

# Leo Liberti

Place and date of birth: Milan, Italy, 8th May 1974  
Citizenship: Italian  
Residence: 39 rue de Chabrol, 75010 Paris, France  
Corresponding address: LIX, École Polytechnique, F-91128 Palaiseau, France  
Telephone: +33660691151, +393332680827  
E-mail: [liberti@lix.polytechnique.fr](mailto:liberti@lix.polytechnique.fr)  
URL: <http://www.lix.polytechnique.fr/~liberti>

At a glance (April 21, 2012)			
<i>Endowments</i>	<i>Postdoc/Ph.D.</i>	<i>Refereed papers</i>	<i>Google Scholar H-index</i>
1.8MEUR	16	128	20

## Main research interests

- Reformulations in mathematical programming
- Mixed-Integer Nonlinear Programming and Global optimization
- Combinatorial optimization
- Complex industrial systems and sustainable development
- Bioinformatics

## Education

2007	<b>HDR</b>	Paris-Dauphine University, Paris, France	-
2004	<b>Ph.D.</b>	Imperial College London (UK)	-
1997	<b>Master</b> (Mathematics)	University of Turin (Italy)	110/110 cum Laude
1995	<b>B.Sc.</b> (Mathematics)	Imperial College London (UK)	First Class
1992	<b>European Baccalaureat</b>	European School, Culham (UK)	78/100

- HDR<sup>1</sup> thesis title: *Reformulation Techniques in Mathematical Programming*.  
Awarded on: 19th November 2007.  
Awarded by: Paris-Dauphine University, France.  
Coordinator: V. Paschos.  
Jury: Ph. Baptiste, A. Billionnet, A. Lisser, T. Westerlund.  
Referee reports: N. Maculan, Ph. Michelon, H. Serali.
- On the French National University Council (CNU) qualification lists for “Maître de Conférences” in sections 26 (applied mathematics) and 27 (computer science) since January 2006.
- Ph.D. thesis title: *Reformulation and Convex Relaxation Techniques for Global Optimization*.  
Awarded on: 15th March 2004.  
Awarded by: CPSE, Imperial College London, UK.  
Supervisor: Prof. C. Pantelides.  
Examiners: Prof. T. Westerlund, Prof. E.N. Pistikopoulos.

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<sup>1</sup>*Habilitation à Diriger des Recherches*, a diploma that must be obtained prior to applying to Associate Professorships in France.

## Employment History

Full-time:

2010-now	Associate Professor <sup>a</sup> at LIX, École Polytechnique, France.
2006-2010	Assistant Professor <sup>b</sup> at LIX, École Polytechnique, France.
2005-2006	Post-doc at LIX, École Polytechnique, France.
2003-2005	Post-doc at DEI, Politecnico di Milano, Italy.
1999-2003	Research assistant (RA1B) at CPSE, Imperial College London, UK.
1998-1999	Compulsory military service in Italy.
1997-1998	Computer science teacher at the CSEA school, Turin, Italy ( <a href="http://www.csea.it">www.csea.it</a> ).

<sup>a</sup>*Professeur Chargé de Cours*, equivalent to *Professeur des Universités de 2ème classe*. In France, this is considered a “full professor” position.

<sup>b</sup>*Maître de Conférence*.

Part-time:

2001-2008	Co-founder of the Ipnos Partnership, London, UK ( <a href="http://www.ipnos.co.uk">http://www.ipnos.co.uk</a> ).
2000-2002	Co-founder of IrisTech S.r.l., Italy ( <a href="http://www.iris-tech.net">http://www.iris-tech.net</a> ).
1999-2004	Network administrator, Imperial College London.
1994-1997	Programming consultant, Imperial College London.

## Research Activities

- *Reformulations in mathematical programming*. Mathematical Programming (MP) is a formal language for describing optimization problems. A MP consists of parameters (encoding the problem instance), decision variables (encoding the solution), objective functions and constraints. Limited to functional forms which can be represented by Directed Acyclic Graphs (DAGs) the leaves of which are parameters and variables, the other nodes being the operators, a *reformulation* is a computable transformation of a MP  $P$  into another MP  $Q$  which shares some mathematical property  $\mathcal{P}$  with  $P$  (e.g.  $\mathcal{P} \equiv$  “all optima of  $Q$  are optima of  $P$ ”). Publications: [76, 77, 79, 64, 87, 9, 101, 25, 66, 15, 108, 26, 32, 33, 35, 36, 38, 40, 41, 42, 43, 44, 45, 46, 47, 48, 57, 68, 69, 70, 71, 73, 75, 104, 112, 120, 121, 122, 124, 126, 129, 132, 133, 139, 142, 143, 150]. Software: ROSE [101, 69]. Funding: [6, 9, 13, 17].
- *Global optimization*. Deterministic  $\varepsilon$ -approximate (spatial Branch-and-Bound) and heuristic solution algorithms for nonconvex Mixed-Integer Nonlinear Programs (MINLP). Publications: [77, 17, 9, 11, 96, 54, 25, 55, 15, 108, 26, 30, 32, 34, 36, 41, 42, 43, 45, 46, 47, 48, 52, 153, 60, 62, 68, 70, 73, 74, 75, 109, 112, 119, 133, 134, 136, 139, 143, 151, 152]. Software: COUENNE [30], RECIPE [17, 119], *ooOPS* [152]. Funding: [3, 5, 24].
- *Combinatorial optimization*. Mixed-Integer Linear Programming (MILP) solution techniques: branching on general disjunctions, spherical cuts, symmetry-breaking, convex hull, binary quadratic programs; clustering by modularity maximization; problems on graphs: covering by bipartite graphs, shortest paths on dynamic graphs, minimum fundamental cycle bases. Publications: [1, 3, 63, 78, 81, 53, 84, 65, 20, 13, 24, 27, 16, 18, 19, 28, 29, 31, 37, 38, 40, 49, 51, 56, 58, 59, 61, 68, 100, 115, 116, 117, 122, 123, 124, 125, 127, 128, 129, 130, 131, 132, 137, 138, 140, 141, 144, 148, 150]. Software: *minfcb* [31]. Patent: [146]. Funding: [4, 8, 20, 21].
- *Complex industrial systems*. Applications of optimization to complex systems arising in industry: efficient routing on traffic-dependent road networks, gamma knife configuration, optimization of a biomass production process, optimized platforming, verification of embedded code, recommender systems (and other subjects). Publications: [78, 4, 80, 84, 85, 92, 93, 98, 99, 28, 35, 36, 37, 70, 103, 114, 116, 123, 125, 128, 130, 133]. Patent: [146]. Funding: [4, 7, 10, 11, 12, 16, 19, 20, 21, 22, 23, 24].
- *Bioinformatics*. Protein structure from NMR data, morphogenesis, Hartree-Fock equations. Publications: [2, 63, 82, x83, 5, 83, 14, 6, 7, 8, 89, 86, 91, 94, 10, 95, 12, 102, 23, 21, 22, 32, 34, 39, 42, 50, 72, 74, 105, 106, 110, 111, 113, 118, 120, 121, 134, 135, 149]. Software: *branchprune*, *MD-jeep* [102, 149]. Funding: [2, 14, 15, 18].
- *Optimization and Sustainable Development*. Research on the application of optimization methods to sustainable development applications: transportation and energy. Publications: [78, 90, 88, 147]. Funding: [7, 3, 1].

