

Giacomo Nannicini

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Google Scholar: <https://scholar.google.com/citations?user=AoE7DGcAAAAJ&hl=en>

Personal information: age 40, Italian citizenship

CV highlights:

- Multiple awards received, including: the Beale–Orchard-Hays prize, the Robert Faure prize, the Glover-Klingman prize.
- More than USD 1.5M in grants as PI or co-PI.
- Extensive teaching experience with outstanding teaching evaluations.
- Author of software used in industry and academia.

Research interests:

- *Quantum computing:* theory, algorithms and software for quantum computers, in particular: quantum optimization, quantum compilers, quantum simulation, algorithms for near-term devices.
- *Data analytics:* theory, algorithms and software for the solution of optimization problems under uncertainty, in particular: linear and nonlinear integer programming, network optimization, dynamic programming, derivative-free optimization.
- *Applications:* applications in analytics, sustainable energy systems, supply chain, transportation, architecture, quantum chemistry.

Employment history:

- August 2022 - now: associate professor in the Daniel J. Epstein Department of Industrial and Systems Engineering, University of Southern California, 3551 Trousdale Parkway, Los Angeles, CA.
- January 2016 - August 2022: research staff member in the Theory of Quantum Computing and Information group at *IBM Research*, T.J. Watson Research Center, 1101 Kitchawan Road, Yorktown Heights, NY.
- July 2011 - September 2016: assistant professor in the Engineering Systems & Design pillar at the *Singapore University of Technology and Design*, 20 Dover Dr, Singapore. (On leave January - September 2016.)
- September 2009 - June 2011: research fellow at the Tepper School of Business at *Carnegie Mellon University*, 5000 Forbes Avenue, Pittsburgh, PA.
- November 2006 - September 2009: researcher at *Mediamobile*, 27 boulevard Hypolite Marquès, Ivry sur Seine, France.

Visiting positions:

- Visiting associate professor at *Laboratoire d'Informatique de Paris-Nord*, Institut Galilée, Université Paris-Nord, 99 avenue Jean-Baptiste Clément, Villetaneuse, France, 2014-2016 (multiple visits).
- Visiting scholar at *Sloan School of Management*, Massachusetts Institute of Technology, 77 Massachusetts Ave, Cambridge, MA, between July 2011 and July 2012.

Education:

- November 2006 - June 2009: Ph.D. in Computer Science at *Ecole Polytechnique*, Paris, France. Final mark: *très honorable*¹.
- September 2004 - September 2006: M.Sc. in Computer Engineering (“Ingegneria Informatica”) at *Università degli studi di Firenze*, Florence, Italy. Final mark: 110/110 summa cum laude.
- September 2001 - September 2004: B.Sc. in Computer Engineering (“Ingegneria Informatica”) at *Università degli studi di Firenze*, Florence, Italy. Final mark: 110/110 cum laude.

Publications:

REFEREED JOURNALS:

- B. Augustino, G. Nannicini, T. Terlaky, L. Zuluaga. Quantum interior point methods for semidefinite optimization. *Quantum*, 7:1110, 2023. (<https://arxiv.org/abs/2112.06025>)
- A. Lodi, E. Malaguti, M. Monaci, G. Nannicini, and P. Paronuzzi. A solution algorithm for chance-constrained problems with integer second-stage recourse decisions. *Mathematical Programming*, to appear (accepted 2023). An earlier version is available on Optimization Online, paper 8514.
- G. Nannicini. Fast quantum subroutines for the simplex method. *Operations Research*, to appear (accepted 2022). (Extended version of IPCO paper.)
- G. Nannicini, L. S. Bishop, O. Gunluk, P. Jurcevic. Optimal qubit assignment and routing via integer programming. *ACM Transactions on Quantum Computing*, 4(1):1–31, 2023. (<https://arxiv.org/abs/2106.06446>)
- S. Arunachalam, V. Havlicek, G. Nannicini, K. Temme, P. Wocjan. Simpler (classical) and faster (quantum) algorithms for Gibbs partition functions. (Extended version of IEEE QCE paper.) *Quantum*, 6:789, 2022. (<https://arxiv.org/abs/2009.11270>)
- N. Halman, G. Nannicini. Fully polynomial-time (Σ, Π) -approximation schemes for continuous nonlinear newsvendor and continuous stochastic dynamic programs. *Mathematical Programming*, 195(1):183–242, 2022. An earlier version is available on Optimization Online, paper 5276.
- G. Nannicini. On the implementation of a global optimization method for mixed-variable problems. *Open Journal of Mathematical Optimization*, 2:1–25, 2021. **Winner of the 2021 Beale–Orchard-Hays prize.**

