

CURRICULUM

GIULIANA CARELLO

EDUCATION AND POSITION

- From December 2017: associate professor at the Dipartimento di Elettronica ed Informazione (now Dipartimento di Elettronica, Informazione e Bioingegneria), Politecnico di Milano, research area: Operations Research.
- 27 October 2014: Associate Professorship in the scientific area 01/A6 “Operations Research”.
- From May 2005: assistant professor at the Dipartimento di Elettronica ed Informazione (now Dipartimento di Elettronica, Informazione e Bioingegneria), Politecnico di Milano, research area: Operations Research.
- October 2004-April 2005: post doc at Dipartimento di Elettronica ed Informazione, Politecnico di Milano.
- January - September 2004: fellow at the Dipartimento di Automatica ed Informatica, Politecnico di Torino.
- 2001-2003: Ph.D. student at the Dipartimento di Automatica ed Informatica, Politecnico di Torino.
Final Thesis discussion: February 11, 2004. Ph.D thesis : “Hub Location Problems in Telecommunication Networks”.
- March-August 2003: visiting the Université Libre de Bruxelles - Service de Matématique de la Gestion.
- 1999: laurea cum laude in Electronic Engineering at the Politecnico di Torino.

RESEARCH ACTIVITY AND PUBLICATIONS

Research activity has been focused on the following topics:

- Healthcare management problems
 - Robust approaches: [20].
 - Staff rostering: [36], [60], [66].
 - Ambulance location: [17], [61], [63], [67].
 - Operating room management: [16], [54].
 - Homecare service management: [2],[5], [11], [24], [52], [55], [58], [59].
 - Blood donation appointment scheduling: [4], [10],[12],[53].
 - Chemotherapy planning: [1].
- Location problems: [26], [28], [34], [57].
- Telecommunication Network & ICT
 - Planning and managing of wireless networks: [29], [30], [49], [51].
 - Network design: [31], [32], [48], [50], [56].
 - Facility location in telecommunication networks: [27], [35], [69].
 - Green Networking: [14], [21], [25], [19], [41], [42], [43], [44].
 - Green ICT: [23].
 - Resource sharing: [7] , [13], [15], [39], [40].
 - Virtual Network Functions: [38], [3], [6], [9]
 - Resource sharing in cloud cluster: [8]
- Home energy management: [22], [37], [45], [46], [47].
- Graph problems: [33].

Publications

Articles on international journals

- [1] G. Carello, P. Landa, Tànfani, A. Testi, “Master chemotherapy planning and clinicians rostering in a hospital outpatient cancer centre”, *Central European Journal of Operations Research*, 2022, 30(1), 159-187.
- [2] G. Carello, E. Lanzarone, “An implementor-adversary approach for uncertain and time-correlated service times in the nurse-to-patient assignment problem”, *Computers and Operations Research*, 2021, 135.
- [3] B. Addis, G. Carello, M. Gao, “ILP-based heuristics for a virtual network function placement and routing problem”, *Networks*, 2021, 78(3), 328-349.
- [4] S. Baş Gure, G. Carello, E. Lanzarone, S. Yalçındağ, “A stochastic risk-averse framework for blood donation appointment scheduling under uncertain donor arrivals”, *Health Care Management Science*, 2020, 23(4), 535-555.
- [5] F. Regis-Hernández, G. Carello, E. Lanzarone, “An optimization tool to dimension innovative home health care services with devices and disposable materials”, *Flexible Services and Manufacturing Journal*, 2020, 32(3), 561-598.
- [6] B. Addis, G. Carello, M. Gao, “On a virtual network functions placement and routing problem: Some properties and a comparison of two formulations”, *Networks*, 75(2), 2020, 158-182.
- [7] L. Cano, G. Carello, M. Cesana, M. Passacantando, B. Sansò, “Modeling the Techno-Economic Interactions of Infrastructure and Service Providers in 5G Networks with a Multi-Leader-Follower Game”, *IEEE Access*, 7, 2019, 162913-162940.
- [8] L. Cano, G. Carello, D. Ardagna, “A framework for joint resource allocation of MapReduce and web service applications in a shared cloud

cluster ”, *Journal of Parallel and Distributed Computing*, 120, 2018, 127-147.

