

Wilson Jallet, PhD

Mathematical, numerical optimization and control

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Summary

Expert in **numerical optimization** and **optimal control**, mathematical modelling. PhD focused on developing and applying schemes to robotics. Skilled in **high-performance programming** (in C++/Python) for applied and computational mathematics. Experience with statistics, stochastic calculus and machine learning.

Experience

Quantitative Researcher at **CFM** May 2026-
Execution team.

Postdoctoral fellow at **Inria, WILLOW Team**, Paris, France Dec 2024–Apr 2026
Further work on real-time model-based control for robotics.

- Development of a C++ numerical optimal control library derived from my PhD thesis
- Nonsmooth optimization for contact-rich control, using ADMM

Intern, Quantitative Research at **BNP Paribas**, London, UK Mar–Aug 2019
Credit derivatives pricing with PDEs under stochastic spread model. Advised by Simon Moreau.

Intern, Data Analytics at **Accuracy**, Paris Area, France Jun–Aug 2018
Analysis of film metadata and box-office performance. Advised by Gil-Arnaud Coche.

Education

PhD student, LAAS-CNRS and Inria WILLOW, Toulouse and Paris, France Feb 2021–Nov 2024
Design and implementation of solvers for constrained trajectory optimization and real-time model-predictive control for robotics. Supervised by Nicolas Mansard and Justin Carpentier.

MSc, Applied math & machine learning (MVA: Math, Vision, Learning), ENS Paris-Saclay Oct 2019–Sep 2020
Courses taken: optimal transport, deep learning, reinforcement learning, topological data analysis, computer vision and object recognition, 3D point cloud analysis, Bayesian machine learning and graphical models.

MEng, Applied mathematics, École polytechnique, Palaiseau, France 2016–2020
Major in applied mathematics (statistics and learning, stochastic calculus, optimization). 3.86/4 cGPA.

Projects and Extracurricular

3D renderer for robotics 2025
Renderer for robotics, custom C++ engine written using the **SDL** library. Used in recent papers from Inria WILLOW.

Aligator – C++ library for real-time numerical optimal control 2021–now
Main PhD thesis project. Design and implementation of optimization algorithms for real-time constrained model-predictive control and (offline) motion generation. Worked on variations of the Riccati recursion algorithm (with constraints & parallelization).

Alpha expansion algorithm & 3D point cloud classification, MVA master's degree 2020
C++ implementation of a multilabel graph cut algorithm for refining 3D point cloud semantic segmentation.

Solving mean-field games with optimal transport, MVA master's degree 2019–2020
Implementation & extension of a paper in Cython. Advised by Gabriel Peyré.

Humanoid robot imitation of motion from videos, MVA master's degree 2019–2020

High-frequency event modeling with point processes, École polytechnique Sep–Dec 2018
Modeling self-exciting temporal point processes with recurrent neural networks in PyTorch.

(Volunteer) System administrator at **Binet Réseau** 2017–2019
Student IT services on campus. Experience with Linux servers. Deployed self-hosted GitLab, JupyterHub.

Languages

Native **French** and **English**, working **Mandarin Chinese**

Skills

Programming languages: C/C++, Python, CMake, Rust, \LaTeX **Tools:** Linux, Git

Frameworks: Eigen, Torch, Cython, PyBind11/Nanobind **Interpersonal skills:** Teaching, Public speaking

Publications

- [1] From Centroidal to Whole-Body Models for Legged Locomotion: A Comparative Analysis
Ewen Dantec, Wilson Jallet, Justin Carpentier
2024 IEEE-RAS 23rd International Conference on Humanoid Robots (Humanoids), 2024
doi: [10.1109/Humanoids58906.2024.10769597](https://doi.org/10.1109/Humanoids58906.2024.10769597)
- [2] Constrained Differential Dynamic Programming: A Primal-Dual Augmented Lagrangian Approach
Wilson Jallet, Antoine Bambade, Nicolas Mansard, Justin Carpentier
2022 IEEE/RSJ International Conference on Intelligent Robots and Systems, 2022
doi: [10.1109/IROS47612.2022.9981586](https://doi.org/10.1109/IROS47612.2022.9981586)
- [3] Implicit Differential Dynamic Programming
Wilson Jallet, Nicolas Mansard, Justin Carpentier
2022 International Conference on Robotics and Automation (ICRA), 2022, IEEE
doi: [10.1109/ICRA46639.2022.9811647](https://doi.org/10.1109/ICRA46639.2022.9811647)
- [4] Parallel and Proximal Constrained Linear-Quadratic Methods for Real-Time Nonlinear MPC
Wilson Jallet, Ewen Dantec, Etienne Arlaud, Nicolas Mansard, Justin Carpentier
Proceedings of Robotics: Science and Systems, 2024
doi: [10.15607/RSS.2024.XX.002](https://doi.org/10.15607/RSS.2024.XX.002)
- [5] PROXDDP: Proximal Constrained Trajectory Optimization
Wilson Jallet, Antoine Bambade, Etienne Arlaud, Sarah El-Kazdadi, Nicolas Mansard, Justin Carpentier
IEEE Transactions on Robotics 41 (Mar. 2025), pp. 2605–2624
doi: [10.1109/TRO.2025.3554437](https://doi.org/10.1109/TRO.2025.3554437)
- [6] ProxNLP: A Primal-Dual Augmented Lagrangian Solver for Nonlinear Programming in Robotics and Beyond
Wilson Jallet, Antoine Bambade, Nicolas Mansard, Justin Carpentier
6th Workshop on Legged Robots, 2022
- [7] Contact Models in Robotics: A Comparative Analysis
Quentin Le Lidec, Wilson Jallet, Louis Montaut, Ivan Laptev, Cordelia Schmid, Justin Carpentier
IEEE Transactions on Robotics 40 (2024), pp. 3716–3733
doi: [10.1109/TRO.2024.3434208](https://doi.org/10.1109/TRO.2024.3434208)
- [8] Enforcing the Consensus between Trajectory Optimization and Policy Learning for Precise Robot Control
Quentin Le Lidec, Wilson Jallet, Ivan Laptev, Cordelia Schmid, Justin Carpentier
2023 IEEE International Conference on Robotics and Automation (ICRA), 2023
doi: [10.1109/ICRA48891.2023.10160387](https://doi.org/10.1109/ICRA48891.2023.10160387)
- [9] Condensed Semi-Implicit Dynamics for Trajectory Optimization in Soft Robotics
Etienne Ménager, Alexandre Bilger, Wilson Jallet, Justin Carpentier, Christian Duriez
IEEE International Conference on Soft Robotics (RoboSoft), 2024, IEEE
doi: [10.1109/RoboSoft60065.2024.10521997](https://doi.org/10.1109/RoboSoft60065.2024.10521997)
- [10] Etienne Ménager, Antoine Bambade, Wilson Jallet, Alberto de Marchi, Justin Carpentier,
“Contact-Implicit Inverse Dynamics”,
Aug. 2025.