Karim Pérez Martínez

PhD in Production Engineering - Operations Research

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Profile

Researcher with over 3 years of experience in developing specialized optimization algorithms for operations planning. My professional experiences are mainly concentrated in the application of optimization techniques to operations planning in manufacturing, and developing of decomposition methods for optimization problems. I have also trained on data visualization, classical machine learning, deep learning and reinforcement learning algorithms. My skills include developing with Python, Optimization solvers as CPLEX and Gurobi, programming libraries and tools such as Matplotlib, Pandas, Numpy, Scikit Learn, Tensorflow, and Keras. My research interests include:

- Supply Chain and Operations Management
- Optimization of Production Planning Decisions in Manufacturing
- Prescriptive, Predictive and Descriptive Analytics
- Mathematical Programming and Decomposition Techniques for Discrete Optimization
- Integration of Machine Learning and Operations Research Techniques

Languages

- **Spanish** - Mother tongue
- **English** - Advanced
- **Portuguese** - Advanced
- **French** - Upper-Intermediate. TCF C1 Oral comprehension, TCF B2 Oral production (2020)

Education

Ph.D. in Production Engineering — *June 2018*

Federal University of São Carlos, Brazil

Specialization: Operations Research

M.Sc. in Production Engineering — *September 2013*

Federal University of São Carlos, Brazil

Specialization: Production Systems Management

B.Eng. in Industrial Engineering — *December 2011*

University of Córdoba, Colombia

Professional Developement

2021	**Machine Learning Strategy and Intro to Reinforcement Learning ,** AI Professional Program at Stanford Engineering School	*Stanford*
2020	**Introduction to Deep Learning & Neural Networks with Keras ,** IBM	*Issued by Coursera*
	Machine Learning with Python, IBM	*Issued by Coursera*
2019	**Summer School in Deep Learning,** The Institute for Data Valorization (IVADO) /Mila	*Montreal, CA*
	Data Analysis and Visualization in Python, IVADO/Calcul Québec	*Montreal, CA*
	GPU Computing with Python, Calcul Québec	*Montreal, CA*
	Machine Learning, Stanford	*Issued by Coursera*
	Data Visualization and Data Analysis with Python, IBM	*Issued by Coursera*
	Python for Data Science and AI, IBM	*Issued by Coursera*
2018	**Software Development for Research,** Calcul Québec	*Montreal, CA*

Scholarships & Grants

GERAD Postdoctoral Scholarship — *Canada*

Group for Research in Decision Analysis (GERAD) - CAD 25,000.00 — *June 2018*

FAPESP Research Internship Abroad Scholarship (BEPE) — *Brazil*

São Paulo Research Foundation (FAPESP) - CAD 34,000 — *May 2016 - May 2017*

FAPESP Ph.D. Scholarship — *Brazil*

São Paulo Research Foundation (FAPESP) - CAD 45,500 — *Oct. 2014-Feb. 2018*

National Ph.D. Scholarship - Social Demand — *Brazil*

Coordination for the Improvement of Higher Education Personnel (CAPES) - CAD 5,000 — *March 2014 - Aug. 2014*

National M.Sc. Scholarship - Social Demand — *Brazil*

Coordination for the Improvement of Higher Education Personnel (CAPES) - CAD 14,000 — *Sept. 2011 - Aug. 2013*

Research Experiences

GERAD, CIRRELT & HEC Montréal — *Montreal, CA*

Postdoctoral Researcher — *June 2018 - Present*

- Developing exact solution methods for a variety of integrated production planning problems
- Preparing and writing scientific papers for submission to peer-reviewed journals
- Preparing and delivering presentations at GERAD and international conferences

CIRRELT & HEC Montréal — *Montreal, CA*

Visiting Ph.D. Student — *May 2016 - May 2017*

- Developing exact solution methods to solve a real production planning problem in the Molded Pulp Packaging Industry
- Auditing Ph.D. courses at HEC Montréal
- Preparing and writing scientific papers for submission to peer-reviewed journals
- Attending, preparing, and delivering oral presentations at CIRRELT, national, and international conferences

