

Alberto Santini

Contacts Email: alberto.santini@upf.edu
Website: santini.in

Affiliations [Universitat Pompeu Fabra, Spain](#)
Department of Economics and Business
Tenure-track assistant professor and “Juan de la Cierva” professor

[Barcelona Graduate School of Economics, Spain](#)
Affiliate professor

[Barcelona Graduate School of Mathematics, Spain](#)
Affiliate professor

Past Positions

2017 [RWTH Aachen, Germany](#)
Deutsche Post Chair for the Optimisation of Distribution Networks
Postdoctoral Researcher, under Prof. Michael Schneider

Education

2014–16 [University of Bologna, Italy](#)
Ph.D. in Automatic Control and Operational Research
Supervisors: Silvano Martello, Daniele Vigo

2011–13 [University of Copenhagen, Denmark](#)
M.Sc. in Mathematics, part of the Master of Excellence programme
Thesis advisors: Stefan Røpke and Louise Kallehauge. Mark: 12/12

2008–10 [University of Catania, Italy](#)
B.Sc. in Mathematics
Thesis advisor: Angelo Bella. Mark: 110/110 summa cum laude

2002–07 [Liceo Scientifico “A. Volta”, Caltanissetta, Italy](#)
Scientific Diploma
Mark: 100/100

Publications

Journal Papers (published or submitted)

- 2020
1. Alberto Santini. “Optimising the assignment of swabs and reagents for PCR testing during a viral epidemic”. In: *Omega* (2020). doi: 10.1016/j.omega.2020.102341
 2. Christian Blum, Marko Djukanovic, Alberto Santini, Hua Jiang, Chu-Min Li, Felip Manyà, and Günter Raidl. “Solving common longest subsequence problems via a transformation to the maximum clique problem”. In: *Computers & Operations Research* 125 (2020). doi: 10.1016/j.cor.2020.105089
 3. Alberto Santini, Ana Viana, Xenia Klimentova, and João Pedro Pedroso. “Exact, heuristic and machine learning approaches to the probabilistic travelling salesman problem with crowdsourcing”. In: *Transportation Science (submitted)* (2020)
 4. Alberto Santini, Michael Schneider, Enrico Bartolini, and Vinicius Greco de Lemos. “The crop growth scheduling problem in vertical farming”. In: *European Journal of Operational Research (submitted)* (2020)

- 2019 5. Alberto Santini. “An Adaptive Large Neighbourhood Search algorithm for the Orienteering Problem”. In: *Expert Systems with Applications* 123 (2019), pp. 154–167. doi: 10.1016/j.eswa.2018.12.050
6. Denis Cornaz, Fabio Furini, Enrico Malaguti, and Alberto Santini. “A note on selective line-graphs and partition colorings”. In: *Operations Research Letters* 47 (6 2019), pp. 565–568. doi: 10.1016/j.orl.2019.08.005
- 2018 7. Enrico Malaguti, Silvano Martello, and Alberto Santini. “The Traveling Salesman Problem with Pickups, Deliveries, and Draft Limits”. In: *Omega* 74 (2018), pp. 50–58. doi: 10.1016/j.omega.2017.01.005
8. Fabio Furini, Enrico Malaguti, and Alberto Santini. “An Exact Algorithm for the Partition Coloring Problem”. In: *Computers & Operations Research* 92 (2018), pp. 170–181. doi: 10.1016/j.cor.2017.12.019
9. Alberto Santini, Stefan Ropke, and Lars Magnus Hvattum. “A comparison of acceptance criteria for the Adaptive Large Neighbourhood Search metaheuristic”. In: *Journal of Heuristics* 24 (5 2018), pp. 783–815. doi: 10.1007/s10732-018-9377-x
- 2017 10. Alberto Santini, Stefan Ropke, and Christian E.M. Plum. “A branch-and-price approach to the Feeder Network Design Problem”. In: *European Journal of Operational Research* 264 (2 2017), pp. 607–622. doi: 10.1016/j.ejor.2017.06.063
11. Andrea Bettinelli, Alberto Santini, and Daniele Vigo. “A real-time conflict solution algorithm for the Train Rescheduling Problem”. In: *Transportation Research Part B* 106 (2017), pp. 237–265. doi: 10.1016/j.trb.2017.10.005
- 2015 12. Alberto Santini, Henrik Alsing Friberg, and Stefan Ropke. “A note on a model for quay crane scheduling with non-crossing constraints”. In: *Engineering Optimization* 47.6 (2015), pp. 860–865. doi: 10.1080/0305215X.2014.958731