- [9] B. Addis, M.Gao, G.Carello, “On the complexity of a Virtual Network Function Placement and Routing problem ”, *Electronic Notes in Discrete Mathematics*, 2018, 69, 197-204.
- [10] S. Baş, G. Carello, E. Lanzarone, S. Yalçındağ, “An appointment scheduling framework to balance the production of blood units from donation”, *European Journal of Operational Research*, 265(3), 2018, 1124-1143.
- [11] G. Carello, E. Lanzarone, S. Mattia, “Trade-off between stakeholders’ goals in the home care nurse-to-patient assignment problem”, *Operations Research for Health Care*, 16, 2018, 29-40.
- [12] S. Baş, G. Carello, E. Lanzarone, S. Yalçındağ, “Unaddressed problems and research perspectives in scheduling blood collection from donors”, *Production Planning and Control*, 29(1), 2018, 84-90 (short note).
- [13] L. Cano, A. Capone, G. Carello, M. Cesana, M. Passacantando, “On optimal infrastructure sharing strategies in mobile radio networks”, *IEEE Transactions on Wireless Communications*, 16(5), 2017, 3003 - 3016.
- [14] B. Addis, G. Carello, S. Mattia, “Survivable green traffic engineering with shared protection”, *Networks*, 69(1), 2017, 6-22.
- [15] L. Cano, A. Capone, G. Carello, M. Cesana, M. Passacantando, “Cooperative infrastructure and spectrum sharing in heterogeneous mobile networks”, *IEEE Journal on Selected Areas in Communications*, 34(10), 2016, 2617-2629.
- [16] B. Addis, G. Carello, A. Grossi, E. Tanfani, “Operating room scheduling and rescheduling: a rolling horizon approach”, *Flexible Services and Manufacturing Journal*, 28, 2016, 206-232.
- [17] R. Aringhieri, G. Carello, D. Morale, “Supporting decision making to improve the performance of an Italian Emergency Medical Service”, *Annals of Operations Research*, 236(1), 2016, 131-148.
- [18] B. Addis, A. Capone, G. Carello, L. Gianoli, B. Sansò. “Energy management in communication networks: a journey through modeling and optimization glasses”, *Computer Networks*, 91-92, 2016, 76-94.
- [19] B.Addis, G.Carello, S.Mattia, “Energy-aware survivable networks”, *Electronic Notes in Discrete Mathematics*, 52, 2016, 133-140.

- [20] B. Addis, G. Carello, A. Gross, E. Lanzarone, S. Mattia, E. Tanfani, “Handling uncertainty in health care management using the cardinality-constrained approach: Advantages and remarks”, *Operations Research for Health Care*, 4, 2015, 1-4 (short note).
- [21] B. Addis, A. Capone, G. Carello, L. Gianoli, B. Sansò. “On the energy cost of robustness and resiliency in IP networks”, *Computer Networks*, 75, 2014, 239-259.
- [22] A. Barbato, A. Capone, G. Carello, M. Delfanti, D. Falabretti, M. Merello. “A framework for home energy management and its experimental validation”, *Energy Efficiency*, 7(6), 2014, 1013-1052.
- [23] B. Addis, D. Ardagna, A. Capone, G. Carello, “Energy-aware joint management of networks and Cloud infrastructures”, *Computer Networks*, 70, 2014, 75-95.
- [24] G. Carello, E. Lanzarone, “A cardinality-constrained robust model for the assignment problem in Home Care services”, *European Journal of Operational Research*, 236(2), 2014, 748-762.
- [25] B. Addis, A. Capone, G. Carello, L. Gianoli, B. Sansò, “ Energy management through optimized routing and device powering for greener communication networks”, *IEEE/ACM Transactions on Networking*, 22(1), 2014, 313-325.
- [26] B. Addis, G. Carello, A. Ceselli. “Combining very large scale and ILP based neighborhoods for a two-level location problem”, *European Journal of Operational Research*, 231(3), 2013, 535-546.
- [27] J. Elias, F. Martignon, G. Carello, “Very Large-Scale Neighborhood Search Algorithms for the Design of Service Overlay Networks”, *Telecommunication Systems*, 49, 2012, 391-408.
- [28] B. Addis, G. Carello, A. Ceselli. “Exactly solving a two-level location problem with modular node capacities”, *Networks*, 59(1), 2012, 161-180.
- [29] A. Capone, G. Carello, I. Filippini, S. Gualandi, F. Malucelli, “Routing, scheduling and channel assignment in Wireless Mesh Networks: Optimization models and algorithms”, *Ad Hoc Networks*, 8(6), 2010, 545-563.
- [30] A. Capone, G. Carello, I. Filippini, S. Gualandi, F. Malucelli, “Solving a resource allocation problem in Wireless Mesh Networks: a comparison between a CP-based and a classical column generation”, *Networks*, 55(3), 2010, 221-233.

