# Pedro Miranda

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Operations Research and Data Scientist who thrives at analyzing data and developing advanced models that support decision-making, generate value, and enable what-if scenario analysis for large, complex resourced-constrained manufacturing and service systems. I have 5 years of experience on the design, implementation, testing and analysis of mathematical models and optimization algorithms for a variety of business problems arising in Production Planning and Scheduling, Supply Chain, Logistics and Transportation, Revenue Growth Management, and Sport Scheduling.

## Profile

- Deep knowledge on the design, planning, operation and control of manufacturing and service systems.
- Experience applying Operations Research methodologies to solve tactical and operational problems on Production Planning and Scheduling, Logistics and Transportation, Supply Chain Planning, Revenue Growth Management, and Sport Scheduling.
- Solid foundations on Mathematical Programming and Optimization Theory, including combinatorial optimization, linear optimization, integer programming, dynamic programming, stochastic programming, and network optimization.
- Hands-on experience on the design and implementation of exact, approximate and hybrid optimization algorithms, such as Benders Decompositions, Column Generation, Lagrangian Relaxation, meta-heuristics, and math-heuristics.
- Comfortable working as a team member on a collaborative environment.
- Excellent communication and interpersonal skills.
- Fluent on Spanish, Portuguese and English, and intermediate command of French.

## Skills

- Design, implementation and analysis of optimization models and algorithms.
- Deep understanding of combinatorial optimization, linear and integer programming, stochastic programming, dynamic programming, among others.
- Understanding of supervised machine learning algorithms, such as linear regression, logistic regression, decision trees, random forest and support vector machine.
- Proficient user of state-of-the-art commercial solvers, such as CPLEX and Gurobi.
- Knowledge and experience implementing optimization models on high-level mathematical modeling languages, such as AMPL and GAMS.
- Experience developing optimization models and algorithms using C++ for integrated production and distribution planning in a major Brazilian furniture manufacturer, and for a large-scale locomotive scheduling in a class I Canadian railway company.
- Experience implementing optimization algorithms in Python for consumer packaged goods trade promotion planning.
- Experience designing and prototyping optimization models and algorithms in Python for sport

scheduling problems (e.g., tournament and umpire scheduling).

- Practical experience developing Python and PostgreSQL scripts to process large amounts of data.
- Comfortable using distributed version control systems, such as Git and Github.
- Ability to present complex technical information to non-technical audience.

## Education

2018 **Ph.D Production Engineering**, *Federal University of São Carlos*, Brazil.
Specialization: Operations Research

2013 **M.Sc Production Engineering**, *Federal University of São Carlos*, Brazil.
Specialization: Operations Research

2011 **B.Sc Industrial Engineering**, *University of Córdoba*, Colombia.

## Experience

Oct 2022 – Present **Senior Optimization Specialist**, Optimal Planning Solutions, Canada.
Responsible for designing, implementing, testing and validating prototypes of mathematical models and optimization algorithms for sport scheduling problems arising in some of the major sport leagues in North America (e.g., NFL, MLS, MLB).

Jan 2021 – Sep 2022 **Research and Data Scientist**, *Eureka*, SAP, Canada.
Lead the design, development, testing and validation of prototype-level code of novel optimization algorithms for revenue growth management in the consumer packaged industry. I also actively participate of research session meetings with project managers and co-innovation customers to identify and validate product requirements.

Jun 2018 – Dec 2020 **Postdoctoral Fellow**, HEC Montreal and CIRRELT, Canada.
Joint work with Canadian National (CN) railways to build, implement and test large-scale optimization models and effective solution algorithms to solve locomotive scheduling problems involving thousands of trains and locomotives on a weekly basis.

May 2016 – May 2017 **Research Intern**, *CIRRELT*, Canada.
Design, implementation and testing of a decomposition-based algorithm for a supply chain planning problem in a furniture company, involving lot-sizing, inventory management and vehicle routing decisions.

## Training and Courses

2020 **Logistics and Transportation Network Design**, *Université du Québec à Montréal*, Montreal, CA.

2020 **Dynamic Programming**, *Université de Montréal*, Montreal, CA.

2019 **Summer School in Deep Learning**, *IVADO/Mila*, Montreal, CA.

2018 **Software Development for Research**, *Calcul Québec*, Montreal, CA.
**SQL & PostgreSQL for Beginners**, *Online Course*, Issued by Udemy.

## Scientific Publications

- Alvarez, A., Miranda, P.L., Rohmer, S.U.K., 2022. Production Routing for Perishable Products. Omega 111, https://doi.org/10.1016/j.omega.2022.102667.

○ Miranda, P.L., Cordeau, J.F., Frejinger, E., 2022. A Time-Space Formulation for the Locomotive Routing Problem at the Canadian National Railways. Computers & Operations Research 139, https://doi.org/10.1016/j.cor.2021.105629.

○ Miranda, P.L., Morabito, R., Ferreira, D., 2019. Mixed integer formulations for a coupled lot-scheduling and vehicle routing problem in furniture settings. INFOR: Information Systems and Operational Research. DOI: 10.1080/03155986.2019.1575686.

○ Miranda, P.L., Cordeau J.F., Ferreira, D., Jans, R., Morabito, R., 2018. A Decomposition Heuristic for a Rich Production Routing Problem. Computers & Operations Research 98, 211–230. https://doi.org/10.1016/j.cor.2018.05.004.

○ Miranda, P.L., Morabito, R. and Ferreira, D. 2018. Optimization Model for a Production, Inventory, Distribution and Routing Problem in Small Furniture Companies. TOP 26(1), 30–67. https://doi.org/10.1007/s11750-017-0448-1.