¹Highest mark awarded by Ecole Polytechnique

- P. Jurcevic, A. Javadi-Abhari, L. S. Bishop, I. Lauer, D. F. Bogorin, M. Brink, L. Capelluto, O. Günlük, T. Itoko, N. Kanazawa, A. Kandala, G. A. Keefe, K. Kruslich, W. Landers, E. P. Lewandowski, D. T. McClure, G. Nannicini, A. Narasgond, H. M. Nayfeh, E. Pritchett, M. B. Rothwell, S. Srinivasan, N. Sundaresan, C. Wang, K. X. Wei, C. J. Wood, J.-B. Yau, E. J. Zhang, O. E. Dial, J. M. Chow, J. M. Gambetta. Demonstration of quantum volume 64 on a superconducting quantum computing system. *Quantum Science and Technology* 6.2:025020, 2021. (<https://arxiv.org/abs/2008.08571>)
- G. Nannicini, E. Traversi, R. Wolfler-Calvo. A Benders squared (B^2) algorithm for infinite horizon stochastic linear programs. *Mathematical Programming Computation*, 12(4):645–681, 2021.
- P. Barkoutsos, G. Nannicini, R. Anton, I. Tavernelli, S. Wörner. Improving Variational Quantum Optimization using CVaR. *Quantum*, <https://quantum-journal.org/papers/q-2020-04-20-256/>, 2020.
- G. Nannicini, G. Sartor, E. Traversi, R. Wolfler-Calvo. An exact algorithm for robust influence maximization on social networks. *Mathematical Programming B*, 183(1):419–453, 2020. (Extended version of IPCO paper.)
- G. Nannicini. An introduction to quantum computing, without the physics. *SIAM review*, 62(4):936–981, 2020. An earlier version is available at: <https://arxiv.org/abs/1708.03684>.
- A. Lodi, E. Malaguti, G. Nannicini, D. Thomopulos. Nonlinear chance-constrained problems with applications to hydro scheduling. *Mathematical Programming B*, 191(1):405–444, 2022.
- G. Nannicini. Performance of hybrid quantum/classical variational heuristics for combinatorial optimization. *Physical Review E*, 99:013304, 2019.
- N. Halman, G. Nannicini. Toward breaking the curse of dimensionality: an FPTAS for stochastic dynamic programs with multidimensional actions and scalar states. *SIAM Journal on Optimization*, 29(2):1131–1163, 2019.
- A. Costa, G. Nannicini. RBFOpt: an open-source library for black-box optimization with costly function evaluations. *Mathematical Programming Computation*, 10(4):597–629, 2018. **Winner of the 2021 Beale–Orchard-Hays prize.**
- N. Halman, G. Nannicini, J. Orlin. On the complexity of energy storage problems. *Discrete Optimization*, 28:31–53, 2018.
- A. Costa, E. Di Buccio, M. Melucci, G. Nannicini. Efficient parameter estimation for information retrieval using black-box optimization. *IEEE Transactions on Knowledge and Data Engineering*, 30(7):1240–1253, 2018.
- A. Fokoue, G. Diaz, G. Nannicini, H. Samulowitz. An effective algorithm for hyperparameter optimization of neural networks. *IBM Journal of Research and Development*, 61(4-5), paper 9, 2017.
- C. D’ambrosio, G. Nannicini, G. Sartor. MILP models for the selection of a small set of well-distributed points. *Operations Research Letters*, 45(1):46–52, 2017.
- J. Kalikka, X. Zhou, J. Behera, G. Nannicini, R. Simpson. Evolutionary design of interfacial phase change van der Waals heterostructures. *Nanoscale*, 8(42):18212–18220, 2016.

- T. Wortmann, A. Costa, G. Nannicini, T. Schröpfer. Advantages of surrogate models for architectural design optimization. *Artificial Intelligence for Engineering Design, Analysis and Manufacturing*, 29(4):471–481, 2015.
- N. Halman, G. Nannicini and J. Orlin. A computationally efficient FPTAS for convex stochastic dynamic programs. *SIAM Journal on Optimization*, 25(1):317–350, 2015.
- G. Cornuéjols, F. Margot and G. Nannicini. On the safety of Gomory cut generators. *Mathematical Programming Computation*, 5(4):345–395, 2013.
- E. Balas, G. Cornuéjols, T. Kis and G. Nannicini. Combining Lift-and-Project and Reduce-and-Split. *INFORMS Journal on Computing*, 25(3):475–487, 2013.
- G. Cornuéjols, C. Michini, G. Nannicini. How tight is the corner relaxation? Insights gained from the stable set problem. *Discrete Optimization*, 9(2):109–121, 2012. Selected by the Editorial Board for the **10 Year Virtual Special Issue** as an “excellent paper [...] published in this journal over the last decade”.
- G. Nannicini and P. Belotti. Rounding-based heuristics for nonconvex MINLPs. *Mathematical Programming Computation*, 4(1):1–31, 2012.
- D. Delling and G. Nannicini. Core routing on dynamic time-dependent road networks. *INFORMS Journal on Computing*, 24(2):187–201, 2012.
- G. Nannicini, D. Delling, D. Schultes and L. Liberti. Bidirectional A* search on time-dependent road networks. *Networks*, 59(2):240–251, 2012. **Winner of the 2012 Glover-Klingman prize.**
- L. Liberti, N. Mladenović and G. Nannicini. A recipe for finding good solutions to MINLPs. *Mathematical Programming Computation*, 3(4):349–390, 2011.
- G. Cornuéjols and G. Nannicini. Practical strategies for generating rank-1 split cuts in mixed-integer linear programming. *Mathematical Programming Computation*, 3(4):281–318, 2011.
- G. Cornuéjols, L. Liberti and G. Nannicini. Improved strategies for branching on general disjunctions. *Mathematical Programming A*, 130(2):225–247, 2011.
- G. Nannicini. Point-to-Point Shortest Paths on Dynamic Time-Dependent Road Networks (Ph.D. thesis abstract). *4OR*, 8(3):327–330, 2010.
- G. Nannicini, P. Baptiste, G. Barbier, D. Kroh, and L. Liberti. Fast paths in large-scale dynamic road networks. *Computational Optimization and Applications*, 45(1):143–158, 2010.
- G. Nannicini and L. Liberti. Shortest paths on dynamic graphs. *International Transactions in Operational Research*, 15:1–13, 2008.