- [31] B. Addis, A. Capone, G. Carello, F. Malucelli, M. Fumagalli, E. Pedrinelli, “Designing Two-layer Optical Networks with Statistical Multiplexing”, *Fiber and Integrated Optics*, 27 (4), 2008, 249-255.
- [32] P. Belotti, A. Capone, G. Carello, F. Malucelli, “Multi-layer MPLS Network Design: the Impact of Statistical Multiplexing”, *Computer networks*, 52 (6), 2008, 1291-1307.
- [33] G. Carello, F. Della Croce, A. Grossi, M. Locatelli, “A ‘maximum node clustering’ problem”, *Journal of Combinatorial Optimization*, 11(4), 2006, 373-385.
- [34] H. Yaman, G. Carello, “Solving the Hub Location Problem with Modular Link Capacities”, *Computers and Operations Research*, 32, 2005, 3227-3245.
- [35] G. Carello, F. Della Croce, M. Ghirardi, R. Tadei, “Solving the Hub Location Problem in Telecommunication Network Design: a Local Search Approach”, *Networks*, 44, 2004, 94-105.
- [36] F. Bellanti, G. Carello, F. Della Croce, R. Tadei, “A greedy-based neighborhood search approach to a nurse rostering problem”, *European Journal of Operational Research*, 153, 2004, 28-40.

Articles on Italian journals

- [37] A. Capone, G. Carello, M. Delfanti, M. Merlo, “ElectrICT: dall’interruttore domestico alle Smart Grid”, *AEIT*, 97, 2010, 42-49.

IEEE conference proceedings (peer-reviewed)

- [38] M. Gao, Y. Li, B. Addis, G. Carello, S. Zhuo, “Take the road back: a different way to study the NFV service chaining problem”, *IEEE Wireless Communication and Networking Conference 2022*, 1266-1271.
- [39] L. Cano, A. Capone, G. Carello, M. Cesana, M. Passacantando, “A Non-cooperative game approach for RAN and spectrum sharing in mobile radio networks”, *European Wireless 2016; 22th European Wireless Conference*, 377-382.
- [40] L. Cano, A. Capone, G. Carello, M. Cesana, “Evaluating the performance of infrastructure sharing in mobile radio networks”, *IEEE International Conference on Communications – ICC 2015*, 3222-3227.

