

Bruno M. Pacheco

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Research interests

Integer programming, combinatorial optimization, game theory, deep learning

Education

Université de Montréal

Montréal, QC

Ph.D. in Computer Science

Aug. 2024 – Present

Advisor: Prof. Margarida Carvalho

Co-advisor: Prof. Kim Yu

Federal University of Santa Catarina (UFSC)

Florianópolis, Brazil

M.Sc. in Systems and Automation Eng.

Aug. 2022 – Aug. 2024

Advisor Prof. Eduardo Camponogara

Thesis: *Deep-learning-based Primal Heuristics for MILP: Supervised Solution-prediction Models*

GPA: 9.05/10

RWTH Aachen University

Aachen, Germany

Exchange Student, Systems and Automation, M.Sc.

Apr. 2020 – Sep. 2020

GPA: 2.3 (German system)

Federal University of Santa Catarina (UFSC)

Florianópolis, Brazil

B.Sc. in Control and Automation Eng.

Mar. 2016 – Jul. 2022

Thesis: *Physics-Informed Deep Equilibrium Models for Solving ODEs*

GPA: 8.73/10

Honors and scholarships

Academic Excellence Scholarship (PROEX/CAPES)

2022

Publications

Graph Neural Networks for the Offline Nanosatellite Task Scheduling Problem [↗](#)

[BM Pacheco](#), [LO Seman](#), [CA Rigo](#), [E Camponogara](#).

Under Review.

A ReLU-based linearization approach for maximizing oil production in subsea platforms: An application to flow splitting [↗](#)

[E Camponogara](#), [LO Seman](#), [ER Müller](#), [LK Miyatake](#), [EF Gaspari](#), [BF Vieira](#), [BM Pacheco](#).

Chemical Engineering Science, 2024.

Solving Differential Equations using Physics-Informed Deep Equilibrium Models [↗](#)

[BM Pacheco](#), [E Camponogara](#).

IEEE CASE 2024.

Selective Prediction for Semantic Segmentation using Post-Hoc Confidence Estimation and Its Performance under Distribution Shift [↗](#)

BLC Borges, [BM Pacheco](#), D Silva.

PML4LRS Workshop, ICLR 2024.

Deep-learning-based Early Fixing for Gas-lifted Oil Production Optimization: Supervised and Weakly-supervised Approaches [↗](#)

[BM Pacheco](#), LO Seman, E Camponogara.

SBAI, 2023.

Does pre-training on brain-related tasks results in better deep-learning-based brain age biomarkers? [↗](#)

[BM Pacheco](#), VHR de Oliverira, ABF Antunes, SDS Pedro, D Silva.

BRACIS, 2023.

Towards fully automated deep-learning-based brain tumor segmentation: Is brain extraction still necessary? [↗](#)

[BM Pacheco](#), GS e Cassia, D Silva.

BSPC, 2023.

Automated machine learning for predictive quality in production [↗](#)

J Krauß, [BM Pacheco](#), HM Zang, RH Schmitt.

CIRP, 2020.

Research experience

Student Researcher, Optimization Strategies for Offshore Oil Production - UFSC

Mentor: Prof. Eduardo Camponogara (UFSC)

Apr. 2023 – Aug. 2024

Evaluation of optimization algorithms for oil production optimization in offshore platforms. Mixed-integer-based formulation of the optimization problem, using ReLU and piecewise-linear surrogate models for the nonlinear terms. Deep-learning-based matheuristics for large scale production optimization problems. Research project funded by Petrobras.

Student Researcher, Machine Learning & Applications Research Group (GAMA) - UFSC

Mentor: Prof. Danilo Silva (UFSC)

Nov. 2020 – Aug. 2022

Training of state-of-the-art convolutional neural networks (U-Net) for brain tumor segmentation in multimodal magnetic resonance imaging (MRI). Analysis of brain extraction algorithms as components in the brain tumor segmentation pipeline. Novel transfer learning approach for brain age estimation from MRI, overcoming the state-of-the-art. Proposition of selective prediction technique for image segmentation tasks with a novel uncertainty estimation method (ongoing research).

Student Assistant, Production Quality - Fraunhofer IPT

Mentor: Jonathan Krauß, Ph.D.

Apr. 2019 – Sep. 2020

Development of a preprocessing pipeline for large datasets (over 250 GB per dataset) of production data. Development of an anomaly detection algorithm for time series data from an industry partner. Evaluation of automatic machine learning techniques in the context of production quality.

Teaching experience	Teaching assistant, Department of Systems and Automation (UFSC)	
	DAS5104: Numerical Calculus	Fall 2023
Other professional experience	CERTI Foundation , NEO Empresarial	Florianópolis, SC
	Engineering intern	Sep. 2016 - Feb. 2019
	BIX Technology	Florianópolis, SC
	Summer intern	Summer 2019
	WEG S.A. , R&D Department	Jaraguá, SC
	Summer intern	Summer 2018
	Embraco/Whirlpool , Business Opportunities Division	Jaraguá, SC
	Summer intern	Summer 2017
Skills	Optimization	SCIP, Gurobi(py), JuMP
	Programming	Python, Julia, C, Java
	Machine Learning	PyTorch, JAX, Weights & Biases, Scikit-learn
	Scientific Computing	Numpy, Pandas, Dask, SQL, Matlab
Languages	Portuguese (native), English (fluent/C1), Spanish (elementary), French (elementary)	