Federal University of São Carlos & SANOVO Greenpack — *Sorocaba, Brazil*

Ph.D. Researcher Student — *May. 2014 - Aug. 2016*

- Modeling and analysing the production planning process in the company
- Collecting real data to validate and test the developed mathematical models
- Validating and discussing results with the production planning team of the company

Federal University of São Carlos & Recycling center CATARES — *Sorocaba, Brazil*

Visiting Undergraduate Student — *March. 2011 - Dec. 2011*

- Modeling and analysing the waste colection process in the city
- Collecting real data to validate and test the mathematical models
- Validating and discussing results with stakeholders in the recycling center

Teaching Experiences

HEC Montréal - Master of Science Program — *Montreal, Canada*

Teaching assistant of the course "Supply Chain Analytics" — *Winter 2021*

- Preparing coding workshop's material
- Creating Python notebooks with examples and exercises of analytics techniques applied to supply chain problems

HEC Montréal - B. in Business Administration *Montreal, Canada*

Part-Time Lecturer of the course "Operations Management" *Winter 2020 and 2021*

- Delivering lectures to the students in accordance with the syllabus created by the department
- Conducting office hours on a regular basis to discuss grades, assignments, and other issues with the students
- Grading assignments and exams

Federal University of São Carlos - B.Eng. in Production Engineering *São Carlos and Sorocaba, Brazil*

Teaching Assistant of the course "Operational Research to Production Engineering I" *Aug. 2017 - Dec. 2017*

Teaching Assistant of the course "Operational Research to Production Engineering II" *March 2014 (2015) - July 2014 (2015)*

Teaching Assistant of the course "Operational Research II" *March 2012 - July 2012*

- Assisting the course instructor with class preparation and course materials
- Conducting office hours on a regular basis to discuss assignments and lab activities with the students

Professional Services

Reviewing

- Computers & Operations Research Journal
- Applied Mathematical Modelling Journal
- European Journal of Operational Research
- Journal Pesquisa Operacional
- Brazilian National Conference on Computational and Applied Mathematics (CNMAC)
- Brazilian Symposium on Operations Research (SBPO)
- Brazilian Workshop on Cutting and Packing Problems, Production Planning, and Related Problems (ONPCE)

Research Events Organization

- Brazilian Workshop on Cutting and Packing Problems, Production Planning, and Related problems (ONPCE)

Member of M.Sc. Jury

- Nov. 2019. Member of the jury. Qualification exam and final defense of the M.Sc. candidate Cindy Lobo. Dept. of Production Engineering, Federal University of São Carlos, Brazil.

Co-supervising

- Oct. 2019 - Jan. 2020. Visiting undergraduate student João Gabriel Hernandes at HEC Montréal. Research project: Reverse Logistics Planning of Waste Electrical and Electronic Equipment (WEEE) in Brazil with Financial and Environmental Objectives.

Publications

Works in progress

- Pérez Martínez, K. ; Adulyasak, Y. and Jans, R. Enhanced Logic-based Benders Decomposition for Printing Planning under Uncertain Demand.
- Melega, G.; Pérez Martínez, K. Formulations for integrated process selection and lot sizing problems.

Accepted for publication

- Pérez Martínez, K. ; Adulyasak, Y. and Jans, R. 2019. Logic-based Benders decomposition for integrated process configuration and production planning problems. *Submitted to INFORMS Journal on Computing* (Technical report, Les Cahiers du GERAD G-2019-73, GERAD. October 2019).