- [41] B. Addis, A. Capone, G. Carello, L. Gianoli, B. Sansò, “A robust optimization approach for energy-aware routing in MPLS networks”, *IEEE International conference on Computing, Networking and Communications – ICNC 2013*, 567 - 572.
- [42] B. Addis, A. Capone, G. Carello, L.G. Gianoli, B. Sansò, “Energy aware management of resilient networks with shared protection”. *IEEE Sustainable Internet and ICT for Sustainability – SustainIT 2012*, 1 - 9.
- [43] B. Addis, A. Capone, G. Carello, L.G. Gianoli, B. Sansò, “Energy-aware multiperiod traffic engineering with flow-based routing”. *IEEE International Conference on Communications – ICC 2012*, 5957 - 5961.
- [44] B. Addis, A. Capone, G. Carello, L.G. Gianoli, B. Sansò, “Multi-period traffic engineering of resilient networks for energy efficiency”. *IEEE Online Conference on Green Communications – GreenCom 2012*, 14-19.
- [45] A. Barbato, A. Capone, G. Carello, M. Delfanti, M. Merlo, A. Zaminga, “House energy demand optimization in single and multi-user scenarios”. *2nd IEEE International Conference on Smart Grid Communications – SmartGridCom 2011*, 345-350.
- [46] A. Barbato, A. Capone, G. Carello, M. Delfanti, M. Merlo, A. Zaminga, “Cooperative and non-cooperative house energy optimization in a smart grid perspective”, *8th International Conference on World of Wireless, Mobile and Multimedia Networks - IEEE International Symposium on a Wireless On-demand Network Systems and Services – WOWMOM 2011*, 1 - 6.
- [47] A. Capone, G. Carello, M. Merlo, “ElectricICT: Low voltage loads and generators coordination towards the SmartGrid paradigm”, *14th International Conference on Harmonics and Quality of Power – ICHQP 2010*, 1 - 5.
- [48] A. Capone, G. Carello, R. Matera, “Multilayer network design with multicast traffic and statistical multiplexing”, *IEEE Global Telecommunications Conference – GLOBECOM 2007*, 2565 - 2570.
- [49] A. Capone, G. Carello, “Scheduling optimization in wireless MESH networks with power control and rate adaptation”, *IEEE Sensor and Ad Hoc Communications and Networks – SECON 2006*, 138 - 147.
- [50] P. Belotti, A. Capone, G. Carello, F. Malucelli, F. Senaldi, A. Totaro, “MPLS over transport network: two layers approach to network design with statistical multiplexing”, *Conference on Next Generation Internet Design and Engineering – NGI 2006*, 326 - 333.

- [51] M. Ajmone Marsan, C.F. Chiasserini, A. Nucci, G. Carello, L. De Giovanni, “Optimizing the topology of Bluetooth wireless personal area networks”, *IEEE INFOCOM 2002*, 572-579.

Other peer-reviewed conference proceedings

- [52] G. Carello, E. Lanzarone, D. Laricini, M. Servilio, “Handling time-related demands in the home care nurse-to-patient assignment problem with the implementor-adversarial approach”, *International Conference on Health Care Systems Engineering – HCSE 2017 - Springer Proceedings in Mathematics and Statistics*, 210, 2017, 87-97.
- [53] S. Baş, G. Carello, E. Lanzarone, Z. Ocak, S. Yalçındağ, “Management of blood donation system: Literature review and research perspectives”, *International Conference on Health Care Systems Engineering – HCSE 2015 - Springer Proceedings in Mathematics and Statistics*, 169, 2016, 121-132.
- [54] B. Addis, G. Carello, E. Tanfani, “A robust optimization approach for the Operating Room Planning Problem with uncertain surgery durations”, *International Conference on Health Care Systems Engineering – HCSE 2013 - Springer Proceedings in Mathematics and Statistics*, 61, 2014, 175-189.
- [55] G. Carello, E. Lanzarone, “Applying the Cardinality-Constrained Approach in Healthcare Systems: The Home Care Example”, *International Conference on Health Care Systems Engineering – HCSE 2013– HCSE 2013 - Springer Proceedings in Mathematics and Statistics*, 61, 2014, 61-72.
- [56] B. Addis, G. Carello, F. Malucelli, “SRG-disjoint design with dedicated and shared protection”, *International Network Optimization Conference - INOC 2011 - Lecture Notes in Computer Science 6701*, 18 - 23.
- [57] B. Addis, G. Carello, A. Ceselli, “A branch-and-cut-and-price approach for a two-level hierarchical location problem”, *International Network Optimization Conference - INOC 2009*.

