at the Faculty of the Engineering of the University of Bologna (Italy) for the academic years 2006-2007/2007-2008/2008-2009/2009-2010.

Tutor for the course: **Operations Research L-S** with Professor Silvano Martello at the Faculty of the Engineering of the University of Bologna (Italy) for the academic years 2006-2007/2007-2008/2008-2009.

Tutor for the course: **Lab of Optimization Tools L** with Professor Andrea Lodi at the Faculty of the Engineering of the University of Bologna (Italy) for the academic years 2006-2007/2007-2008/2008-2009.

Tutor for the course: **Lab of Operations Research L-A** with Professor Andrea Lodi at the Faculty of the Engineering of the University of Bologna (Italy) for the academic years 2006-2007/2007-2008/2008-2009.

## Languages

Italian: mother tongue.

English: good knowledge.

French: B2.

## Computer Skills

Programming Languages: C, C++, Java, JSP.

Operating Systems: Linux, Windows.

Software for Optimization: AMPL, Arena, COIN-OR solvers, Cplex, GAMS, Julia, JuMP, LaTeX, Matlab, MPL, Porta, SCIP.

## PhD Students

### Current

Gabriele Iommazzo: PhD co-advisor.

## **Past**

Luca Mencarelli: PhD co-advisor (European Project MINO).

Olivier Wang: PhD co-advisor (thesis CIFRE with IBM).

Youcef Sahraoui: PhD co-advisor (thesis CIFRE with EDF).

Claire Lizon: PhD co-advisor (thesis CIFRE with IFPEN).

## **Master and Bachelor Students**

### **Current**

Francesco Vita (Università Politecnica delle Marche, Italy).

### **Past**

Gabriele Iommazzo: co-advisor of the Master thesis in Master of Science in Business Informatics (2017). Now PhD student at École Polytechnique.

Angelo Di Zio: co-advisor of the Master thesis in Computer Science Engineering (2012). Now at Ferrari S.P.A.

Enrico Galassi: co-advisor of the Bachelor thesis in Computer Science Engineering (2011).

Simone Bacchilega: co-advisor of the Bachelor thesis in Computer Science Engineering (2011).

Michele Dinardo: co-advisor of the Master thesis in Computer Science Engineering (2010). Now at KPMG.

Gianluca Costa: co-advisor of the Bachelor thesis in Computer Science Engineering (2009). Now at YOOX Group.

Paolo Magini: co-advisor of the Master thesis in Industrial Engineering (2006). Now at Reply.