

Guillaume Dalle

✉ guillaume.dalle.pro@gmail.com | 🌐 <https://gdalle.github.io/> | 🐙 [gdalle](#) | 🌐 [guillaume-dalle](#) |
📞 0000-0003-4866-1687

Postdoctoral researcher

Education

PhD in applied mathematics

École des Ponts ParisTech

2019 - 2022

Champs-sur-Marne, France

- Thesis: *Machine Learning and Combinatorial Optimization Algorithms, with Applications to Railway Planning*

Master of Science in applied mathematics

École Normale Supérieure Paris-Saclay

2018 - 2019

Cachan, France

- Coursework in machine learning and optimization
- Thesis: *Delay propagation on suburban railway networks*

Engineering degree

École polytechnique

2015 - 2018

Palaiseau, France

- Coursework in applied mathematics, computer science and humanities

Scientific preparatory classes

Lycée Louis-le-Grand

2013 - 2015

Paris, France

- Coursework in mathematics and physics

Bilingual French-German high school

Lycée Jeanne d'Arc

2010 - 2013

Clermont-Ferrand, France

Professional Experience

Postdoctoral researcher

École polytechnique fédérale de Lausanne

2023 - present

Lausanne, Switzerland

- Theoretical study of graph neural networks

Research intern

Électricité de France R&D

2018

Chatou, France

- Markovian models for soiling estimation & cleaning optimization in solar power plants

Software development intern

Foris AI

2017

Santiago, Chile

- Linear Programming & local search for university timetabling

Teaching

Teaching assistant

École polytechnique fédérale de Lausanne

2023 - present

Lausanne, Switzerland

- Statistical physics for optimization & learning ([course page](#))
- Modèles stochastiques pour les communications ([course page](#))

Teaching assistant & guest lecturer

Massachusetts Institute of Technology

2022 - 2023

Cambridge (MA), United States

- Julia - solving real-world problems with computation ([course page](#))

Teaching assistant & lecturer

École des Ponts ParisTech

2019 - 2022

Champs-sur-Marne, France

- Introduction to optimization
- Operations research ([course page](#))
- Design of optimization challenges on:
 - facility location with Air Liquide
 - train shunting with SNCF
 - inventory routing with Renault

Civic service

Lycée Jean-Baptiste Corot

2015

Savigny-sur-Orge, France

- Scientific courses and mentoring for struggling high school and undergraduate students

Publications & preprints

- [1] L. Bouvier, G. Dalle, A. Parmentier, and T. Vidal, “Solving a Continent-Scale Inventory Routing Problem at Renault”, *Transportation Science*, Oct. 2023, doi: [10.1287/trsc.2022.0342](https://doi.org/10.1287/trsc.2022.0342).
- [2] L. Clarté, A. Vandenbroucq, G. Dalle, B. Loureiro, F. Krzakala, and L. Zdeborová, “Analysis of Bootstrap and Subsampling in High-dimensional Regularized Regression”, no. arXiv:2402.13622. arXiv, Feb. 2024.
- [3] G. Dalle, L. Baty, L. Bouvier, and A. Parmentier, “Learning with Combinatorial Optimization Layers: A Probabilistic Approach”, no. arXiv: 2207.13513. arXiv, Dec. 2022. doi: [10.48550/arXiv.2207.13513](https://doi.org/10.48550/arXiv.2207.13513).
- [4] G. Dalle, “Machine Learning and Combinatorial Optimization Algorithms, with Applications to Railway Planning”, 2022.
- [5] G. Dalle and Y. de Castro, “Minimax Estimation of Partially-Observed Vector AutoRegressions”, no. arXiv:2106.09327. arXiv, May 2022. doi: [10.48550/arXiv.2106.09327](https://doi.org/10.48550/arXiv.2106.09327).
- [6] P. Stephan and G. Dalle, “Method for Determining a Soiling Speed of a Photovoltaic Generation Unit”, Jun. 2020

Talks

Conferences

2024 (accepted)

- JuliaCon: *Gradients for everyone: a quick guide to autodiff in Julia* ([abstract](#))
- JuliaCon: *Fast and generic Hidden Markov Models* ([abstract](#))
- JuliaCon: *Interfaces.jl: base and package interface tests for your objects* ([abstract](#))

2023

- Workshop “Exploring synergies: Machine Learning Meets Physics & Optimization”: *Every solution, everywhere, all at once: turning optimization solvers into probability distributions* ([abstract](#))
- JPOC: *What is the gradient of a Linear Program? Automatic differentiation on a polytope*
- Julia and Optimization Days: *Graphs in Julia - on the edge of glory* ([slides](#))
- Julia and Optimization Days: *Writing fast Julia code* ([slides](#))

2022

- JuliaCon: *InferOpt.jl: combinatorial optimization in ML pipelines* ([recording](#))
- JuliaCon: *ImplicitDifferentiation.jl: differentiating implicit functions* ([recording](#))
- Journées SMAI-MODE: *Recherche d'itinéraires dans un réseau ferroviaire : apprendre à mieux optimiser* ([abstract](#))
- ROADEF: *Learning to Solve Stochastic Multi-Agent Path Finding* ([abstract](#))

2020

- ROADEF: *Delay propagation on a suburban railway network* ([abstract](#))

2019

- PGMO Days: *Delay propagation on a suburban railway network* ([abstract](#))

Invitations & seminars

2024

- Institut de Mathématiques de Bourgogne: *Deep learning meets combinatorial optimization - a tale of missing gradients* ([abstract](#))

2023

- Swiss Data Science Center: *Every solution, everywhere, all at once: turning optimization solvers into probability distributions*

2022

- MIT CSAIL: *Learning with Combinatorial Optimization Layers: A Probabilistic Approach*

2021

- Institut de Recherche Mathématique de Rennes: *Pourquoi les trains sont-ils toujours en retard?* ([abstract](#))
- École des Ponts ParisTech: *Understanding railway delay propagation through latent variable models* ([abstract](#))

Mentoring

Student advisor

École polytechnique fédérale de Lausanne

2023 - present

Lausanne, Switzerland

- [Chun-Tso Tsai](#) (2023): *Multi-Agent Pathfinding with Mixed-Integer Linear Programming and Lagrange Relaxation*
- [Oleg Fafurin](#) (2023): *Graph algorithms in Julia*

Student advisor

École des Ponts ParisTech

2019 - 2022

Champs-sur-Marne, France

- [Louis Bouvier](#) (2021): *Large Neighborhood Search and Structured Prediction for the Inventory Routing Problem*
- Various group projects:
 - train shunting (2020)
 - multimodal transit routing (2020)
 - pathfinding in historical maps (2022)
 - optimized dorm room assignment (2022)

Community service

Peer review

- Journals: [Journal of Open Source Software](#), [Transportation Research](#)
- Conferences: [JuliaCon](#) (2021-2024), [NeurIPS](#) (2023), [ICML](#) (2023)

Awards

- 2023 **PhD award for mathematics in industry**, AMIES
- 2021 **Prix Pasquet for the best engineering student**, École des Ponts ParisTech
- 2015 **1st place in the nationwide entrance exam**, École polytechnique

Skills

- Languages** English | French | German | Spanish
- Programming** Julia | Python | Git(Hub) | LaTeX
- Personal Interests** Music | Songwriting | Board games | Bouldering