MANUSCRIPTS (UNDER REVIEW AND/OR POSTED ONLINE):

- B. Augustino, J. Leng, G. Nannicini, T. Terlaky, X. Wu. A quantum central path algorithm for linear optimization. Available at: *arXiv*, paper 2311.03977 (<https://arxiv.org/abs/2311.03977>).
- B. Augustino, G. Nannicini, T. Terlaky, L. Zuluaga. Solving the semidefinite relaxation of QUBOs in matrix multiplication time, and faster with a quantum computer. Available at: *arXiv*, paper 2301.04237 (<https://arxiv.org/abs/2301.04237>).

- N. Halman and G. Nannicini. Fully polynomial-time approximation schemes for robust multistage decision making. Under review.
- J. J. Torres, G. Nannicini, E. Traversi, R. Wolfler-Calvo. A trust-region framework for derivative-free mixed-integer optimization. Under review.
- E. Pednault, J. Gunnels, G. Nannicini, L. Horesh, R. Wisnieff. Leveraging secondary storage to simulate deep 54-qubit Sycamore circuits. Available at: *arXiv*, paper 1910.09534, (<https://arxiv.org/abs/1910.09534>).
- E. Pednault, J. Gunnels, G. Nannicini, L. Horesh, T. Magerlein, E. Solomonik, E. Draeger, E. Holland, R. Wisnieff. Pareto-efficient quantum circuit simulation using tensor contraction deferral. (This is an extended version of “Breaking the 49-qubit barrier in the simulation of quantum circuits” (<https://arxiv.org/abs/1710.05867>)).

BOOK CHAPTERS:

- B. Augustino and G. Nannicini. Quantum linear algebra. *Encyclopedia of optimization*, to appear.
- G. Nannicini. Introduction to quantum computing. *Encyclopedia of optimization*, to appear.
- T. Wortmann and G. Nannicini. Introduction to Architectural Design Optimization. *City Networks - Planning for Health and Sustainability*, P. Pardalos, S.Th. Rassia, A. Migdalas, A. Karakitsiou (eds.). Springer Optimization and its Applications, volume 128, pages 259-278. Springer, 2017.
- G. Nannicini, G. Cornuéjols, M. Karamanov and L. Liberti. Branching on split disjunctions. *Combinatorial Optimization: Methods and Applications*, V. Chvátal (ed.), pages 164-182. IOS Press, 2011.
- P. Belotti, L. Liberti, A. Lodi, G. Nannicini and A. Tramontani. Disjunctive inequalities: applications and extensions. *Encyclopedia of Operations Research and Management Science*, J. Cochran et al. (eds.), Wiley, Hoboken, 2013.
- L. Liberti, G. Nannicini and N. Mladenović. A good recipe for solving MINLPs. *MATHEURISTICS: Hybridizing metaheuristics and mathematical programming*, volume 10 of Annals of Information Systems, pages 231-245. Springer, 2009.

CONFERENCE PROCEEDINGS:

- J. van Apeldoorn, A. Cornelissen, A. Gilyén, G. Nannicini. Quantum tomography with state-preparation unitaries. *Proceedings of SODA 2023*, to appear. Available at: *arXiv*, paper 2207.08800 (<https://arxiv.org/abs/2207.08800>).
- S. Arunachalam, V. Havlicek, G. Nannicini, K. Temme, P. Wocjan. Simpler (classical) and faster (quantum) algorithms for Gibbs partition functions. **Best paper (quantum algorithms track) at IEEE QCE 21.**
- G. Nannicini. Fast quantum subroutines for the simplex method. *Proceedings of IPCO 2021*, pages 311-325, 2021. Available at: *arXiv*, paper 1910.10649 (<https://arxiv.org/abs/1910.10649>).
- G. Nannicini, G. Sartor, E. Traversi, R. Wolfler-Calvo. An exact algorithm for robust influence maximization on social networks. *Proceedings of IPCO 2019*, pages 313-326, 2019.