Conference proceedings without peer review

- [58] G. Carello, E. Lanzarone, S. Mattia, “Comparing two different objective functions in a cardinality-constrained model for the assignments in Home Care”, *Operational Research Applied to Healthcare Services Conference - ORAHS 2013*, 87-90.

- [59] G. Carello, E. Lanzarone, S. Mattia, “A multilevel cardinality-constrained model for the nurse-to-patient assignment in Home Care”, *Operational Research Applied to Healthcare Services Conference - ORAHS 2013*, 91-94.
- [60] B. Addis, R. Aringhieri, G. Carello, M. Gribaudo, A. Gross, “Advanced workforce management in healthcare”, *Operational Research Applied to Healthcare Services Conference - ORAHS 2011*, 308- 319.
- [61] E. Amaldi, G. Carello, E. Cittadino, “A probabilistic multi-period optimization approach for the ambulance location problem”, *Operational Research Applied to Healthcare Services Conference - ORAHS 2011*, 24-34.
- [62] B. Addis, G. Carello, F. Malucelli, “Network design with SRG based protection”. *10th Cologne-Twente Workshop on Graphs and Combinatorial Optimization, CTW 2011*, 27-31.
- [63] R. Aringhieri, G. Carello, D. Morale, “A simulation based tool for ambulances management evaluation”, *Operational Research Applied to Healthcare Services Conference - ORAHS 2007*, 379-392.
- [64] G. Carello, I. Filippini, S. Gualandi, F. Malucelli, “Scheduling and routing in wireless multi-hop networks by column generation”, *International Network Optimization Conference 2007 – INOC 2007*.
- [65] P. Belotti, A. Capone, G. Carello, F. Malucelli, F. Senaldi, A. Totaro, “Design of multi-layer networks with traffic grooming and statistical multiplexing”, *International Network Optimization Conference – INOC 2007*.

Book chapters

- [66] B. Addis, R. Aringhieri, G. Carello, A. Grosso, F. Maffioli, “Workforce Management based on forecast demand”. In *Advanced Decision Making Methods Applied to Health Care (International Series in Operations Research & Management Science, 173)*, E. Tanfani, A. Testi Editors, Springer, 1-11, 2012.
- [67] R. Aringhieri, R. Berchi, G. Carello, F. Fragnelli, D. Morale, A. Pagliosa, G. Righini, G. Sesana, “Il ruolo della ricerca operativa nell’organizzazione di un sistema di pronto intervento di soccorso sanitario”. In *Scienza delle Decisioni in Italia*, G. Felici e A. Sciomachen Editors, ECIG, Genova, 35-48, 2008.

Book editor

- [68] A. Testi, E. Tanfani, E. Ivaldi, G. Carello, R. Aringhieri, V. Fragnelli, *Operations research for patient-centered health care delivery – Proceedings of the XXXVI International ORAHS Conference*, Franco Angeli, Milano, 2010.

Ph.D thesis

- [69] G. Carello, “Hub Location Problems in Telecommunication Networks”, Tesi di Dottorato, Politecnico di Torino, 2004.