Publications In preparation

- 2020 13. Alberto Santini and Maxence Delorme. “Optimising the energy efficiency of an automated vertical farm serviced by elevators”. In: *In preparation* (2020)
14. Alberto Santini, Michael Schneider, Thibaut Vidal, and Daniele Vigo. “Decomposition strategies for large-scale Vehicle Routing Problems”. In: *In preparation* (2020)
15. Alberto Santini and Stefan Ropke. “Parallel Adaptive Large Neighbourhood Search”. In: *In preparation* (2020)
16. Michele Monaci, Ciara Pike-Burke, and Alberto Santini. “The time-bomb knapsack problem”. In: *In preparation* (2020)
17. Alberto Santini. “Differential privacy and optimisation: an introduction and short survey”. In: *In preparation* (2020)

Technical Reports

- 2015 18. Valentina Cacchiani, Alberto Santini, and Daniele Vigo. *A study on metaheuristic approaches to the energy-efficient Train Timetabling Problem*. Tech. rep. OR-15-6. DEI, University of Bologna, 2015
- 2014 19. Valentina Cacchiani, Alberto Santini, and Daniele Vigo. *A novel modelling approach to the Train Timetabling Problem*. Tech. rep. OR-14-27. DEI, University of Bologna, 2014

Conference Talks

- 2020 20. Alberto Santini and Ana Viana. “Crowdsourcing in last-mile delivery: machine learning and heuristic approaches to the Stochastic TSP with Crowdsourcing”. In: *5th Conference of Young Researchers of the Royal*

Spanish Society of Mathematics and Statistics. 2020

- 2018
- 21. Alberto Santini, Ana Viana, Xenia Klimentova, and João Pedro Pedroso. “Machine learning and heuristic approaches to the Probabilistic TSP with Crowdsourcing”. In: *4th AIROYoung Workshop*. 2020
 - 22. Alberto Santini and Christian Blum. “Solving a class of longest subsequence problems via maximum cliques”. In: *ODS Conference*. 2018
 - 23. Alberto Santini. “An ALNS heuristic for the Orienteering Problem”. In: *EURO Conference*. 2018
 - 24. Alberto Santini. “A hybrid Machine Learning and ALNS approach to the Orienteering Problem”. In: *EURO/ALIO Conference*. 2018
- 2017
- 25. Fabio Furini, Enrico Malaguti, and Alberto Santini. “Exact and heuristic algorithms for the partition colouring problem”. In: *ODS Conference*. 2017
- 2016
- 26. Alberto Santini, Stefan Ropke, and Lars Magnus Hvattum. “Poster: A comparison of acceptance criteria for the ALNS metaheuristic”. In: *AIRO Conference*. 2016
 - 27. Alberto Santini, Stefan Ropke, and Lars Magnus Hvattum. “A comparison of acceptance criteria for the Adaptive Large Neighbourhood Search metaheuristic”. In: *EURO Conference*. 2016
- 2015
- 28. Enrico Malaguti, Silvano Martello, and Alberto Santini. “A maritime version of the Travelling Salesman Problem”. In: *Odysseus Conference*. 2015
 - 29. Alberto Santini, Stefan Ropke, and Christian E.M. Plum. “A rich maritime extension of the Vehicle Routing Problem”. In: *AIRO Conference*. 2015
- 2014
- 30. Enrico Malaguti, Silvano Martello, and Alberto Santini. “The Travelling Salesman Problem with pickup, delivery and draught limits”. In: *AIRO Conference*. 2014

Awards

- 2018
- [Omega best paper award](#)
Won the Best Paper Award for a paper published during 2018 in the journal Omega. The paper was “The Traveling Salesman Problem with Pickup, Deliveries, and Draft Limits”.

Grants Personal or as P.I., competitive

- 2020–21
- [Planet Wellbeing research grant](#)
PI of a research proposal with Gara Villalba (Universitat Autònoma de Barcelona) and Michael Schneider (RWTH Aachen University), on the optimisation of vertical farming in Barcelona’s public schools. Grant awarded by Universitat Pompeu Fabra.
- 2018–20
- [Juan de la Cierva Formación](#)
Two-year grant from the Spanish government. Ranked 1st out of 49 participants from all areas of Mathematics, with a score of 99/100.
- 2014–16
- [Ph.D. grant by the University of Bologna](#)
Ranked 1st out of 9 qualified participants, with a score of 92/100.

Grants As part of a group, competitive

- 2019
- [I+D+i 2019 \(Retos\)](#)
Part of the group awarded for the project “Optimización logística para el cuidado de la salud en el hogar y los servicios sociales” by the Spanish Ministry of Science.