- V. Austel, S. Dash, O. Günlük, L. Horesh, L. Liberti, G. Nannicini, B. Schieber. Globally optimal symbolic regression. *Proceedings of NIPS 2017 Symposium on Interpretable Machine Learning*, <https://arxiv.org/abs/1711.09889>, 2017. Available at: *arXiv*, paper 1710.10720, <https://arxiv.org/abs/1710.10720>. Selected for a spotlight talk.
- E. Malaguti, G. Nannicini and D. Thomopulos. Optimizing allocation in a warehouse network. *Proceedings of the International Conference on Network Optimization (INOC 2017)*, Volume 64 of Electronic Notes in Discrete Mathematics, pages 195-204. Elsevier, 2018.
- C. Waibel, T. Wortmann, G. Nannicini, R. Evins, T. Schröpfer and J. Carmeliet. Are genetic algorithms really the best choice for building energy optimization? *Proceedings of SimAUD 2017*, pages 51-58. SCS, 2017.
- T. Wortmann, G. Nannicini. Optimization methods for architectural design. *Proceedings of the 21st Annual Conference on Computer-Aided Architecture Design Research in Asia (CAADRIA 2016)*, 2016.
- A. Costa, G. Nannicini, T. Schröpfer, T. Wortmann. Black-box optimization of lighting simulation in architectural design. *Proceedings of Complex Systems Design & Management Asia*, pages 27-39. Springer, 2015.
- N. Halman, G. Nannicini and J. Orlin. A computationally efficient FPTAS for convex stochastic dynamic programs. *Proceedings of ESA 2013*, volume 8125 of Lecture Notes in Computer Science, pages 577-588. Springer, 2013.
- G. Nannicini, P. Belotti, J. Lee, J. Linderoth, F. Margot, A. Wächter. A probing algorithm for MINLP with failure prediction by SVM. *Proceedings of CPAIOR 2011*, volume 6697 of Lecture Notes in Computer Science, pages 154-169. Springer, 2011.
- G. Nannicini and P. Belotti. Rounding-based heuristics for nonconvex MINLPs. *Proceedings of EWMINLP*, Marseille, 2010.
- G. Cornuéjols, L. Liberti and G. Nannicini. Improved strategies for branching on general disjunctions. *Proceedings of CTW 09*, Paris, 2009.
- G. Nannicini, D. Delling. Core Routing on Time-Dependent Networks. *Proceedings of ROADEF 09*, Nancy, 2009.
- G. Nannicini, P. Baptiste, D. Kroh, and L. Liberti. Fast point-to-point shortest path queries on dynamic graphs with interval data. *Proceedings of CTW 2007*, Enschede, 2007.
- D. Delling, G. Nannicini. Bidirectional core-based routing in dynamic time-dependent road networks. *Proceedings of ISAAC 08*, volume 5369 of Lecture Notes in Computer Science, pages 813-824. Springer, 2008.
- G. Nannicini, P. Baptiste, D. Kroh, and L. Liberti. Fast computation of point-to-point paths on time-dependent road networks. *Proceedings of COCOA 08*, volume 5165 of Lecture Notes in Computer Science, pages 225-234. Springer, 2008.
- G. Nannicini, D. Delling, L. Liberti, D. Schultes. Bidirectional A* search for time-dependent fast paths. *Proceedings of WEA 2008*, volume 5038 of Lecture Notes in Computer Science, pages 334-346. Springer, 2008.
- G. Nannicini, P. Baptiste, D. Kroh, and L. Liberti. Fast paths in dynamic road networks. *Proceedings of ROADEF 08 (long papers)*, Clermont-Ferrand, 2008.

- G. Nannicini, D. Delling, L. Liberti, D. Schultes. Bidirectional A* on time-dependent graphs. *Proceedings of CTW 2008*, Milan, 2008.

PATENTS:

- Currently $\approx 12?$ US patents pending – details available upon request. (Sorry, I stopped keeping track of the exact number.)
- G. Nannicini. *Estimation de trafic dans un réseau routier* (in French), French patent FR0756225 and European patent EP2012290. 2009.
- G. Nannicini. *Estimation de plus court chemin dépendant du temps dans un réseau routier* (in French), French patent FR0800366 and European patent EP2235477. 2009.
- G. Nannicini, D. Delling and D. Schultes. *Estimation de plus court chemin dépendant du temps dans un réseau routier* (in French), French patent FR0851725 and European patent EP2257766. 2009.

EDITED BOOKS:

- S. Cafieri, A. Mucherino, G. Nannicini, F. Tarissan, L. Liberti (eds.). *Proceedings of CTW09 Conference*, Paris, 2009.

THESES:

- Ph.D. thesis: *Point-to-Point Shortest Paths on Dynamic Time-Dependent Road Networks*. Advisors: L. Liberti, P. Baptiste, D. Krob. Defense: 18th June 2009.
- M.Sc. dissertation²: *Global optimization of black-box functions with high evaluation cost* (in Italian). Advisors: F. Schoen, P. Cappanera. Defense: 26th September 2006.
- B.Sc. dissertation²: *Prediction of cysteine bonding status with machine learning methods* (in Italian). Advisors: P. Frascioni, A. Passerini. Defense: 15th September 2004.

TECHNICAL REPORTS:

- G. Nannicini. A snapshot of quantum algorithms for optimization. *Oberwolfach Reports* series (OWR) 26/2019.
- G. Nannicini. On generalized Benders decomposition and outer approximation for convex chance-constrained problems. *Oberwolfach Reports* series (OWR) 46/2015. Based on joint work with Andrea Lodi, Enrico Malaguti, Dimitri Thomopoulos.
- J. Kalikka, X. Zhou, G. Nannicini, R. E. Simpson. Layered 2D crystals by design: optimisation of Sb_2Te_3 -GeTe van der Waals superlattices. 2015. Available at: *arXiv*, paper 1509.01335 (<http://arxiv.org/abs/1509.01335>).
- G. Cornuéjols, F. Margot, G. Nannicini and C. Tjandraatmadja. Selecting active cuts in MIP solvers. First-summer research paper at CMU Tepper, September 2013.

²In the Italian education system, a written thesis must be prepared and discussed after each course of study.

- G. Nannicini, P. Belotti, J. Lee, J. Linderoth, F. Margot, A. Wächter. A probing algorithm for MINLP with failure prediction by SVM. IBM Report RC25103, 2011.
- G. Nannicini, P. Belotti and L. Liberti. A local branching heuristic for MINLPs. 2008. Available at: *arXiv*, paper 0812.2188 (<http://arxiv.org/abs/0812.2188>).