## Grants and sponsorships

1. *MSR Thesis Grant*. Microsoft Research PhD thesis award about optimization and simulation applied to smart buildings; at LIX, Ecole Polytechnique (PI, 3 years starting 2012, 100KEUR).
2. *Bip:Bip*. ANR project on bioinformatics led by Institut Pasteur (LIX workpackage leader, 119KEUR, 5 years, started 2012).
3. *IFPen*. PhD studentship on black-box MINLP techniques applied to reservoir engineering; at LIX, École Polytechnique (PI, 30KEUR, 3 years, started 2011).
4. *Mediamobile*. PhD studentship on multimodal shortest paths on large dynamic graphs research; at LIX, Ecole Polytechnique (co-PI, 57KEUR, 3 years, started 2009).
5. *EWMINLP10 workshop sponsorship* from IBM and TOTAL, 2010, 6KEUR (co-PI).
6. *ARM*. Digiteo “Emergence” project on Reformulations in Mathematical Programming, 3 years starting sept. 2009, 109KEUR (PI).
7. *OSD*. Microsoft Chair on Sustainable Development, 4 years starting 2009, 540KEUR (co-PI).
8. *CTW09 workshop sponsorship*. Digiteo support for scientific events, 7.5KEUR (PI).
9. *RMNCCO*. Digiteo “Senior Chair” on Reformulations in Mathematical Programming, 4 years starting march 2009, 250KEUR (PI).
10. *ASOPT*. ANR project on software verification, 3 years starting sept. 2008, around 700KEUR (5 partners).
11. *PASO*. Digiteo Emergence project on software verification, 2 years starting july 2008, 110KEUR (4 partners).
12. *FLUCTUAT*. Digiteo OMTE project on software verification, 1 year starting june 2008, around 50KEUR (2 partners).
13. *Digiteo Visiting Professor sponsorship*. Funding for inviting Prof. P. Hansen (GERAD, Canada) at LIX for 6 months in 2008/2009.
14. *X Visiting Professor sponsorship*. Funding for inviting Prof. C. Lavor (UniCamp, Brazil) at LIX for a 2-months period in 2009.
15. *CNRS Visiting Professor sponsorship*. Funding for inviting Prof. C. Lavor (UniCamp, Brazil) at LIX for a 3-months period in 2008.
16. *EDONA*. Paris Region System@tic project, part of Num@tec Automotive, for co-operative R&D in car electronics. Consortium of 19 industrial and academic partners; at LIX, École Polytechnique (PI for LIX Work Package, 56KEUR, 24 months starting 2007).
17. *ARS*. ANR (Agence Nationale de la Recherche) project on Automatic Reformulation Search; at LIX, École Polytechnique (PI for the whole project, 118KEUR, 36 months starting 2007).
18. *Morpheus*. EU project on the transition from genetic to morphological features in living beings: *in silico* simulations; at LIX, École Polytechnique (co-PI for the Work Package in which LIX participates, around 100KEUR, 24 months starting 2007).
19. *Post-doctoral fellowship fundings, complex industrial systems*. A post-doctoral fellowship on the subject of complex industrial systems awarded by the Ile-de-France region; at LIX, École Polytechnique (co-PI, 72KEUR, 18 months starting 2007).
20. *Mediamobile*. PhD studentship on shortest paths on large dynamic graphs research; at LIX, École Polytechnique (PI, 45KEUR, 3 years, starting 2006).
21. *Shortest paths on large dynamic graphs*. Partial real-time traffic information is interpreted as a dynamic (time) cost on a geographical graph representing the French route network. Computing shortest paths in such a graph is a challenging practical problem. This project is industrially sponsored by Mediamobile and organised within the framework of the Chaire Thales, LIX, École Polytechnique (PI, 20KEUR, early 2006).
22. *System@tic/Usine logicielle*. Ile-de-France project for the ParisTech competitiveness pole; focusing on verification and validation of software systems; at LIX, École Polytechnique (scientific adviser, around 120KEUR, 60 months started early 2006).
23. *Complex industrial systems*. A complex industrial system can be seen as a collection of hypergraphs which model all the relationships among the different agents. From this model it is possible to formulate related (nonlinear) scheduling and classification problems. This project is led by Prof. D. Kroh (LIX, École Polytechnique) and sponsored by Thales Group (around 1MEUR over 5 years, on the grant 2005-2009).

24. *Biomass-based energy production*. Energy can be produced by processing biomass-based materials, including wasted alimentary fats and unused agricultural products. The planning and running of such an industrial plant requires the use of optimization. This is an industrially sponsored project in collaboration with TechnoPlan, a small Milan firm which received a regional grant for building such plants throughout many Italian regions (co-PI, 30KEUR, 2005-2006).
25. *Ipnos partnership*. Founded in London, UK in 2001, with three partners. Management and design of computer networks. Research and development of B2B paradigm on-line software packages. Net revenue: around 35K GBP / year (co-founder and partner at 45%).
26. *IrisTech s.r.l.*. Founded in Milan, Italy in 2000, with two partners. Website hosting for medium-sized businesses. Net revenue: 50K euro / year. Co-founder and partner at 20% until 2002.

## Prizes

- 2nd position in the “Modularity Clustering Quality Challenge” section of the 10th *DIMACS Implementation Challenge* 2012.
- 2nd “Robert Faure” ROADEF prize 2009 (this is the tri-ennial prize of the French OR society, with three laureates at each edition).
- “Best poster” prize at Digiteo Annual Forum 2008.
- IMA (Institute for Mathematics and Applications) Prize for “exceptional performance” on completion of the B.Sc.

## Organization and administration activities

- COIN-OR Foundation member since Oct. 2012.
- Programme Committee co-chair for ATMOS 2012.
- Programme Committee member for the Symposium on Experimental Algorithms (SEA12), 2012 (LNCS Proceedings).
- Programme Committee member for Mini Euro Conference on Variable Neighbourhood Search (MECVNS12), 2012.
- Associate Editor for Computational Management Science since 2011.
- Programme Committee member for MatHeuristics 2012 international workshop.
- Associate Editor for EURO Journal of Computational Optimization since foundation (2012).
- Member of the Programme Committee of the Int. Conf. on Op. Res. and Enterprise Systems (ICORES), Algarve 2012.
- Member of the Programme Committee of the European Symposium on Computer Aided Process Engineering (ESCAPE), London 2012.
- Organization of the workshop Pretty Structures 2011 (IHP, Paris, May 2011, with J. Edmonds).
- Department Vice President since nov. 2010.
- Editor in Chief (with S. Martello and T. Marchant) of *JOR* (Springer) since sept. 2010.
- Co-director of Microsoft-CNRS Chair “Optimization and Sustainable Development” since february 2010.
- Head of research team (System Modelling and Optimization — SYSMO) since february 2010.
- On the Editorial Board of *Discrete Applied Mathematics* (Elsevier) since february 2010.
- Organizing committee co-chair for the Oberwolfach Mini-Workshop “Exploiting Symmetry in Optimization” (Aug. 2010).
- Organizing committee co-chair for CPAIOR 2010 satellite workshop HybridNL.
- Organization of the sixth Optimeo Workshop (Paris, March 2010).
- Organizing committee for CSDM 2010 international conference.
- Programme Committee member for MatHeuristics 2010 international workshop.
- Organizing committee co-chair for TOGO10 international workshop on Global Optimization, August 2010.

- Scientific committee member of the international conference ICOSC2010, July 2010.
- Organizing committee co-chair for EWMINLP10 international workshop on MINLPs, April 2010.
- Local organizing committee chair in CTW09 international workshop on Graphs and Combinatorial Optimization in Paris, France, June 2009.
- Organizing committee co-chair for CPAIOR 2009 satellite workshop BR-OPT.
- Guest editor with N. Maculan of a special issue of *Discrete Applied Mathematics* on “Reformulation techniques in Mathematical Programming” (Vol. 157(6), March 2009).
- Digiteo program committee, 2008-2009.
- Organization of the first Optimeo 2008 Workshop.
- Recruitment committee of Paris 6 University since October 2007.
- Scientific and local committee of the international workshop CAL07 (Colloque d’Automne du LIX 2007).
- Scientific committee of Cologne-Twente Workshop on Graphs and Combinatorial Optimization (yearly international workshop) since June 2007.
- Associate Editor for *International Transactions in Operational Research* (Blackwell) since April 2007.
- Recruitment committee of Paris-Sud University since March 2007.
- Guest editor with U. Faigle, S. Pickl, F. Maffioli of a special issue of *Discrete Applied Mathematics* (Vol. 155(14), September 2007).
- Guest editor with U. Faigle, S. Pickl, F. Maffioli of a special issue of *Discrete Optimization* (Vol. 3(3), September 2006).
- Associate Editor for *Journal of Global Optimization* (Springer) since September 2006.
- Scientific committee of the international conference MECVNS on Variable Neighbourhood Search, Tenerife, Spain, 2005.
- Local organizing committee member in CTW04 international workshop on Graphs and Combinatorial Optimization in Menaggio, Italy, 2004. Co-editor of the Conference Proceedings (published in the Electronic Notes in Applied Mathematics **17**, Elsevier 2004).
- Referee for several international journals.

## Conference attendance

- GOW12, Natal, Brazil, June 2012 **Plenary speaker**.
- GSC12, Univ. d’Artois, France, June 2012 **Plenary speaker**.
- LION6, Paris, Jan. 2012 **Plenary speaker**.
- AUSSOIS12 Combinatorial Optimization Workshop, Aussois, France, Jan. 2012.
- INFORMS11, Charlotte, Nov. 2011.
- BALCOR11, Thessaloniki, Greece, Sept. 2011 **Plenary speaker**.
- MIP11, Waterloo, Canada, June 2011 **Invited speaker**.
- CTW11, Frascati, Italy, June 2011.
- HybridNL11 (satellite workshop to CPAIOR11), Berlin, Germany, May 2011 **Plenary speaker**
- Pretty Structures 2011, Paris, France, May 2011 **Invited speaker**.
- AUSSOIS11 Combinatorial Optimization Workshop, Aussois, France, Jan. 2011. **Invited speaker**.
- ORBEL10, Ghent, Belgium, Feb. 2011 **Plenary speaker**.
- COCOA10, Kona, USA, Dec. 2010.
- ewMINLP-Seville, Seville, Spain, Dec. 2010 **Invited speaker**.
- ICMS10, Kobe, Japan, Sept. 2010.
- TOGO10, Toulouse, France, August 2010. **Co-chair**.
- OPTSYM10, Oberwolfach, Germany, August 2010. **Co-chair**.
- ICCOPT10, Santiago, Chile, July 2010.
- EURO10, Lisbon, Portugal, July 2010.
- ALIO/INFORMS10, Buenos Aires, Argentina, June 2010.