2016	PRIN (Research Projects of Relevant National Interest) 2016 Part of the group awarded for the project “Transportation and Logistics Optimization in the Era of Big and Open Data”.
------	---

Grants Other

2019	Yerun Mobility Award To visit University Paris Dauphine, sponsored by YERUN.
2018–2023	Association of European Operational Research Societies (EURO) Grant to organise the EUROYoung Workshops.
2018	Erasmus+ Grant To visit the University of Bologna, through the SmartTransLog consortium.
2017	COST STSM Grant Short-Term Scientific Mission grant to conduct research at INESC-TEC under COST Action “European Network for Collaboration on Kidney Exchange Programmes”.
2016	Association of European Operational Research Societies (EURO) Grant to organise the “EURO Young Researchers OR Webinars”.
2015	Marco Polo scholarship Grant to conduct research abroad.

Teaching Ph.D. level

2020	Business Analytics for Operations and Marketing Taught in a team. Universitat Pompeu Fabra, first-year course for Ph.D. students (M.Res. in Economics, Finance and Business).
2018–20	Research Seminars Taught in a team. Universitat Pompeu Fabra, first-year course for Ph.D. students (M.Res. in Economics, Finance and Business).

Teaching Master's level

2019–20	Practical Data Science for Management Barcelona School of Management, Universitat Pompeu Fabra, M.Sc. in Management.
2019–20	Advanced Machine Learning RWTH Business School, M.Sc. in Data Analytics and Decision Science.
2018–19	Data Science Projects RWTH Business School, M.Sc. in Data Analytics and Decision Science.
2018–20	Machine Learning RWTH Business School, M.Sc. in Data Analytics and Decision Science.
2017	Optimisation methods for Big Data Analytics RWTH Aachen, Master's in Management, Business, and Economics.
2014–18	Optimisation Algorithms (teaching assistant) Course taught by Paolo Toth. University of Bologna, M.Eng. in Computer Engineering.

Teaching Bachelor's level

- 2020 [Applied Optimisation Techniques](#)
Universitat Pompeu Fabra, elective course for all last-year Bachelor's students of the Department of Economics.
- 2019 [Revenue Management and Dynamic Pricing](#)
Universitat Pompeu Fabra, elective course for all last-year Bachelor's students of the Department of Economics.
- 2018–20 [Operations Management](#)
Universitat Pompeu Fabra, Bachelor's in International Business Economics.
- 2018–19 [Operations Management](#)
Universitat Pompeu Fabra, Bachelor's in Business Management Administration.
- 2016–17 [Foundations of OR \(teaching assistant\)](#)
A-K cohort taught by Enrico Malaguti, L-Z cohort taught by Michele Monaci.
University of Bologna, B.Eng. in Management Engineering.

Academic experience Scientific Organisations

- 2019–2021 [Elected member of the Board of Directors](#)
Part of the 12-persons board of directors of AIRO, the Italian Operational Research Association.
- 2018 [Founder](#)
Founded EUROYoung, a group of young O.R. scientists from EURO member countries, with the aim of organising training events for early-stage researchers.
- 2016–18 [Coordinator](#)
Coordinator of AIROYoung, the youth chapter of the Italian Operational Research Association. During my tenure as coordinator, I organised two workshops securing funding from Italian and European institutions; I created a database of young talents in O.R. and of open positions, helping matching O.R. scientists with relevant opportunities; I helped enroll new young members into AIRO, from Italy and other European countries.
- 2016 [Founder](#)
Founder of AIROYoung, the youth chapter of the Italian Operational Research Association.

Academic experience Organisation of Seminars, Workshops, and Courses

- 2019 [Member of the Organising Committee](#)
The 2nd EUROYoung Workshop. Porto, Portugal, 25–26 June 2020.
- 2019 [Organiser of a PhD and Postdoc course](#)
Organised a course for PhD and Postdocs of the Barcelona Graduate School of Mathematics, titled “An Introduction to Equilibrium Problems and their applications”. The course is taught by Mauro Passacantando.
- 2019 [Member of the Organising Committee](#)
The 1st EUROYoung Workshop. Invited speakers: Ana Viana and Federico Perea. Seville, Spain, 2–3 May 2019.
- 2019 [Member of the Organising Committee](#)
The 3rd AIROYoung Workshop and 1st AIROYoung PhD School. Invited speakers: Teodor Crainic and Endre Boros. Rome, Italy, 26–29 Mar 2019.
- 2018–19 [Coordinator of the “Operations and Marketing” seminar series](#)
This is a series of weekly seminars at the Department of Economics and Business of Universitat Pompeu Fabra, with invited speakers from all over the world.
- 2018 [Member of the Organising Committee](#)

The 2nd AIROYoung Workshop, on the theme “Logistics optimisation and applied operational research”. Invited speakers: Geir Hasle and Roberto Roberti. Cosenza, Italy, 03–05 Mar 2018.