EDUCATIONAL WORK AND OTHER WORKS:

- G. Nannicini. An equation-free introduction to derivative-free optimization. *Bulletin de la ROADEF* (ROADEF newsletter), number 34, 2015.
- K. Otto, B. Camburn, A. Mathur, R. Bouffanais, E. Kyoseva, D. Poletti, R. Simpson, G. Nannicini, J. Yong, K. Wood. Integrated 2D Design in the Curriculum: Effectiveness of Cross-Subject Engineering Challenges. *American Society for Engineering Education Annual Conference*, Indianapolis, Paper ID# 8653, 2014.

Prizes and awards:

- 2021 Best Paper (Quantum Algorithms track) at IEEE QCE 21 for the paper “Simpler (classical) and faster (quantum) algorithms for Gibbs partition functions” (co-authored with S. Arunachalam, V. Havlicek, K. Temme, P. Wocjan).
- 2021 Beale–Orchard-Hays prize for the papers “RBFOpt: an open-source library for black-box optimization with costly function evaluations” (co-authored with A. Costa) and “On the implementation of a global optimization method for mixed-variable problems”, awarded every 3 years by the Mathematical Optimization Society for excellence in computational mathematical programming.
- 2017 Singapore “Good Design” Award (SG Mark), together with T. Schröpfer and T. Wortmann, for our work on derivative-free optimization in architectural design (RBFOpt + Opossum).
- 2016 COIN-OR Cup, together with graduate student T. Wortmann, for the contribution of open-source software for architectural design optimization (RBFOpt + Opossum).
- 2015 Prix Robert Faure, awarded every 3 years to a researcher under 35 years by ROADEF for contributions to operations research.
- 2012 Glover-Klingman prize for the best paper published on *Networks* in 2012 (paper co-authored with D. Delling, D. Schultes, L. Liberti).
- Other recognition:
 - Discrete Optimization 10 Year Anniversary Special Issue: one of my papers (co-authored with G. Cornuéjols and C. Michini) was chosen for this selection of “ten excellent papers [...] published in this journal over the last decade”, 2014.
 - Selected for the IBM Regional Journal of Eminence, a “recognition for leadership and technical excellence”, 2016.

- Finalist, Microsoft Research Faculty Fellowship 2014.
- Second prize at *Prix de l'innovation de l'Ecole Polytechnique*, 2009.

Some mentions of my work in the news:

- On quantum computing: Wall Street Journal, New York Times, Scott Aaronson's blog, MIT Technology Review, New Scientist, Bloomberg, Singularity Hub, IEEE Spectrum.

Grants and sponsorships:

- At USC:
 - *Toward quantum advantage for continuous optimization*, PI, funded by ONR, 2023. 3 year duration, \$538K.
- At IBM:
 - *Quantum algorithms for machine learning, optimization, and simulation*, project member, funded by Army Research Office, 2020. 3 year duration, \$724K.
 - *Quantum computer science*, PI, funded by IBM Research Frontiers Institute, 2019. 2 year duration, \$500K.
 - *Quantum applications*, PI, funded by IBM Research Frontiers Institute, 2017. 2 year duration, \$1M.
- At SUTD:
 - *Integrated tools for efficient optimization of parametric designs*, Co-PI, funded by International Design Center, 2015. 1 year duration, S\$80K.
 - *An algorithmic approach for energy production scheduling under uncertainty*, PI, MoE Tier 1 Academic Research Fund, 2015. 2 years duration, S\$55K.
 - *Optimization tools for generative method in architecture and sustainable design*, co-PI, funded by International Design Center, 2012. 2 years duration, S\$651K.
 - *Algorithm design for cutting planes in Mixed-Integer Linear Programming*, PI, funded by SUTD and International Design Center, 2011. 3 years duration, S\$100K.

Software projects:

Main author:

- `V-tactic`, route planner for <http://www.v-traffic.fr>: high-performance parallel software for time-dependent shortest paths computations on large dynamic graphs. Commercial license, not publicly available.
- `COIN-OR RBF0pt`: an efficient implementation of the RBF method for the global optimization of functions available through an expensive oracle (“black-box”). Project manager and maintainer. Available on PyPI (≈ 15000 downloads each month). Open-source.

- `COIN-OR CglRedSplit2`: Reduce-and-Split and Lift-and-Project + Reduce-and-Split cut generator for MILPs. Available in COIN-OR Cgl (trunk). Open-source.
- `COIN-OR CglGMI`: numerically safe Gomory Mixed-Integer cut generator for MILPs. Available in COIN-OR Cgl (trunk). Open-source.
- `Coupe`: high-throughput parallel solver for nonconvex MINLPs. Available on request. Open-source.
- `Recipe`: VNS-based heuristic for nonconvex MINLPs that coordinates global/local search of any solver with an AMPL interface. Available on Leo Liberti’s webpage. Open-source.
- `Cut safety testing framework`: an algorithmic framework for testing the safety of cut generators in a Branch-and-Cut setting. Available upon request. Open-source.
- `ADP Toolbox`: a toolbox for the approximate solution of stochastic dynamic programs of certain classes. Available upon request. Open-source.

Contributor:

- `Qiskit`: several contributions to the Variational Quantum Eigensolver, optimization interfaces, transpilers, and more. Available on Qiskit’s webpage and PyPI. Open-source.
- `COIN-OR Couenne`: contributor of primal heuristics (`CouenneIterativeRounding`) and bound tightening techniques (`CouenneAggrProbing`) for a Branch-and-Bound solver for nonconvex MINLPs. Available on COIN-OR’s webpage. Open-source.
- `SCIP`: contributor of Gomory Mixed-Integer cut generator. Available on ZIB’s webpage. Open-source.

