

Guillaume Perez



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January 2 1990 (34 years)

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[Google Scholar](#)

[DBLP](#)

[GitHub](#)

Skills

Algorithm	<div><div></div><div></div><div></div><div></div><div></div></div>
Constraint Programming	<div><div></div><div></div><div></div><div></div><div></div></div>
Data Structure	<div><div></div><div></div><div></div><div></div><div></div></div>
Optimization	<div><div></div><div></div><div></div><div></div><div></div></div>
Machine Learning	<div><div></div><div></div><div></div><div></div><div></div></div>
Problem Solving	<div><div></div><div></div><div></div><div></div><div></div></div>
Deep Learning	<div><div></div><div></div><div></div><div></div><div></div></div>
Data Processing	<div><div></div><div></div><div></div><div></div><div></div></div>

Tools

C/C++	<div><div></div><div></div><div></div><div></div><div></div></div>
Python	<div><div></div><div></div><div></div><div></div><div></div></div>
Pytorch	<div><div></div><div></div><div></div><div></div><div></div></div>
Numpy/Scipy	<div><div></div><div></div><div></div><div></div><div></div></div>
Armadillo C++	<div><div></div><div></div><div></div><div></div><div></div></div>
MatLab	<div><div></div><div></div><div></div><div></div><div></div></div>

Language

French	English
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Spanish	Japanese
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Research Scientist

Experience

- Optimization and Scheduling Consultant**
Huawei Technologies, Paris (2019-2021; 2022-2023)
Algorithms design for instructions **scheduling** and software **pipelining**.
Constraint Models for train scheduling and **network design**.
Design and implementation of a robust **hybrid optimization** solver.
Design of **rematerialization** algorithms for **large language models**.
- Deep Learning for Embedded Vision Consultant**
Imra Research, Sophia Antipolis (2018-2019; 2021-2022; 2024)
Design of a **deep learning** pipeline for **video analysis** and **anomaly** detection using multi-modal inputs. **Deep reinforcement learning** for electric **motor control**. Design of **oscillation-free** action loss functions.
- Postdoctoral position - Constrained Machine Learning**
Cornell University, Ithaca, New York (2017-2018)
Development of methods linking together algorithms of **machine learning** and **constrained optimization**.
Applications in **materials science**, biology and ecology.

Education

- PhD Artificial Intelligence - Constraint Programming**
Université Nice Sophia Antipolis (2014-2017)
Design and implementation of **algorithms** mixing **compression**, **data structures** and **stochastic** optimization.
Application in **music generation** and soil analysis.
- Master's degree: Computer Science**
Université Nice Sophia Antipolis (2012-2014)
Three **Constraint programming** internships. Design and implementation of compressing **data structures** for constraint solvers.

Projects

Optimization

- C++**
- Constraints Solver:** Combinatorial optimization solver for scheduling and design space problems.
 - MDD:** Multi-valued Decision Diagrams library for optimization. First generic relax-MDD API.
 - Constraints:** implementation, table and MDD in SOTA CP solvers (Or-tools, choco, oscar)
 - TicTacToe:** AI design API for the TicTacToe game. Used by Master students

Python

- Bandit:** Multi-armed bandit UCB1 implementation for algorithm selection.

Machine Learning

- C++**
- Projected Gradient Descent:** Projection onto the simplex and weighted l1 ball. Sparsity learning.
 - Compressed Sensing:** Data reconstruction framework from noisy and sparse signal.
 - NMF Solver:** Non-negative matrix factorization solver for Data reconstruction.
- Python**
- Neural network** design (TensorFlow) for Crystal structure prediction.
 - Neural network** design (Pytorch) for autonomous driving, scene analysis and feature extraction.

Selected Publications



The Generalized Confidence Constraint - Perez G. et al. - **AAAI 2023 (A*)**



Distribution Optimization in Constraint Programming - Perez G. et al. - **CP 2023 (A)**



Reducing adverse impacts of Amazon hydropower expansion
A. Flecker, Shi Q. et al. - **Science 2022 (IF 47.73)**



Efficient projection algorithms onto the weighted l_1 ball
Perez G., Barlaud M. et al. - **Artificial Intelligence 2022 (IF 14.05)**



A deep reinforcement learning heuristic for SAT-based on GNN
Fournier T, Lallouet A. et al. - **ICTAI 2022 (B)**



A filtered bucket-clustering method for projection onto the simplex and the l_1 ball
Perez G., Barlaud M. et al. - **Mathematical Programming 2020 (IF 3.78)**



Reducing greenhouse gas emissions of Amazon hydropower with strategic dam planning
Almeida R. Shi Q. et al. - **Nature Communications 2019 (IF 11.87)**



Objective as a Feature for Robust Search Strategies - Palmieri A. Perez G. - **CP 2018 (A)**



Parallel Algorithms for Operations on MDDs - Perez G. Régim JC. - **AAAI 2018 (A*)**



Extending the Capacity of $1/f$ Noise Generation
Perez G., Rappazzo B., Gomes C. - **CP 2018 (A)**



Relaxed Projection Method for Constrained Non-negative Matrix Factorization
Bai J., Ament S., Perez G. et al. - **CPAIOR 2018 (B)**



MDDs: Sampling and Probability Constraints
Perez G. Régim JC. - **CP 2017 (A)**



Soft and Cost MDD Propagators - Perez G. Régim JC. - **AAAI 2017 (A*)**

Compact-Table: Efficiently Filtering Table Constraints with Reversible Sparse Bit-Sets
Demeulenaere J.. et al - **CP 2016 (A)**



Enforcing Structure on Temporal Sequences: The Allen Constraint
Roy P., Perez G. et al - **CP 2016 (A)**

Efficient Operations On MDDs for Building Constraint Programming Models.
Perez G. Régim JC. - **IJCAI 2015 (A*)**



Improving GAC-4 for Table and MDD based constraints
Perez G. Régim JC. - **CP 2014 (A)**



Combinatorial Optimization

Machine Learning

Continuous Optimization