2017 [Workshop Organiser](#)

Organised, together with Lavinia Amorosi, the 1st AIROYoung Workshop, on the theme “Emerging Optimization Problems on Complex Networks”. Invited speakers: Justo Puerto and Maria Grazia Scutellà. Rome, Italy, 16–17 Feb 2017.

2016 [EURO Young Researchers OR Webinars Organiser](#)

Organised a series of OR webinars by and for young researchers from all over the world, sponsored by EURO.

2015 [Seminars Organiser](#)

Organised a series of doctoral seminars within the Operational Research group at DEI, University of Bologna, involving local and visiting researchers.

Academic experience [Conferences](#)

2020 [Member of the Programme Committee](#)

ODS2020, Optimisation and Decision Science 2020 with theme “Optimisation in Artificial Intelligence and Data Science”. Rome, Italy.

2020 [Member of the Programme Committee \(ECON track\)](#)

GECCO2020, the The Genetic and Evolutionary Computation Conference. Cancun, Mexico.

2019 [Member of the Programme Committee \(ECON track\)](#)

GECCO2019, the The Genetic and Evolutionary Computation Conference. Prague, Czech Republic.

2019 [Member of the Programme Committee](#)

HM2019, the 11th International Workshop on Hybrid Metaheuristics. Concepción, Chile.

2018 [Member of the Organising Committee](#) and [Session Chair](#)

ODS 2018, Optimisation and Decision Science Conference. Chair of the “AIROYoung” session. Taormina, Italy.

2018 [Session Chair](#)

“EURO Young” session at the EURO 2018 Conference. Valencia, Spain.

2018 [Session Chair](#)

“AIROYoung” session at the EURO/ALIO 2018 Conference. Bologna, Italy.

2017 [Session Chair](#)

“AIROYoung” session at the ODS 2017, Optimisation and Decision Science Conference. Sorrento, Italy.

2016 [Poster Session Chair](#)

“Young OR Researchers Poster Session” at the AIRO 2016 Conference. Trieste, Italy.

2016 [Session Chair](#)

“Methodological advancements in metaheuristics” session at the EURO 2016 Conference. Poznan, Poland.

2015 [Session Chair](#)

“Exact Methods for Routing Problems” at the AIRO 2015 Conference. Pisa, Italy.

Academic experience [Evaluation Committees](#)

2018 [Grant proposal evaluator](#)

“FONDECYT Initiation into Research” programme, Chilean National Science and Technology Commission.

2018–20 [Member of the M.Sc. Thesis Defence Committee](#)

Master’s in Statistics and Operational Research, Polytechnic University of Catalunya, Spain.

Academic experience Visiting Positions

- 2018 [University of Bologna, Italy](#)
Visiting Paolo Toth and Daniele Vigo under an Erasmus+ grant from the SmartTransLog consortium.
- 2017 [INSEC-TEC, Portugal](#)
Visiting as part of a Short-Term Scientific Mission for COST Action “European Network for Collaboration on Kidney Exchange Programmes”. Working with Ana Viana, João Pedro Pedroso, and Xenia Klimentova.
- 2016 [Amazon Inc.](#)
Visiting Research Scientist in Seattle, USA. Working with Mauricio Resende and Andrew Goldberg.
- 2016 [Vrije Universiteit Amsterdam](#)
Visiting Ph.D. Student at the Department of Information, Logistics and Innovation. Working with Wout Dullaert.
- 2015 [University of Calabria](#)
Visiting Ph.D. Student at the Department of Mechanical, Energy and Management Engineering. Working with Demetrio Laganà.
- 2015 [Danish Technical University \(DTU\)](#)
Visiting Ph.D. Student at the Department of Management Engineering. Working with Stefan Røpke.