Invited and plenary conference talks:

- Plenary talk at *Adiabatic Quantum Computing 2023*. Albuquerque, NM, 2023.
- Lecturer for the *LANL Quantum Computing Summer School*. Los Alamos, NM, 2023.
- Plenary panelist at *2022 CORS/INFORMS International Conference*. Vancouver, BC, Canada, 2022.
- Lecturer for the spring school at *ISCO 2022* (International Symposium on Combinatorial Optimization). Online conference, 2022.
- Invited tutorial at *SIAM OP21*. Online conference, 2021.
- Plenary talk at *ROADEF 2020*. Université de la Méditerranée, Montpellier, France, 2020.
- Invited talk at the *CRM MINLP workshop*. Montreal, QC, Canada, 2019.
- Plenary talk at *MOPTA 2019*. Lehigh University, Bethlehem, PA, 2019.

- Invited tutorial at the *2017 International Symposium on Computer Performance, Modeling, Measurements and Evaluation*. Columbia University, New York, NY, 2017.
- Invited talk at the *International Workshop on Modern Optimization and Application*. Chinese Academy of Sciences, Beijing, China, 2016.
- Invited talk at the *Workshop on Emerging Topics in Conic and Discrete Optimization*. Singapore University of Technology and Design, Singapore, 2014.
- Invited talk at the *Workshop on Mixed Integer Programming (MIP) 2014*. Ohio State University, Columbus, OH, 2014.
- Invited talk at Condor Week. University of Wisconsin at Madison, WI, 2012.
- Invited talk at the *Workshop on Mixed Integer Programming (MIP) 2011*. University of Waterloo, ON, Canada, 2011.
- Invited talk at the *Workshop on Multiple Row Cuts in Integer Programming*. Bertinoro, Italy, 2009.
- Invited talk at the *Spring Workshop on Computational Issues in Mixed Integer Nonlinear Programming*. Université Bordeaux 1, Bordeaux, France, 2009.

Seminars:

- Seminar at Cornell University (Ezra Round Table seminar series in Systems Engineering), Ithaca, NY, 2021.
- Seminar at University of L'Aquila, Italy, 2021.
- Seminar at Texas Tech University, Industrial, Manufacturing & Systems Engineering, Lubbock, TX, 2021.
- Seminar at LIPN, Université Paris 13, Paris, France, 2021.
- Seminar at University of Iowa, Tippie College of Business, Iowa City, IA, 2021.
- Seminar at Yahoo Research, New York, NY, 2020.
- Seminar at University of Illinois Chicago, College of Business Administration, Chicago, IL, 2020.
- Seminar at Argonne National Laboratory, Mathematics and Computer Science, Lemont, IL, 2019.
- Seminar at the Decision, Risk and Optimization seminar series of the IEOR department, Columbia University, New York, NY, 2018.
- Seminar at the Operations Research series of the Tepper School of Business, Carnegie Mellon University, Pittsburgh, PA, 2017.
- Seminar at the Operations Research series of the Operations Research Center, Massachusetts Institute of Technology, Boston, MA, 2017.
- Seminar at Università degli studi di Bologna, Bologna, Italy, 2015.

- Seminar at LIPN, Université Paris 13, Paris, France, 2015.
- Seminar at IBM T. J. Watson, Yorktown Heights, NY, 2015.
- Seminar at University of Minnesota, Minneapolis, MN, 2014.
- Seminar at IBM Research Singapore, 2014.
- Seminar at IBM T. J. Watson, Yorktown Heights, NY, 2014.
- Seminar at Université Paris Dauphine, Paris, France, 2014.
- Seminar at LIX, Ecole Polytechnique, Palaiseau, France, 2013.
- Seminar at Zuse Institut Berlin, Berlin, Germany, 2013.
- Seminar at IBM T. J. Watson, Yorktown Heights, NY, 2013.
- Seminar at Carnegie Mellon University, Pittsburgh, PA, 2012.
- Seminar at Freie Universität Berlin, Berlin, Germany, 2012.
- Seminar at Université Paris Dauphine, Paris, France, 2010.
- Seminar at Carnegie Mellon University, Pittsburgh, PA, 2009.
- Seminar at Università degli studi di Firenze, Firenze, Italy, 2009.
- Seminar at IBM T. J. Watson, Yorktown Heights, NY, 2008.
- Seminar at Polytech'Tours, Tours, France, 2008.
- Seminar at Università degli studi di Modena e Reggio Emilia, Modena, Italy, 2007.

Other conferences with contributed talks:

- INFORMS 22, Indianapolis, IN, 2022.
- INFORMS 21, Anaheim, CA, 2020.
- SIAM PP 20, Seattle, WA, 2020.
- ICCOPT 19, Berlin, Germany, 2019.
- ISMP 18, Bordeaux, France, 2018.
- INFORMS 17, Houston, TX, 2017.
- SIAM Conference on Optimization, Vancouver, Canada, 2017.
- ICCOPT 16, Tokyo, Japan, 2016.
- Workshop on Combinatorial Optimization, Aussois, France, 2016.
- Workshop on MINLP at Mathematisches Forschungsinstitut Oberwolfach (MFO), Oberwolfach, Germany, 2015.
- ISMP 15, Pittsburgh, PA, 2015.