- CTW10, Köln, Germany, May 2010.
- SEA10, Ischia, Italy, May 2010.
- EWMINLP10, Marseille, France, April 2010. **Co-chair**.
- JFRO10, Paris, France, March 2010. **Plenary speaker**.
- ROADEF10, Toulouse, France, Feb. 2010.
- AUSSOIS10 Combinatorial Optimization Workshop, Aussois, France, Jan. 2010. **Invited speaker**.
- SOBRAPO09 Brazilian OR conference, Bahia, Brazil, Sept. 2009. **Plenary speaker**.
- ISMP09 Conference, Chicago, USA, August 2009. *Session chair*.
- MOPTA09 Conference, Lehigh, USA, August 2009.
- IFIP09 Conference, Buenos Aires, Argentina, July 2009. **Plenary speaker**.
- JPOC6 Workshop, Bordeaux, France, June 2009. **Plenary speaker**.
- CTW09, Paris, France, June 2009. **Chair**.
- CIMINLP Workshop, Bordeaux, France, March 2009. **Invited speaker**.
- IMA MINLP Conference, Minneapolis, USA, Nov. 2008. **Invited speaker**.
- COCOA08, St. John's, Canada, Aug. 2008.
- SAGO08, Kruger Park, South Africa, July 2008.
- AAIM08, Shanghai, China, June 2008.
- CTW08, Gargnano, Italy, May 2008.
- NCP07, Rouen, France, Dec. 2007.
- INFORMS07, Seattle, USA, Nov. 2007.
- CTW07, Enschede, The Netherlands, May 2007. *Session chair*.
- ISMP06, Rio de Janeiro, Brazil, Aug. 2006. *Session chair*.
- EURO06, Reykjavik, Iceland, July 2006. *Session chair*.
- ROADEF, Lille, France, Feb. 2006.
- MEC VNS, Tenerife, Spain, Nov. 2005. *Session chair*.
- EURO-ALIO 2005, Paris, France, Oct. 2005.
- GO05, Almeria, Spain, Sept. 2005.
- AIRO05, Camerino, Italy, Sept. 2005. *Session chair*.
- AIRO04, Lecce, Italy, Sept. 2004.
- COLOQUIO SMP, Lima, Peru, July 2004. **Plenary speaker**.
- ERICE04, Erice, Italy, June 2004.
- CTW04, Menaggio, Italy, June 2004. *Session chair*.
- SYM-OP-IS, Herceg-Novi, Serbia and Montenegro, Oct. 2003.
- ICOOC, Ulaanbaatar, Mongolia, Aug. 2002. *Session chair*.
- IFORS Conference, Edinburgh, UK July 2002.
- SIAM Conference on Optimization, Toronto, Canada, May 2002.

### Visiting terms and seminars

- Comp. Sci. Dept., IIT Delhi (2012, 1 seminar, invited by Nareen Garg).
- LIPN6, Université Paris XIII (2011, 1 seminar, invited by R. Wolfler Calvo).
- COPPE, Universidade Federal do Rio de Janeiro; and IMECC, Universidade Estadual de Campinas (2011, 1 month, 2 seminars, invited by N. Maculan and C. Lavor).
- CERFACS, Toulouse, France (2010, 1 seminar, invited by A. Mucherino).
- IMECC-Universidade do Estado de Campinas, São Paulo, Brazil (2010, 1 week, invited by C. Lavor).
- Tepper School of Business, Carnegie-Mellon University (2009, 1 seminar in the Tepper Research Seminar series).
- Chemical Engineering, Carnegie-Mellon University (2009, 1 seminar, invited by I. Grossmann).

- Gaz de France, Paris (2008, 1 seminar, invited by M.C. Plateau)
- T.J. Watson IBM Research Center, Yorktown Heights (2007, 1 seminar, invited by J. Lee).
- LIF, Université de Marseille à Luminy (2007, 1 seminar, invited by G. Cornuéjols).
- Università di Roma “La Sapienza” (2007, 1 seminar, invited by G. Patrizi).
- PRISM, Université de Versailles (2007, 1 seminar, invited by I. Tseveendorj).
- LAMSADE, Université Paris IX - Dauphine (2006, 1 seminar, invited by V. Paschos).
- LIAFA, Université Paris VI (2006, 1 seminar, invited by M. Habib).
- COPPE, Universidade Federal do Rio de Janeiro (2006, 1 month, invited by N. Maculan).
- LINA, Université de Nantes (2006, 1 seminar, invited by X. Gandibleux).
- LRI, Université Paris XI (2006, 1 seminar, invited by B. Rozoy).
- LIP6, Université Paris VI (2006, 1 seminar, invited by F. Sourd).
- Conservatoire National d’Arts et Métiers (2006, 1 seminar, invited by A. Billionnet).
- LIPN, Université Paris XIII (2006, 1 seminar, invited by G. Plateau).
- Università degli Studi di Milano (2005, seminar, invited by M. Trubian).
- Academy of Sciences of Belgrade (2003-2004, 4 times, 1 week each time, 6 seminars, invited by N. Mladenović).
- COPPE, Universidade Federal do Rio de Janeiro (2004, 1 month, invited by N. Maculan).
- Universidade do Estado do Rio de Janeiro (2004, 2 weeks, invited by C. Lavor).
- Universidad de Lima (2004, 1 week, invited by W. Sosa).
- Politecnico di Milano (2001-2002, twice, 2 seminars, invited by E. Amaldi).
- Università di Torino (2001, 1 seminar, invited by M. Locatelli).
- Università di Firenze (2001, 1 seminar, invited by F. Schoen).
- Università di Pisa (2001, 1 seminar, invited by G. Gallo).

## Teaching experience

*Note:* The didactic material for the courses can be downloaded from <http://www.lix.polytechnique.fr/~liberti/teaching>.

### 1. Administrative responsibilities.

- Department vice-president from 2010.
- Co-organizer of the specialization “Optimization, Communication, Signal” with F. Bonnans, 2008-2009.

### 2. Courses taught

- **Advanced Mathematical Programming.** Given within the MPRO programme, Conservatoire National d’Arts et Métiers. 15 students. Lectures: 8h. Level: M.Sc.
- **Operations Research and Sustainable Development.** Given within the MPRO programme, Conservatoire National d’Arts et Métiers. 15 students. Lectures: 8h. Level: M.Sc.
- **Fundamentals of programming and algorithms,** Given at DIX, École Polytechnique. 140 students, Lectures: 18h. Course level: B.Sc.
- **Algorithms, Networks, Languages.** Given at DIX, École Polytechnique, assistant to B. Werner. Lectures and exercises: 12h. Level: B.Sc.
- **Software engineering.** Given at DIX, École Polytechnique, 4 times, with D. KroB. Course level: M.Sc.
- **Optimization: Modelling and Software.** Given at DIX, École Polytechnique, 3 times. Course level: M.Sc.
- **Operations Research.** Given at DIX, École Polytechnique, for the Master “Ingegnerie de Systèmes Industriels Complexes” (ISIC), 3 times. Course level: M.Sc.
- **Scheduling, linear programming and network flows.** Given at Paris VI University for the “Master Parisien en Recherche Informatique” (MPRI), 1st semester 2006-2007, 2007-2008 with C. Dürr and Ph. Baptiste. 35 students. Course level: M.Sc.