Invited talks

- 2019 “Crowdsourcing in last-mile delivery: machine learning and heuristic approaches to the Stochastic TSP with Crowdsourcing.”
Invited to present at the seminar series of LAMSADE, University Paris Dauphine.
- 2016 “A real-time conflict resolution algorithm for the train rescheduling problem.”
Invited to present at: Vrije Universiteit, Amsterdam (Feb 2016); Danish Technical University (DTU), Kongens Lyngby (Oct 2016); DSB Training Centre, Nyborg (Oct 2016).
- 2015 “TSP with pickups, deliveries, and draught limits.”
University of Bologna. Part of a series of seminars held by Ph.D. students and young researchers.
- 2014 “Recent trends in Operational Research and practical business applications.”
American University of Armenia; series of two seminars at the College of Science and Engineering.
- 2014 “Data Enevelopment Analysis and OR applications in measuring efficiency.”
University of Bologna. Part of the course “Resource Optimization”, M.Eng. in Management Engineering.

Supervised theses

- 2020 [Master’s Thesis, M.Res. in Economics, School of Economics and Business, Universitat Pompeu Fabra](#)
Co-supervisor, “Imitation, Principal Component Analysis, and the Effects of Modifications to eSports on Competitive Balance”, Karim Carroum.
- [Master’s Thesis, M.Sc. in Management, Barcelona School of Management, Universitat Pompeu Fabra](#)
Supervisor, “A simulation study of integrated real-time data resulting in a dynamic pricing model for crowdsourcing-to-customer last-mile deliveries”, Otis van der Meij.
- [Project, M.Sc. in Data Analytics and Decision Science, RWTH Business School](#)
Supervisor, “COVID-19 Pandemic: Comparison of forecasting methodologies and affecting factors for fatalities and transmission rates”, Peter Yacoub.
- [Project, M.Sc. in Data Analytics and Decision Science, RWTH Business School](#)
Supervisor, “Machine learning for selective assembly with automatic adaption to use-case complexity”, Sourabh Hujare.

	Bachelor's Thesis, School of Economics and Business, Universitat Pompeu Fabra Supervisor, "Congestion tax as the optimal policy tool to minimize congestion in the city of Barcelona", Joel Sanginés-Uriarte Dooly and Adrià Trepà i Izquierdo.
	Bachelor's Thesis, School of Economics and Business, Universitat Pompeu Fabra Supervisor, "Machine Learning for Price Discrimination", Jan Czernek.
2019	Erasmus+ Internship, incoming from the University of Twente Supervisor, "Production planning and optimisation of vertical farms", Vinicius Greco de Lemos.
	Master's Thesis, M.Sc. in Management, Barcelona School of Management, Universitat Pompeu Fabra Supervisor, "Demand forecasting model in food delivery, a heuristic approach to data science using Python and geoanalysis", Marc Herrera.
2017	Project, M.Sc. in Management, Business, and Economics, RWTH Aachen Supervisor, "Improving document-level machine translation with word2vec", Sean Eulenberg.
	Master's Thesis, M.Sc. in Management, Business, and Economics, RWTH Aachen Co-supervisor, "A heuristic algorithm for the electric pickup and delivery problem", Lutz Venhofen.
2016	Master's Thesis, M.Eng. in Management Engineering, University of Bologna Co-supervisor, "Embedding robustness in train rescheduling algorithms", Alessandro Morandi.
	Project, M.Eng. in Computer Engineering, University of Bologna Co-supervisor, "A genetic algorithm for real-time energy optimisation of train timetables", Francesco Di Lella.
2015	Master's Thesis, M.Eng. in Management Engineering, University of Bologna Co-supervisor, "Metaheuristic algorithms for energy optimisation in train timetabling and rescheduling", Hang Xu.
	Project, M.Eng. in Computer Engineering, University of Bologna Co-supervisor, "A constructive heuristic for the dispatching problem on multi-track territories", Giacomo Dall'Olio and Simone Laierno.
2014	Master's Thesis, M.Eng. in Management Engineering, University of Bologna Co-supervisor, "Valutazione della Performance di un caso di Customer Contact Desk attraverso l'applicazione della metodologia Data Envelopment Analysis", Martina Carli.

Work experience

2016	Amazon Research Scientist Intern. Seattle, USA.
2012–13	Procter & Gamble Strategic Sourcing Intern. Bruxelles, Belgium.
2012	WISON Offshore & Marine Procurement Trainee. Shanghai, China.
2011–12	Amiiko Ruby on Rails Developer. Copenhagen, Denmark.

Other

Languages	Italian: mothertongue; English: fluent; French: very good; Spanish: very good; Catalan: very good.
Volunteering	Spanish Red Cross; Italian Red Cross; Danish Red Cross; Big Brother / Big Sister Project Kongelunden, Copenhagen, Denmark; Associació per la Promoció del Transport Public, Barcelona, Spain.
Certifications	Chartered shipbroker according to Italian law (2012).