- ESA 13, Sophia-Antipolis, France, 2013.
- Workshop on Combinatorial Optimization, Aussois, France, 2013.
- ISMP 12, Berlin, Germany, 2012.
- Workshop on Combinatorial Optimization, Aussois, France, 2012.
- CPAIOR 11, Berlin, Germany, 2011.
- Workshop on Hybrid Methods for Nonlinear Combinatorial Optimization, Berlin, Germany, 2011.
- SIAM Conference on Optimization, Darmstadt, Germany, 2011.
- Workshop on Combinatorial Optimization, Aussois, France, 2011.
- INFORMS 10, Austin, TX, 2010.
- MOPTA 10, Bethlehem, PA, 2010.
- SIAM 10 Annual Meeting, Pittsburgh, PA, 2010.
- European Workshop on MINLP, Marseille, France, 2010.
- Workshop on Combinatorial Optimization, Aussois, France, 2010.
- ISMP 09, Chicago, IL, 2009.
- IFIP 09, Buenos Aires, Argentina, 2009.
- CTW 09, Paris, France, 2009.
- ROADEF 09, Nancy, France, 2009.
- Workshop on Combinatorial Optimization, Aussois, France, 2009.
- COCOA 08, St. John's, Canada, 2008.
- MATHEURISTICS 08, Bertinoro, Italy, 2008.
- WEA 08, Cape Cod, MA, 2008.
- CTW 08, Milan, Italy, 2008.
- ROADEF 08, Clermont-Ferrand, France, 2008.
- INFORMS 07 Annual Meeting, Seattle, WA, 2007.
- CAL 08, Paris, France, 2007.
- CTW 07, Twente, The Netherlands, 2007.

Other presentations:

- Poster at MIP 2010. Georgia Institute of Technology, Atlanta, GA, 2010.
- Poster at MIP 2009. University of California at Berkeley, Berkeley, CA, 2009.

- Poster at the IMA workshop: Mixed Integer Nonlinear Optimization, Algorithmic Advances and Applications. Minneapolis, MN, 2008.
- Talk at the Automatic Reformulation Search workshop. Ecole Polytechnique, Paris, France, 2008.

Editorial activities:

- Editor for INFORMS Journal on Computing special issue on Quantum Computing and Operations Research, to be published in 2024.
- Associate editor for Mathematics of Operations Research, since 2023.
- Associate editor for INFORMS Journal on Computing, since 2023.
- Associate editor for Journal of Optimization Theory and Applications, since 2022.
- Associate editor for Open Journal of Mathematical Optimization, since 2019.
- Technical editor for Mathematical Programming Computation, since 2014.

Conference organization activities:

- Cluster chair at INFORMS 2023 (Emerging technologies and applications).
- Minisymposium organizer at SIAM OP 2023 (Quantum computing and optimization).
- Member of the scientific committee of ISMP 2024.
- Member of the program committee of IPCO 2023.
- Member of the organizing committee of the Workshop on Trends in Computational Discrete Optimization, ICERM, April 2023.
- Chair of the program/organizing committee of the Workshop on Quantum Computing and Operations Research (at the Fields Institute), October 2022.
- Member of the organizing committee for ACO@CMU, a workshop in honor of Gerard Cornuejols 70th birthday, 2022.
- Cluster chair of INFORMS Computing Society conference 2022.
- Minicluster organizer at INFORMS annual meeting 2021.
- Member of the program committee of IEEE Quantum Computing and Engineering Week 2021, 2022, 2023.
- Member of the program committee of ISMP 2021.
- Cluster chair of INFORMS Computing Society conference 2019.
- Member of the scientific committee of ISMP 2018.
- Chair of the program committee of MIP 2018.

- Member of the program committee of MIP 2017.
- Session organizer at ICCOPT 2016.
- Member of the program committee of WCO 2015.
- Session organizer at ISMP 2015.
- Member of the program committee of ESA 2014.
- Member of the program committee of WCO 2014.
- Session organizer at ICCOPT 2013.
- Session organizer at ISMP 2012.
- Member of the program committee of ATMOS 2012.
- Member of the local organizing committee of TOGO 2010.
- Member of the local organizing committee of CTW 2009.

Professional service:

- Member of the INFORMS Optimization Society student paper prize committee, 2023.
- Chair of the INFORMS Computing Society working group on quantum computing, since 2021.
- Chair of SIAM “Guided Affinity Group” on Quantum Computing for the SIAM CSE21 conference.
- From 2017 to 2020: chair of the Operations Research PIC (Professional Interest Community) for the IBM T.J. Watson lab.
- Chair of the committee for the 2017 COIN-OR Cup.
- From November 2015 to December 2021: member of the Strategic Leadership Board of the COIN-OR foundation.
- From May 2012 to October 2015: member of the Ph.D. program committee of the Engineering Systems & Design pillar at SUTD, responsible for establishing, planning and managing the Ph.D. program since its inception.
- From 2013 to 2014: organizer of the ESD Brown Bag Seminar Series.
- External project reviewer for:
 - US National Science Foundation.
 - French “Agence Nationale de la Recherche (ANR)”.
 - European Research Council.
 - Italian Ministry of Education, University and Research.
 - Portuguese “Fundação para a Ciência e a Tecnologia”.