Conference talks

- G. Carello, E. Lanzarone, M. Servilio. “Nurse-to-Patient Assignment in Home Care Services with Uncertain and Temporally Correlated Patient Demand”, ODS 2019.
- G. Carello, B. Addis, M. Gao. “A network function virtualization problem with simple path routing”, ODS 2018.
- G. Carello, B. Addis, M. Gao. “On a network function virtualization chaining problem with simple path routing: properties and formulations”, EURO 2018.
- B. Addis, G. Carello, M. Raco. “Heuristics for an energy-aware management problem in cellular networks”, AIRO 2015.
- G. Carello, E. Lanzarone, S. Mattia. “Different perspectives and goals in Home Care planning”, AIRO 2014.
- B. Addis, G. Carello, A. Grossi, E. Tanfani. “A rolling horizon approach for planning surgery cases under uncertain surgery duration: deterministic versus robust solutions”, ORAHS 2014.
- B. Addis, G. Carello, E. Tanfani. “A cardinality-constrained robust approach for the Stochastic Surgical Case Assignment Problem”. EURO 2013.
- B. Addis, G. Carello, S. Mattia. “Energy-aware operation management in telecommunication network with shared protection mechanism”, INOC 2013.
- G. Carello, E. Lanzarone. “A robust optimization approach for the nurse-to-patient assignment problem in Home Care”, AIRO 2012.
- B. Addis, G. Carello, F. Malucelli. “A network loading problem with shared protection and SRG: Formulations and ILP based hybrid heuristics”, ISMP 2012.
- E. Amaldi, G. Carello. “A Probabilistic Multi-Period Optimization Model for the Ambulance Location Problem”, AIRO 2011.
- B. Addis, G. Carello, A. Ceselli. “A neighborhood based heuristic for a two level hierarchical facility location problem”, AIRO 2009.
- S. Bosio, G. Carello, S. Gualandi, F. Malucelli, “A transmission scheduling problem in wireless networks”, ISMP 2006.
- G. Carello, F. Della Croce, A. Grossi, M. Locatelli, “The maximum node clustering problem”, AIRO 2005.

- P. Belotti, A. Capone, G. Carello, F. Malucelli, “Optimizing routing and network design with statistical multiplexing”, CTW 2005.
- G. Carello, F. Della Croce, R. Tadei, “Heuristic for the Generalized Quadratic Assignment Problem with quadratic capacity constraints”, EWGLA 2004.
- G. Carello, F. Della Croce, M. Ghirardi, R. Tadei, “Solving the hub location problem in telecommunication network design: a local search approach”, INOC 2003.
- G. Carello, F. Della Croce, M. Ghirardi and R. Tadei, “Solving the Concentrator Location Problem in two-level telecommunication network-design: a local search approach”, AIRO 2003.
- G. Carello, F. Della Croce, M. Ghirardi, R. Tadei, “Solving the hub location problem in telecommunication network design: a local search approach”, AIROWINTER 2003.
- F. Bellanti, G. Carello, F. Della Croce, R. Tadei, “A Tabu Search Approach to a Nurse Rostering Problem”, AIRO 2001.
- F. Bellanti, G. Carello, F. Della Croce, R. Tadei, “A Tabu Search Approach to a Nurse Rostering Problem”, MIC 2001.

ORGANIZATION OF CONFERENCES

- Member of the organizing committee AIRO 2014
- Member of the Technical Program Committee SustainIT 2012
- Member of the organizing committee ORAHS 2010

LECTURES

- Laurea Magistrale or Specialistica (equivalent to Master of Science)
 - Graph Optimization (Telecommunication Engineering, Computer Science Engineering, Mathematical Engineering programme - Politecnico di Milano): academic years 2011/2012, 2012/2013, 2013/2014, 2014/2015, 2016/2017, 2017/2018, 2018/2019, 2020/2021, 2021/2022.
 - Foundations of Operations Research (Computer Science Engineering programme, - Politecnico di Milano - Como): academic year 2015/2016.
 - Fondamenti di Ricerca Operativa D (Computer Science Engineering programme - Politecnico di Milano): academic years 2005/2006, 2008/2009, 2009/2010.
- Laurea (equivalent to Bachelor of Science)
 - Fondamenti di Ricerca Operativa (Mathematical Engineering programme - Politecnico di Milano): academic years 2009/2010, 2010/2011, 2016/2017, 2017/2018, 2018/2019, 2019/2020, 2020/2021, 2021/2022.
 - Second half of the lectures of the course Metodi di Ottimizzazione della Ricerca Operativa, (Management Engineering programme - Politecnico di Milano) academic year 2019/2020.
 - Fondamenti di Ricerca Operativa D (Computer Science Engineering programme - Politecnico di Milano): academic years 2006/2007, 2007/2008.