- **Introduction to C++ (Online)**. For DIX/DMAP, École Polytechnique.
- **Introduction to C++**. Given at DMAP, Ecole Polytechnique, 4 times. Course level: B.Sc.
- **Introduction to C++ for Java Users**. Given at DIX, École Polytechnique, 4 times. Course level: B.Sc.
- **Principles of Programming Languages**. Given at DIX, École Polytechnique, 2nd semester 2005-2006. Assistant to G. Dowek. 180 students. 40 hours computer lab (Java). Course level: B.Sc.
- **Constraints and combinatorics**. Given at DIX, École Polytechnique, II semester 2005-2006, with Ph. Baptiste. 20 students. 3 hours lecture, 3 hours computer lab (CPLEX). Course level: M.Sc.
- **Fundamental Computer Science**. End-of-course project for the course INF431 given at DIX, École Polytechnique, II semester 2005-2006.
- **Advanced Operations Research**. Given at Politecnico di Milano, II semester 2004-2005. Assistant to E. Amaldi. 50 students. 14 hours lecture, 10 hours computer lab (MatLab). *Syllabus*: Convexity, nonlinear optimisation models, unconstrained and constrained nonlinear optimisation algorithms, saddle point theory. I had a substantial part in planning the course contents. Course level: M.Sc.
- **Fundamentals of Operations Research**. Given 6 times at Politecnico di Milano (campus Milano and campus Como) as assistant to two professors:
  - E. Amaldi. *Syllabus*: Graph theory (trees, paths, networks) linear optimisation (models, simplex algorithm, duality), combinatorial optimisation (models, cutting plane, branch-and-bound).
  - F. Malucelli. *Syllabus*: Graph theory (trees, paths, networks) linear optimisation (models, simplex algorithm, duality), combinatorial optimisation (models, cutting plane, branch-and-bound, heuristics).
- (a) I semester 2004-2005. Assistant to F. Malucelli. 150 students. Lectures: 4 hours. Computer labs: 20 heures (AMPL). Course level: B.Sc.
- (b) I semester 2004-2005. Assistant to E. Amaldi. 200 students. Lectures: 14 hours. Computer labs: 10 hours (AMPL). Course level: M.Sc.
- (c) II semester 2003-2004. Assistant to E. Amaldi. 100 students. Lectures: 14 hours. Computer labs: 10 heures (AMPL). Course level: B.Sc.
- (d) I semester 2003-2004. Assistant to F. Malucelli. 150 students. Lectures: 4 hours. Computer labs: 20 hours (XPress-MP). Course level: M.Sc.
- (e) I semester 2003-2004. Assistant to E. Amaldi. 150 students. Lectures: 12 hours. Computer labs: 12 hours (AMPL). Course level: B.Sc.
- (f) II semester 2002-2003. Assistant to E. Amaldi. 100 students. Lectures: 14 hours. Computer labs: 10 hours (AMPL). Course level: B.Sc.
- **Global optimization**. Mini-course given at Lima University in July 2004. 30 students. Lectures: 9 hours. *Syllabus*: Nonlinear models, main local nonlinear optimisation methods, algorithms in global optimisation. Material: monograph “Introduction to Global Optimization” published by SMP Press, Lima 2004. Course level: M.Sc. and Ph.D.
- **Introduction to C++**. Given at Imperial College London during the II semester 2001-2002. Assistant to C. Pantelides. 100 students. Lectures: 4 hours. Computer labs: 12 hours (Visual C++). *Syllabus*: C++ Syntax, examples, data structures, classes, inheritance, software architecture. Course level: B.Sc.
- **Using the computer**. Given three times to the personnel of my regiment (Engineer Corps) during the military service, sept/oct 1998. Sponsored by the European Project “Euroformazione Difesa”. Each edition of the course had 30 students, 10 hours of lessons and 10 hours of computer labs. *Syllabus*: Using Windows and Office. Course level: secondary school. I was also the main administrative liaison between the Regiment, the Defence Ministry Office and the supporting professional institute.
- **Design and implementation of websites**. Given at the CSEA professional institute (Turin, Italy) in January 1998. 20 students. Lessons: 10 hours. Computer labs: 10 hours. *Syllabus*: Server-client communication model, HTTP protocol, syntax, introduction to dynamic websites. Course level: professional course for B.Sc. graduates.
- **Introduction to logic**. Given at the CSEA professional institute (Turin, Italy) in november 1997. 30 students. Lessons: 25 hours. *Syllabus*: boolean logic. Course level: professional course for people with A-levels.
- **Operating systems**. Given at the CSEA professional institute (Turin, Italy) in october 1997. 40 students. Lessons: 20 hours. Computer labs: 10 hours (Linux). *Syllabus*: taxonomy of operating systems, introduction to unix-like OSes, installation of Linux. Course level: professional course for people with A-levels.

- **Introduction to the computer.** Given at the CSEA professional institute (Turin, Italy) in september 1997. 40 students. Lessons: 20 hours. Computer labs: 10 hours. *Syllabus*: DOS, Logo, Basic. Course level: professional course for people with A-levels.

## Supervision and tutoring

- **Since October 2011:** Supervision of the Ph.D. thesis of C. Lizon. Topic: black-box MINLP methods applied to reservoir engineering.
- **Since November 2010:** Postdoctoral supervision of H. Hijazi. Topic: Global optimization and mathematical programming in software verification.
- **Since November 2010:** Postdoctoral co-supervision of D. Brockhoff. Topic: preferences in multiobjective optimization.
- **Since November 2010:** Postdoctoral co-supervision of A. Fialho. Topic: automatic configuration of complex algorithms.
- **Since June 2010:** Co-supervision (with P. Hansen) of the Ph.D. thesis of C. Lucas. Topic: Symmetry in mathematical programming and applications to clustering.
- **Since May 2010:** Postdoctoral supervision of N. Touati. Topic: multiobjective optimization and routing of hazardous materials.
- **Since March 2010:** Supervision of the Ph.D. thesis of D. Kirchler. Topic: multiobjective multimodal shortest paths on road networks.
- **November 2009:** Member of the Ph.D. awarding committee for Andreas Lundell (Åbo University, Finland).
- **Since Sept. 2009:** Supervision of the Ph.D. thesis of A. Costa. Topic: reformulations in mathematical programming.
- **September 2009:** Member of the Ph.D. awarding committee for Makhoul Hadji (Telecom SudParis and Paris 6).
- **Since January 2009:** Supervision of the Ph.D. thesis of F. Roda. Topic: multiobjective optimization.
- **Octobre 2008:** Member of the Ph.D. awarding committee for Ronald Zumkeller (École Polytechnique).
- **Octobre 2008:** Member of the Ph.D. awarding committee for Cheikh Brahim Ould El Mounir (Amiens University).
- **Since July 2008:** Post-doctoral supervision of A. Mucherino. Topic: Clustering.
- **Since April 2008:** Supervision of M.Sc. research stage (year 1) of J. Leconte. Topic: Optimization techniques for static code analysis.
- **Since March 2008:** Post-doctoral supervision of S. Cafieri. Topic: Reformulation techniques in mathematical programming.
- **March-May 2008:** Co-supervision (with E. Amaldi) of K. Dhyani's PhD thesis (internship at LIX, École Polytechnique). Topic: Hyperplane Clustering Problem.
- **Since November 2007:** Post-doctoral supervision of L. Di Giacomo. Topics: Platforming, An LCP-based IP heuristic.
- **Since September 2007:** Post-doctoral supervision of F. Tarissan. Topic: Optimization techniques for bioinformatics problems, Reformulation techniques.
- **September 2006:** Member of the Ph.D. awarding committee for Lydia Gastal (LRI, Orsay).
- **March-September 2007:** Supervision of ISIC Master students L. Rosero et A. Perciu. Topic: Modelling techniques in system architecture.
- **since March 2007:** Post-doctoral supervision of F. Marinelli. Topic: Platforming, Optimization techniques in static analysis of code.
- **Since November 2006:** Co-supervision (with P. Baptiste and D. Kroh) of the Ph.D. thesis of G. Nannicini. Topic: Shortest paths on large stochastic networks.
- **November 2006:** Member of the Ph.D. awarding committee for Marie-Christine Plateau (CNAM, Paris).
- **October 2006:** Post-doctoral supervision of P. Belotti.

- **Decembre 2005:** Co-supervision (with P. Baptiste) of the Ph.D. thesis of C. Gwiggner. Topic: Air traffic.
- **Septembre 2005:** Co-supervision (with E. Amaldi) of the Ph.D. minor of M. Sykora. Topic: Cycle bases.
- **August 2005:** Mini-project<sup>2</sup> by R. Villa. Topic: Scheduling with communication delays.
- **July 2005:** Mini-project by C. Brescia. Topic: Scheduling with communication delays.
- **July 2005:** Co-supervision (with E. Amaldi) of the M.Sc. thesis of A. Chiapparini. Topic: Cycle bases.
- **May 2005:** Co-supervision (with F. Malucelli) of the M.Sc. thesis of A. Pastino. Topic: Localization of wireless hubs for gas-meter networks.
- **December 2004:** Mini-project by S. Coniglio, F. Italiano, A. Tagliasacchi. Topic: Cycle bases.
- **May 2004:** Mini-project by F. Cerretti, D. Vanoni. Topic: Tree enumeration.
- **March 2004:** Mini-project by S. Galli. Topic: Global optimization software interfacing with AMPL.
- **January 2004:** Mini-project by A. Omassi. Topic: Report on the linear solver CLP.

### Computer-related skills

- Excellent mastering of C/C++/Fortran programming in large-scale software projects; integration of different software modules, written in different programming languages, under a unified software framework; rational API design and implementation.
- Excellent mastering of Optimization Systems and Software: CPLEX, XPRESSMP, AMPL, SNOPT, MINOS, GLPK and many others, both commercial and free.
- Excellent mastering of Unix systems (Linux, Solaris, IRIX, Tru64), good knowledge of Windows operating systems.
- Good knowledge of Security and Intrusion Detection (firewalls, log scanning) and considerable practical experience therein.