- Examiner for the following Ph.D. theses:
 - Ramin Fakhimi, Department of Industrial and Systems Engineering, Lehigh University, 2022-2023.
 - Dounia Lakhmiri, Department of Mathematics and Industrial Engineering, Polytechnique Montreal, 2021.
 - Shi Dongjian, Department of Mathematics, National University of Singapore, 2013.

Teaching:

- At the *University of Southern California*, Los Angeles, CA:
 - Optimization methods for analytics (2023, Spring and Fall term, course ISE 530). Graduate level.
 - Quantum computing and optimization (2023, Fall term, course ISE 599). Graduate level.
- At *Lehigh University*, Bethlehem, PA:
 - Quantum computing. Graduate level.
- At *Columbia University*, New York, NY:
 - Quantum computing (special topics in IEOR). Graduate level.
- Short graduate course “An introduction to quantum computing, without the physics”:
 - At *IBM T.J. Watson*, Yorktown Heights, NY, in 2017, 2018.
 - At *LIPN, Université Paris 13*, Paris, France, in 2017.
 - At *SUTD*, Singapore, in 2017.
- At *SUTD*, Singapore:
 - Linear optimization (2013, 2014 and 2015, Fall term, course 40.510). Graduate level.
 - Optimization (2013 and 2014, Fall term, course 40.002). Undergraduate level.
 - Modeling the Systems World (2013, 2014 and 2015, Spring term, course 10.007). Undergraduate level.
 - Advanced Math II (2012, Fall term, course 10.004). Undergraduate level.
- Teaching associate at *MIT Sloan*, Cambridge, MA:
 - Optimization methods in Operations Research (2012, Spring term, course 15.058). Undergraduate and graduate level. Responsible for recitations, problem sets, quizzes and midterms, and contributing to lecture development.
 - Optimization methods in Management Science (2012, Spring term, course 15.053). Undergraduate level. Responsible for problem sets, quizzes and midterms, and contributing to lecture development.
- Teaching assistant at *Ecole Polytechnique*, Paris:

- Introduction to C++ (2007, Spring and Fall term, 2008, Spring and Fall term, 2009, Spring term).
- Introduction to Computer Science (2007 and 2008, Spring term).
- Operations Research (MISIC 2007, Fall term).
- Mathematical Programming: Modeling and Applications (2008, Fall term).

Teaching evaluations: (more details available upon request)

- Course instructor at *SUTD* for PhD course 40.510, Fall 2015:
 - Overall rating: 4.52/5.0.
- Course lead at *SUTD* for course 10.007, Spring 2015:
 - Overall rating as a lecturer (all sections): 4.27/5.0.
 - Overall rating as cohort instructor (one section): 4.6/5.0.
- Course instructor at *SUTD* for PhD course 40.510, Fall 2014:
 - Overall rating: 4.37/5.0.
- Course instructor at *SUTD* for course 40.002, Fall 2014:
 - Overall rating as cohort instructor (one section): 4.9/5.0.
- Course lead at *SUTD* for course 10.007, Spring 2014:
 - Overall rating as a lecturer (all sections): 4.2/5.0.
 - Overall rating as cohort instructor (one section): 4.3/5.0.
- Course instructor at *SUTD* for PhD course 40.510, Fall 2013:
 - Overall rating: 4.53/5.0.
- Course lead at *SUTD* for course 40.002, Fall 2013:
 - Overall rating as a lecturer and course lead (all sections): 4.56/5.0.
 - Overall rating as cohort instructor (one section): 4.8/5.0.
- Course lead at *SUTD* for course 10.007, Spring 2013:
 - Overall rating as a lecturer (all sections): 4.3/5.0.
 - Overall rating as cohort instructor (one section): 4.4/5.0.
- Course instructor at *SUTD* for course 10.004, Fall 2012, two sections:
 - Overall rating: 4.3/5.0, 4.5/5.0.
- Teaching associate at *MIT Sloan* for course 15.058, Spring 2012:
 - Overall rating: 6.73/7.00.

Former students and researchers:

- Co-advisor of Brandon Augustino, PhD student at ISyE, Lehigh University. Subsequent position: postdoctoral research fellow at MIT Sloan.
- Co-advisor of Juan Jose Torres Figueroa, PhD student at LIPN, Université Paris 13. Subsequent position: research engineer at Saint-Gobain.
- Co-advisor Thomas Wortmann, PhD student in the Architecture & Sustainable Design pillar at SUTD. Subsequent position: assistant professor at Xi'an Jiaotong-Liverpool University.
- Advisor of Giorgio Sartor, PhD student in the Engineering Systems & Design pillar at SUTD. Subsequent position: postdoctoral research fellow (tenure-track equivalent) at SINTEF.
- Advisor of Alberto Costa, postdoctoral research fellow, January 2013 to January 2015. Subsequent position: postdoctoral research fellow at National University of Singapore, Industrial and Systems Engineering.

Professional membership:

- Member of the INFORMS Computing Society and the INFORMS Optimization Society.
- Member of the Mathematical Optimization Society.
- Member of SIAM.
- Member of DIMACS.
- Full member of the COIN-OR Foundation.

Consulting and other external activities:

- Consultant for Singapore Diamond Investment Exchange Pte Ltd (commodity exchange in physically settled diamonds, <http://www.sdix.sg>), 2014–2015.
- Advisor for “Claire – 30 Seconds to Fly” (<http://www.30secondstofly.com/>), 2015–2017.