Papers in International Journals

- Martínez, K. P.; Adulyasak, Y.; Jans, R.; Morabito, R. and Toso, E. A. V. 2019. An exact optimization approach for an integrated process configuration, lot-sizing and scheduling problem. *Computers & Operations Research*, 103, 310–323
- Martínez, K. P.; Morabito, R., and Toso, E. A. V. 2018. A coupled process configuration, lot sizing and scheduling model for production planning in the molded pulp industry. *International Journal of Production Economics*, 204, 227–243
- Martínez, K. P., Toso, E. A., Morabito, R., 2016. Production planning in the molded pulp packaging industry. *Computers & Industrial Engineering*, 98, 544–566
- Martínez, K. P.; Toso, E. A. V., 2016. Lot sizing and scheduling in the molded pulp packaging industry. *Gestão & Produção* 23(3), 649-660

Conferences & Oral Presentations

Invited Talks

- "Logic–based Benders reformulations and algorithms for process configuration and production planning problems". *Group for Research in Decision Analysis (GERAD)*. Montreal, Canada. May, 2019
- "Exact and heuristic approaches for an integrated process configuration, lot sizing and scheduling problem". *Interuniversity Research Centre on the Enterprise Networks, Logistics and Transportation (CIRRELT)*. Montreal, Canada. April, 2017

Regular Presentations

- "Solving process configurations and production planning problems" with Y. Adulyasak and R. Jans. In: *2019 INFORMS Annual Meeting*. October 20-23. Seattle, United States
- "Logic-based Benders reformulations and algorithms for process configurations and production planning problems" with Y. Adulyasak and R. Jans. In: *2019 INFORMS ALIO International Conference*. June 9-12. Cancún, México
- "Logic-based Benders reformulations and algorithms for process configurations and production planning problems", with Y. Adulyasak and R. Jans. In: *Optimization Days 2019*. May 13-15. Montreal, Canada
- "Solution approaches for an integrated process configuration, lot-sizing and scheduling problem in the packaging industry", with Y. Adulsayak, R. Jans, E. Toso and R. Morabito. In: *2017 INFORMS Annual Meeting*. October 22–25, 2017. Houston, United States
- "Planning and scheduling processes in the molded pulp packaging industry", with E. Toso and R. Morabito. In: *58th Annual conference of the Canadian Operational Research Society*. May 30–June 1, 2016. Banff, Canada
- "An optimization model for generating molding patterns and production planning in the molded pulp industry", with E. Toso and R. Morabito. In: *XVII Brazilian Workshop on Cutting and Packing Problems, Production planning and related problems (ONPCE)*. June 11–12, 2015. Sorocaba, Brazil
- "Lot sizing and scheduling: A case study in a Brazilian packaging company", with E. Toso. In: *XV Brazilian Workshop on Cutting and Packing Problems, Production planning and related problems (ONPCE)*. March 21–22, 2013. São José de Rio Preto, Brazil

Peer-reviewed Conference Proceedings

- "Mathematical models for production planning and scheduling in the molded pulp packaging industry", with E. Toso and R. Morabito. In: *XLVI Brazilian Symposium on Operations Research*. September 16–19, 2014. Salvador, Brazil
- "Planejamento e Programação da Produção na Indústria de Embalagens em Polpa Moldada", with E. Toso. In: *XLV Brazilian Symposium on Operations Research*. September 16–19, 2013, Natal, Brazil
- "A Mixed Integer Programming Model for a Hybrid Flowshop Scheduling Problem with Limited Buffers", with P, L. Miranda Lugo and R. Texeira. In: *XLV Brazilian Symposium on Operations Research*. September 16–19, 2013, Natal, Brazil
- "Vehicle routing for recyclable waste collection", with E. Toso. In: *XLIV Brazilian Symposium on Operations Research*. September 24–28, 2012. Rio de Janeiro, Brazil

References

Raf Jans
Professor in Logistics and Operations Management
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Yossiri Adulyasak
Associate Professor in Logistics and Operations Management
Canada Research Chair in Supply Chain Analytics · HEC Montréal (Canada)
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Reinaldo Morabito
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