### Languages

- Italian: mother tongue.
- English: excellent spoken and written.
- French: good spoken and written.

### List of publications

- INTERNATIONAL JOURNALS:
  1. J. Lee, **L. Liberti**, *A matroid view of key theorems for edge-swapping algorithms*, Mathematical Methods of Operations Research, accepted.
  2. A. Mucherino, C. Lavor, **L. Liberti**, *Exploiting symmetry properties of the Discretizable Molecular Distance Geometry Problem*, Journal of Bioinformatics and Computational Biology, accepted.
  3. S. Cafieri, P. Hansen, **L. Liberti**, *Improving heuristics for network modularity maximization using an exact algorithm*, Discrete Applied Mathematics, accepted.
  4. V. Giakoumakis, **D. Krob**, L. Liberti, F. Roda, *Technological architecture evolutions of information systems: trade-off and optimization*, Concurrent Engineering Research and Applications, accepted.
  5. C. Lavor, **L. Liberti**, A. Mucherino, *The interval Branch-and-Prune algorithm for the Discretizable Molecular Distance Geometry Problem with inexact distances*, Journal of Global Optimization, accepted.
  6. C. Lavor, **L. Liberti**, A. Mucherino, *The interval Branch-and-Prune algorithm for the discretizable molecular distance geometry problem with interval data*, Journal of Global Optimization, accepted.

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<sup>2</sup>These are projects of the duration of 2-4 months for B.Sc. students.

7. S. Sallaume, S. Martins, L. Satoru Ochi, W. Gramacho, C. Lavor, **L. Liberti**, *A discrete search algorithm for finding the structure of protein backbones and side chains*, International Journal of Bioinformatics Research and Applications, accepted.
8. A. Mucherino, C. Lavor, **L. Liberti**, *The discretizable distance geometry problem*, Optimization Letters, accepted.
9. H. Sherali, E. Dalkiran, **L. Liberti**, *Reduced RLT representations for nonconvex polynomial programming problems*, Journal of Global Optimization, accepted.
10. C. Lavor, **L. Liberti**, N. Maculan, A. Mucherino, *The discretizable molecular distance geometry problem*, Computational Optimization and Applications, accepted.
11. C. D'Ambrosio, A. Frangioni, **L. Liberti**, A. Lodi, *A storm of Feasibility Pumps for Nonconvex MINLP*, Mathematical Programming B, accepted.
12. C. Lavor, J. Lee, A. Lee-St. John, **L. Liberti**, A. Mucherino, M. Sviridenko, *Discretization orders for distance geometry problems*, Optimization Letters, **6**:783-796, 2012.
13. G. Nannicini, D. Dellinger, D. Schultes, **Leo Liberti**, *Bidirectional A\* search on time-dependent road networks*, Networks, **59**(2):240-251, 2012.
14. C. Lavor, **L. Liberti**, N. Maculan, A. Mucherino, *Recent advances on the discretizable molecular distance geometry problem*, European Journal of Operational Research, **219**:698-706, 2012.
15. **L. Liberti**, *Reformulations in Mathematical Programming: Automatic symmetry detection and exploitation*, Mathematical Programming A, **131**:273-304, 2012.
16. D. Aloise, P. Hansen, **L. Liberti**, *An improved column generation algorithm for minimum sum-of-squares clustering*, Mathematical Programming A, **131**:195-220, 2012.
17. **L. Liberti**, N. Mladenović, G. Nannicini, *A recipe for finding good solutions to MINLPs*, Mathematical Programming Computation, **3**:349-390, 2011.
18. G. Cornuéjols, **L. Liberti**, G. Nannicini, *Improved strategies for branching on general disjunctions*, Mathematical Programming A, **130**:225-247, 2011.
19. **L. Liberti**, L. Alfandari, M.-C. Plateau, *Edge cover by connected bipartite subgraphs*, Annals of Operations Research, **188**(1):307-329, 2011.
20. S. Cafieri, P. Hansen, **L. Liberti**, *Locally optimal heuristic for modularity maximization of networks*, Physical Review E, **83**:056105(1-8), 2011.
21. C. Lavor, A. Mucherino, **L. Liberti**, N. Maculan, *On the computation of protein backbones by using artificial backbones of hydrogens*, Journal of Global Optimization, **50**:329-344, 2011.
22. **L. Liberti**, C. Lavor, A. Mucherino, N. Maculan, *Molecular distance geometry methods: from continuous to discrete*, International Transactions in Operational Research, **18**:33-51, 2010.
23. C. Lavor, A. Mucherino, **L. Liberti**, N. Maculan, *Discrete approaches for solving molecular distance geometry problems using NMR data*, International Journal of Computational Bioscience, **2010**:88-94, 2010.
24. D. Aloise, S. Cafieri, G. Caporossi, P. Hansen, S. Perron, **L. Liberti**, *Column generation algorithms for exact modularity maximization in networks*, Physical Review E, **82**(4):046112, 2010.
25. C. D'Ambrosio, A. Frangioni, **L. Liberti**, A. Lodi, *On interval subgradient and no-good cuts*, Operations Research Letters, **38**:341-345, 2010.
26. S. Cafieri, J. Lee, **L. Liberti**, *On convex relaxations of quadrilinear terms*, Journal of Global Optimization, **47**:661-685, 2010.
27. S. Cafieri, P. Hansen, **L. Liberti**, *Loops and multiple edges in modularity maximization of networks*, Physical Review E, **81**(4):046102, 2010.
28. G. Nannicini, Ph. Baptiste, G. Barbier, D. Krob, **L. Liberti**, *Fast paths in large-scale dynamic road networks*, Computational Optimization and Applications, **45**:143-158, 2010.
29. S. Cafieri, P. Hansen, **L. Liberti**, *Edge ratio and community structure in networks*, Physical Review E, **81**(2):0261051-14, 2010.
30. P. Belotti, J. Lee, **L. Liberti**, F. Margot, A. Wächter, *Branching and bounds tightening techniques for non-convex MINLP*, Optimization Methods and Software, **24**(4):597-634, 2009.
31. E. Amaldi, **L. Liberti**, F. Maffioli, N. Maculan, *Edge-swapping algorithms for the minimum fundamental cycle basis problem*, Mathematical Methods of Operations Research, **69**:205-233, 2009.
32. **L. Liberti**, C. Lavor, N. Maculan, M.A.C. Nascimento, *Reformulation in mathematical programming: an application to quantum chemistry*, Discrete Applied Mathematics, **157**(6):1309-1318, 2009.
33. **L. Liberti**, *Reformulations in Mathematical Programming: Definitions and Systematics*, RAIRO-RO, **43**(1):55-86, 2009.

34. **L. Liberti**, C. Lavor, N. Maculan, F. Marinelli, *Double Variable Neighbourhood Search with smoothing for the Molecular Distance Geometry Problem*, Journal of Global Optimization, **43**:207-218, 2009.
  35. **L. Liberti**, N. Maculan, Y. Zhang, *Optimal configuration of gamma ray machine radiosurgery units: the sphere covering subproblem*, Optimization Letters, **3**:109-121, 2009.
  36. M. Bruglieri, **L. Liberti**, *Optimal running and planning of a biomass-based energy production process*, Energy Policy, **36**:2430-2438, 2008.
  37. G. Nannicini, **L. Liberti**, *Shortest paths on dynamic graphs*, International Transactions in Operations Research, **15**:551-563, 2008.
  38. **L. Liberti**, *Spherical cuts for Integer Programming problems*, International Transactions in Operational Research, **15**:283-294, 2008.
  39. **L. Liberti**, C. Lavor, N. Maculan, *A Branch-and-Prune algorithm for the Molecular Distance Geometry Problem*, International Transactions in Operational Research, **15**(1):1-17, 2008.
  40. **L. Liberti**, *Compact linearization for binary quadratic problems*, 4OR, **5**(3):231-245, 2007.
  41. S. Kucherenko, P. Belotti, **L. Liberti**, N. Maculan, *New formulations for the Kissing Number Problem*, Discrete Applied Mathematics, **155**(14):1837-1841, 2007.
  42. C. Lavor, **L. Liberti**, N. Maculan, M.A. Chaer do Nascimento, *Solving Hartree-Fock systems with global optimization methods*, Europhysics Letters, **77**(5):50006p1-50006p5, 2007.
  43. **L. Liberti**, C. Pantelides, *An exact reformulation algorithm for large nonconvex NLPs involving bilinear terms*, Journal of Global Optimization, **36**:161-189, 2006.
  44. **L. Liberti**, *Linearity embedded in nonconvex problems*, Journal of Global Optimization, **33**(2):157-196, 2005.
  45. **L. Liberti**, S. Kucherenko, *Comparison of deterministic and stochastic approaches to Global Optimization*, International Transactions in Operational Research, **12**(3):263-286, 2005.
  46. **L. Liberti**, *Reformulation and Convex Relaxation Techniques for Global Optimization* (Extended abstract of Ph.D. Thesis), 4OR, **2**:255-258, 2004.
  47. **L. Liberti**, *Reduction Constraints for the Global Optimization of NLPs*, International Transactions in Operational Research, **11**(1): 34-41, 2004.
  48. **L. Liberti**, C.C. Pantelides, *Convex Envelopes of Monomials of Odd Degree*, Journal of Global Optimization, **25**:157-168, 2003.
  49. **L. Liberti**, *Structure of the Invertible CA Transformations Group*, Journal of Computer and System Sciences, **59**:521-536, 1999.
- NATIONAL JOURNALS:
    50. A. Mucherino, C. Lavor, **L. Liberti**, N. Maculan, *On the Definition of Artificial Backbones for the Discretizable Molecular Distance Geometry Problem*, Mathematica Balkanica, **23**(3-4):289-302, 2009.
    51. **L. Liberti**, E. Amaldi, N. Maculan, F. Maffioli, *Mathematical models and a constructive heuristic for finding minimum fundamental cycle bases*, Yugoslav Journal of Operational Research, **15**(1):15-24, 2005.
    52. **L. Liberti**, *On a class of nonconvex problems where all local minima are global*, Publications de l'Institut Mathématique, **76**(90):101-109, 2004.
  - BOOKS/ISSUES EDITED AND AUTHORED:
    53. S. Cafieri, U. Faigle, **L. Liberti** (eds.), *Graphs and Combinatorial Optimization*, special issue of Discrete Applied Mathematics dedicated to the CTW09 Conference, **159**(16):1659-1914, 2011.
    54. S. Cafieri, B. Tóth, E. Hendrix, **L. Liberti**, F. Messine (eds.), *Proceedings of the Toulouse Global Optimization Workshop*, Toulouse, 2010.
    55. P. Bonami, **L. Liberti**, A. Miller, A. Sartenaer (eds.), *Proceedings of the European Workshop on MINLP*, Marseille, 2010.
    56. S. Cafieri, A. Mucherino, G. Nannicini, F. Tarissan, **L. Liberti** (eds.) *Proceedings of CTW09 Conference*, Paris, 2009.
    57. **L. Liberti**, N. Maculan (eds.) *Reformulation Techniques in Mathematical Programming*, special issue of Discrete Applied Mathematics, **157**(6), 2009.
    58. U. Faigle, **L. Liberti**, F. Maffioli, S. Pickl (eds.) *Graphs and Combinatorial Optimization*, special issue of Discrete Applied Mathematics dedicated to the CTW04 Conference, **155**(14), 2007.
    59. U. Faigle, **L. Liberti**, F. Maffioli, S. Pickl (eds.) *Graphs and Combinatorial Optimization*, special issue of Discrete Optimization dedicated to the CTW04 Conference, **3**(3), 2006.
    60. **L. Liberti**, N. Maculan (eds.) *Global Optimization: from Theory to Implementation*, Springer, Berlin, 2006.

61. **L. Liberti**, F. Maffioli (eds.) *Proceedings of CTW04 Workshop on Graph Theory and Combinatorial Optimization*, Electronic Notes in Discrete Mathematics, **17**, Elsevier, 2004.
62. **L. Liberti**, *Introduction to Global Optimization*, Monographs of the Sociedad Matemática Peruana, SMP Press, Lima, 2004 (ISBN: 9972-899-56-X).
- BOOK CHAPTERS (REFEREED):
  63. **L. Liberti**, C. Lavor, *On a relationship between graph realizability and distance matrix completion*, in A. Migdalas (ed.), *Optimization Theory, Decision Making, and Operational Research Applications*, Springer, Berlin, accepted.
  64. P. Belotti, S. Cafieri, J. Lee, **L. Liberti**, A. Miller, *On the composition of convex envelopes for quadrilinear terms*, in A. Chinchuluun et al. (eds.), *Proceedings of ICOSC11*, Springer, Berlin, accepted.
  65. G. Nannicini, G. Cornuéjols, M. Karamanov, **L. Liberti**, *Branching on split disjunctions*, in V. Chvátal (ed.), *Combinatorial Optimization: Methods and Applications*, IOS Press, 164-182, 2011.
  66. **L. Liberti**, *Symmetry in Mathematical Programming*, in S. Leyffer and J. Lee (eds.), *Mixed Integer Nonlinear Programming*, IMA Series **154**:263-286, Springer, New York, 2012.
  67. **L. Liberti**, E. Ortiz, *Ottaviano Fabrizio Mossotti* (in Italian), *Dizionario Biografico degli Italiani*, vol. 77, Istituto della Enciclopedia Italiana, Roma 2012.
  68. P. Belotti, **L. Liberti**, A. Lodi, G. Nannicini, A. Tramontani, *Disjunctive inequalities: applications and extensions*, in J. Cochran et al. (eds.), *Encyclopedia of Operations Research and Management Science*, Wiley, Hoboken, 2011.
  69. **L. Liberti**, S. Cafieri, F. Tarissan, *Reformulations in Mathematical Programming: a Computational Approach*, in A. Abraham et al. (eds.), *Foundations of Computational Intelligence Vol. 3, Studies in Computational Intelligence* **203**:153-234, Springer, Berlin, 2009.
  70. M. Bruglieri, **L. Liberti**, *Optimally running a biomass-based energy production process*, in J. Kallrath, P. Pardalos, S. Rebennack, M. Scheidt (eds.), *Optimization in the Energy Industry*, 221-232, Springer, New York, 2009.
  71. H.D. Sherali, **L. Liberti**, *Reformulation-Linearization Technique for Global Optimization*, in P. Pardalos and C. Floudas (eds.), *Encyclopedia of Optimization*, 2nd Edition, 3263-3268, Springer, Berlin, 2008.
  72. C. Lavor, **L. Liberti**, N. Maculan, *Molecular distance geometry problem*, in P. Pardalos and C. Floudas (eds.), *Encyclopedia of Optimization*, 2nd Edition, 2305-2311, Springer, Berlin, 2008.
  73. **L. Liberti**, *Writing Global Optimization Software*, in L. Liberti and N. Maculan (eds.), *Global Optimization: from Theory to Implementation*, 211-262, Springer, Berlin, 2006.
  74. C. Lavor, **L. Liberti**, N. Maculan, *Computational experience with the molecular distance geometry problem*, in Janos Pintér, *Global Optimization: Scientific and Engineering Case Studies*, 213-225, Springer, Berlin, 2006.
  75. **L. Liberti**, *Comparison of Convex Relaxation for Monomials of Odd Degree*, in I. Tseveendorj, P.M. Pardalos, R. Enkhbat (eds.), *Optimization and Optimal Control*, World Scientific Publishing Co., 2003.
- CONFERENCES (REFEREED):
  76. S. Cafieri, P. Hansen, L. Létocart, **L. Liberti**, F. Messine, *Compact relaxations for polynomial programming problems*, in *Experimental Algorithms, Lecture Notes in Computer Science*, accepted.
  77. A. Costa, **L. Liberti**, *Relaxations of multilinear convex envelopes: dual is better than primal*, in *Experimental Algorithms, Lecture Notes in Computer Science*, accepted.
  78. D. Kirchler and **L. Liberti** and R. Wolfler Calvo, *A label correcting algorithm for the shortest path problem on a multi-modal route network*, in *Experimental Algorithms, Lecture Notes in Computer Science*, accepted.
  79. M. Fischetti, **L. Liberti**, *Orbital shrinking*, in *Proceedings of the International Symposium of Combinatorial Optimization, Lecture Notes in Computer Science*, accepted.
  80. H. Hijazi, A. Diallo, M. Kieffer, **L. Liberti**, C. Weidmann, *A MILP approach for designing robust variable-length codes based on exact free distance computation*, in M. Marcellin et al. (eds.), *Proceedings of the Data Compression Conference*, 2012
  81. D. Aloise, G. Caporossi, P. Hansen, **L. Liberti**, S. Perron, M. Ruiz, *Modularity maximization in networks by Variable Neighbourhood Search*, in *Proceedings of 10th DIMACS Implementation Challenge Workshop*, 2012.

82. A. Mucherino, C. Lavor, **L. Liberti**, N. Maculan, *On the discretization of distance geometry problems*, in Proceedings of Mathematics of Distances and Applications (MDA12), 2012.
83. A. Mucherino, C. Lavor, **L. Liberti**, *A symmetry-driven BP algorithm for the Discretizable Molecular Distance Geometry Problem*, Proceedings of the Computational Structural Bioinformatics Workshop, 390-395, IEEE, 2011.
84. D. Kirchler, **L. Liberti**, T. Pajor, R. Wolfler Calvo, *UniALT for regular language constrained shortest paths on a multi-modal transportation network*, in Proceedings of the 11th Workshop on Algorithmic Approaches for Transportation Modelling, Optimization and Systems, OpenAccess Series in Informatics, Schoß Dagstuhl, 2011.
85. L. Iwaza, M. Kieffer, **L. Liberti**, K. Al-Agha, *Joint decoding of multiple-description network-coded data*, in NETCOD 2011 Proceedings, IEEE, 2011.
86. **L. Liberti**, B. Masson, C. Lavor, A. Mucherino, *Branch-and-Prune trees with bounded width*, in L. Adacher et al. (eds.), CTW11 Proceedings, 189-193, Università di Roma 3, 2011.
87. A. Costa, P. Hansen, **L. Liberti**, *Bound constraints for point packing in a square*, in L. Adacher et al. (eds.), CTW11 Proceedings, 126-129, Università di Roma 3, 2011.
88. F. Roda, P. Hansen, **L. Liberti**, *The price of equity in the hazmat transportation problem*, in L. Adacher et al. (eds.), CTW11 Proceedings, 235-238, Università di Roma 3, 2011.
89. **L. Liberti**, B. Masson, J. Lee, C. Lavor, A. Mucherino, *On the number of solutions of the discretizable molecular distance geometry problem*, in W. Wang, X. Zhu and D.-Z. Du (eds.), Combinatorial Optimization and Applications, Lecture Notes in Computer Science, **6831**:322-342, Springer, Berlin, 2011.
90. N. Touati-Moungla, P. Belotti, V. Jost, **L. Liberti**, *A branch-and-price algorithm for the risk-equity constrained routing problem*, in J. Pahl, T. Reiners, S. Voß (eds.), Network Optimization, Lecture Notes in Computer Science, **6701**:439-449, Springer, Berlin, 2011.
91. **L. Liberti**, C. Lavor, A. Mucherino, *An exponential algorithm for the Discretizable Molecular Distance Geometry Problem is polynomial on proteins*, in Bioinformatics Research and Applications (ISBRA11 Conference, short paper), 2011.
92. F. Roda, **L. Liberti**, F. Raimondi, *Evaluation of collaborative filtering algorithms using a small dataset*, in International Conference of Web Information Systems and Technologies, ACM, 2011.
93. F. Roda, A. Costa, **L. Liberti**, *Optimal recommender systems blending*, in Proceedings of the International Conference on Web Intelligence, Mining and Semantics, ACM, 2011.
94. A. Mucherino, C. Lavor, T. Malliavin, **L. Liberti**, M. Nilges, N. Maculan, *Influence of pruning devices on the solution of molecular distance geometry problems*, in P. Pardalos and S. Rebennack (eds.), Experimental Algorithms, Lecture Notes in Computer Science, **6630**:206-217, Springer, Heidelberg, 2011.
95. C. Lavor, **L. Liberti**, A. Mucherino, *On the solution of molecular distance geometry problems with interval data*, in Proceedings of the International Workshop on Computational Proteomics (Int. Conf. on Bioinformatics and Biomedicine), IEEE, Hong-Kong, 77-82, 2010.
96. P. Belotti, S. Cafieri, **L. Liberti**, J. Lee, *Feasibility-based bounds tightening via fixed points*, in W. Wu and O. Daescu (eds.), Combinatorial Optimization and Applications, Lecture Notes in Computer Science, **6508**:65-76, 2010.
97. S. Cafieri, **L. Liberti**, F. Messine, B. Nogarède, *Discussion about formulations and resolution techniques of electrical machine design problems*, in Proceedings of the XIX International Conference on Electrical Machines, IEEE, Rome, 2010. doi.10.1109/ICELMACH.2010.5607836.
98. E. Goubault, S. Le Roux, J. Leconte, **L. Liberti**, F. Marinelli, *Static analysis by abstract interpretation: a Mathematical Programming approach*, in Numerical and Symbolic Abstract Domains, Electronic Notes in Theoretical Computer Science, **267**:73-87, 2010.
99. V. Giakoumakis, D. Krob, **L. Liberti**, F. Roda, *Optimal technological architecture evolutions of information systems*, in M. Aiguier, F. Breteau, D. Krob (eds.), Complex Systems Design and Management, Springer, Berlin, 2010.
100. S. Cafieri, P. Hansen, **L. Liberti**, *Improving heuristics for network modularity maximization using an exact algorithm*, in Proceedings of MatHeuristics, Vienna, 2010.
101. **L. Liberti**, S. Cafieri, D. Savourey, *The Reformulation-Optimization Software Engine*, in K. Fukuda et al., Mathematical Software, Lecture Notes in Computer Science, **6327**:303-314, 2010.
102. A. Mucherino, **L. Liberti**, C. Lavor, *MD-jeep: an Implementation of a Branch & Prune algorithm for Distance Geometry Problems*, in K. Fukuda et al., Mathematical Software, Lecture Notes in Computer Science, **6327**:186-197, 2010.

103. **L. Liberti**, S. Le Roux, J. Leconte and F. Marinelli, *Mathematical Programming based debugging*, ISCO Proceedings, Electronic Notes in Discrete Mathematics **36**:1311-1318, 2010.
104. A. Costa, **L. Liberti** and P. Hansen, *Formulation symmetries in circle packing*, ISCO Proceedings, Electronic Notes in Discrete Mathematics **36**:1303-1310, 2010.
105. A. Mucherino, C. Lavor, **L. Liberti**, E.-G. Talbi, *A Parallel Version of the Branch & Prune Algorithm for the Molecular Distance Geometry Problem*, IEEE conference proceedings, ACS/IEEE International Conference on Computer Systems and Applications (AICCSA10), Hammamet, Tunisia, May 2010.
106. A. Mucherino, C. Lavor, **L. Liberti**, E.-G. Talbi, *On Suitable Parallel Implementations of the Branch & Prune for Distance Geometry*, Electronic Proceedings, Grid5000 Spring School 2010, Lille, France, April 2010.
107. P. Belotti, S. Cafieri, J. Lee, **L. Liberti**, *On the convergence of feasibility based bounds tightening*, in U. Faigle, R. Schrader, D. Herrmann (eds.), CTW10 Proceedings, 21-24, Köln 2010.
108. A. Costa, P. Hansen, **L. Liberti**, *Static symmetry breaking in circle packing*, in U. Faigle, R. Schrader, D. Herrmann (eds.), CTW10 Proceedings, 47-50, Köln 2010.
109. C. D'Ambrosio, A. Frangioni, **L. Liberti**, A. Lodi, *Experiments with a Feasibility Pump approach for nonconvex MINLPs*, in P. Festa (ed.), Efficient Algorithms, Lecture Notes in Computer Science **6049**:350-360, Springer, Berlin 2010.
110. C. Lavor, A. Mucherino, **L. Liberti** and N. Maculan, *An artificial backbone of hydrogens for finding the conformation of protein molecules*, Proceedings of the Computational Structural Bioinformatics Workshop, IEEE, 152-155, 2009.
111. C. Lavor, A. Mucherino, **L. Liberti** and N. Maculan, *Computing artificial backbones of hydrogen atoms in order to discover protein backbones*, Proceedings of the International Multiconference on Computer Science and Information Technology, IEEE, 751-756, 2009.
112. S. Cafieri, J. Lee, **L. Liberti**, *Comparison of convex relaxations of quadrilinear terms*, in C. Ma, L. Yu, D. Zhang, Z. Zhou (eds.), Global Optimization: Theory, Methods and Applications I, Lecture Notes in Decision Sciences, **12(B)**:999-1005, Global-Link Publishers, Hong Kong 2009.
113. A. Mucherino, **L. Liberti**, C. Lavor, N. Maculan, *Comparisons between an exact and a meta-heuristic algorithm for the molecular distance geometry problem*, GECCO09 Proceedings, ACM, 2009.
114. F. Marinelli, O. de Weck, D. Krob, **L. Liberti**, A. Mucherino, *A General Framework for Combined Module- and Scale-based Product Platform Design*, 2nd Int. Symp. Engineering Systems Proceedings, MIT, Boston, 2009.
115. G. Cornuéjols, **L. Liberti**, G. Nannicini, *Improved strategies for branching on general disjunctions*, CTW09 Proceedings, 144-145, École Polytechnique, Paris 2009.
116. F. Roda, **L. Liberti**, F. Raimondi, *Combinatorial optimization based recommender systems*, 175-179, CTW09 Proceedings, École Polytechnique, Paris 2009.
117. A. Bettinelli, **L. Liberti**, F. Raimondi, D. Savourey, *The anonymous subgraph problem*, CTW09 Proceedings, 269-274, École Polytechnique, Paris 2009.
118. C. Lavor, **L. Liberti**, A. Mucherino, N. Maculan, *On a discretizable subclass of instances of the molecular distance geometry problem*, in D. Shin, Proceedings of the Symposium of Applied Computing, p. 804-805, ACM, 2009.
119. **L. Liberti**, G. Nannicini, N. Mladenović, *A good recipe for solving MINLPs*, in V. Maniezzo, T. Stützle, S. Voß (eds.), *Matheuristics: Hybridizing metaheuristics and mathematical programming*, Annals of Information Systems, **10**, Springer, 2009.
120. F. Tarissan, **L. Liberti**, C. La Rota, *Biological Regulatory Network reconstruction: a mathematical programming approach*, ECCS08 Proceedings (online at <http://www.jeruccs2008.org/files/eccs.pdf>), 2008.
121. C. La Rota, F. Tarissan, **L. Liberti**, *Inferring parameters in genetic regulatory networks*, CLAIO08 Proceedings, 2008.
122. K. Dhyani, **L. Liberti**, *Mathematical programming formulations for the bottleneck Hyperplane Clustering problem*, MCO08 Proceedings, Communications in Computer and Information Science **14**:87-96, Springer, New York, 2008.
123. G. Nannicini, Ph. Baptiste, D. Krob, **L. Liberti** *Fast Computation of Point-to-Point Paths on Time-dependent Road Networks*, COCOA08 Proceedings, Lecture Notes in Computer Science **5165**:225-234, Springer 2008.

124. **L. Liberti**, *Automatic generation of symmetry-breaking constraints*, in B. Yang, D.-Z. Du and C.A. Wang (eds.), COCOA08 Proceedings, Lecture Notes in Computer Science **5165**:328-338, Springer 2008.
  125. G. Nannicini, D. Delling, **L. Liberti**, D. Schultes, *Bidirectional A\* search for time-dependent fast paths*, in C.C. McGeoch (ed.), WEA08 Proceedings, Lecture Notes in Computer Science **5038**:334-346, Springer, 2008.
  126. **L. Liberti**, *Reformulations in Mathematical Programming: Definitions*, in G. Righini (ed.), CTW08 Proceedings, 67-70, 2008.
  127. **L. Liberti**, F. Raimondi, *The Secret Santa problem*, in R. Fleischer and J. Xu (eds.), AAIM08 Proceedings, Lecture Notes in Computer Science **5034**:271-279, Springer, 2008.
  128. G. Nannicini, Ph. Baptiste, D. Krob, **L. Liberti**, *Fast computation of Point-to-Point Time-dependent Paths on Dynamic Road Networks with Interval Data*, ROADEF08 Proceedings (Long papers section), Blaise Pascal University Press, Clermont-Ferrand, February 2008.
  129. T. Davidović, **L. Liberti**, N. Maculan, N. Mladenović, *Towards the Optimal Solution of the Multiprocessor Scheduling Problem with Communication Delays*, MISTA07 Proceedings, Paris, August 2007.
  130. G. Nannicini, Ph. Baptiste, D. Krob, **L. Liberti**, *Fast point-to-point shortest path queries on dynamic road networks with interval data*, CTW07 Proceedings, Twente, May 2007.
  131. M.C.-Plateau, **L. Liberti**, L. Alfandari, *Edge cover by bipartite subgraphs*, CTW07 Proceedings, Twente, May 2007.
  132. **L. Liberti**, *A useful characterization of the feasible region of binary linear programs*, CTW07 Proceedings, Twente, May 2007.
  133. M. Bruglieri, **L. Liberti**, *Modelling the optimal design of a biomass-based energy production process*, ORMMES Proceedings, Coimbra, Oct. 2006.
  134. **L. Liberti**, C. Lavor, N. Maculan, *Double VNS for the Molecular Distance Geometry Problem*, Proc. of Mini Euro Conference on Variable Neighbourhood Search, Tenerife, Spain, 23-25 November 2005.
  135. C. Lavor, **L. Liberti**, N. Maculan, *Grover's Algorithm applied to the Molecular Distance Geometry Problem*, Proc. of VII Brazilian Congress of Neural Networks, Natal, 16-19 October 2005.
  136. **L. Liberti**, M. Dražić, *Variable Neighbourhood Search for the Global Optimization of Constrained NLPs*, Proc. of the Global Optimization Workshop, Almeria, Spain, 18-22 September 2005.
  137. E. Amaldi, **L. Liberti**, N. Maculan, F. Maffioli, *Efficient edge-swapping heuristics for finding minimum fundamental cycle bases*, in C. Ribeiro and S. Martins (eds.), Experimental and Efficient Algorithms, Lecture Notes in Computer Science, **3059**:14-29, Springer, 2004.
  138. E. Amaldi, **L. Liberti**, F. Maffioli, N. Maculan, *Algorithms for finding minimum fundamental cycle bases in graphs*, Electronic Notes in Discrete Mathematics, **17**:29-33, 2004.
  139. **L. Liberti**, N. Maculan, S. Kucherenko, *The Kissing Number Problem: a New Result from Global Optimization*, Electronic Notes in Discrete Mathematics, **17**:203-207, 2004.
  140. E. Amaldi, **L. Liberti**, N. Maculan, F. Maffioli, *Local Search for the Minimum Fundamental Cycle Basis Problem*, Workshop on Real-life Applications of Metaheuristics, Antwerp, 18 Dec. 2003.
  141. E. Amaldi, **L. Liberti**, N. Maculan, F. Maffioli, *The Minimum Fundamental Cycle Basis Problem: a New Heuristic based on Edge Swaps*, SYM-OP-IS 2003 Conference Proceedings, Herceg-Novi, Crna Gora, 30 Sept. 2003.
- THESES:
    142. **L. Liberti**, *Reformulation techniques in mathematical programming*, Thèse d'Habilitation à Diriger des Recherches, Université de Paris-Dauphine, 2007.
    143. **L. Liberti**, *Reformulation and convex relaxation techniques for global optimization*, Ph.D. Thesis, Imperial College, 2004.
    144. **L. Liberti**, *Fondamenti algebrici degli automi cellulari invertibili* (in Italian), Tesi di Laurea, Università di Torino, 1997.
    145. **L. Liberti**, *Ottaviano Fabrizio Mossotti: the youth years (1791-1823)*, B.Sc. Thesis, Imperial College, 1995.
  - PATENTS:
    146. **L. Liberti**, G. Barbier, Ph. Baptiste, D. Krob, *Estimation de trafic dans un réseau routier* (in French), Patent n. 08104579.1-2215, European Patent Office, 19th Aug. 2008.

- OTHER:
  147. Y. Hamadi, **L. Liberti**, *Microsoft-CNRS "Optimization and Sustainable Development" Polytechnique Chair: activity report for 2009-2011*, MSR-TR-2011-42 (320 pages), 2011.
  148. G. Nannicini, Ph. Baptiste, G. Barbier, D. Krob, **L. Liberti**, *Fast paths in large-scale dynamic road networks*, arXiv:cs.NI/0704.1068, 2006.
  149. C. Lavor, **L. Liberti**, N. Maculan, *A Branch-and-Prune algorithm for the Molecular Distance Geometry Problem*, arXiv:q-bio/0608012, 2006.
  150. T. Davidović, **L. Liberti**, N. Maculan, N. Mladenović, *Mathematical Programming-Based approach to Scheduling of Communicating Tasks*, Les Cahiers du GERAD, G-2004-99, 2004.
  151. C. Pantelides, **L. Liberti**, P. Tsiakis, T. Crombie, *Global CAPE-OPEN Working Package 2.3: Mixed-Integer Linear/Nonlinear Programming Interface Specification*, Global CAPE-OPEN Industry Standard v.1.5.2, 2002.
  152. **L. Liberti**, P. Tsiakis, B. Keeping, C. Pantelides, *ooOPS: Reference Manual*, CPSE, Imperial College London, UK, 2001.
- DIVULGATION:
  153. Pantelides, C.C. and **Liberti, L.** and Tsiakis, P. and Crombie, T., *MINLP Interface Specification*, CAPE-OPEN Update, **2**:10-13, 2002.
  154. **L. Liberti**, F. Raimondi, *An Economical Scheme for Quasi Real-Time Backup*, SysAdmin Magazine, **11**(7), 2002.
  155. **L. Liberti**, *Web-enabled Filesystem-based Databases*, SysAdmin Magazine, **11**(3), 2002.
  156. **L. Liberti**, F. Raimondi, *La mia prima pagina dinamica* (in Italian), Inter.net Magazine, **70**, July/August 2001.
  157. **L. Liberti**, *Automating Firewall Log Scanning*, Linux Journal, **87**:104-107, 2001.
  158. **L. Liberti**, *Quick Network Redundancy Schemes*, SysAdmin Magazine, **10**(4):8-16, 2001.