GUILLAUME DALLE

Postdoctoral researcher in machine learning at EPFL

guillaume.dalle@epfl.ch · gdalle.github.io · gdalle · guillaume-dalle · 0000-0003-4866-1687

EXPERIENCE

Postdoctoral researcher
EPFL (INDY / IdePHICS / SPOC)

Jan. 2023 – ongoing · Lausanne (Switzerland)

Currently investigating the statistical behavior of graph neural networks.
With P. Thiran, F. Krzakala & L. Zdeborová

Invited teaching assistant
Massachusetts Institute of Technology

Sep. 2022 - Dec. 2022 · Cambridge, MA (USA)

Helped redesign and teach an undergraduate class on using the Julia language for computation.
With Alan Edelman.

Teaching assistant
École des Ponts

Sep. 2019 - Aug. 2022 · Champs-sur-Marne (France)

Taught optimization (undergraduate level) & operations research (graduate level). Mentored several student research projects and one Master's thesis.

Research intern
École des Ponts (CERMICS) | SNCF

Apr. 2019 – Jul. 2019 · Champs-sur-Marne (France)

Studied probabilistic graphical models & variational inference for railway delay propagation.

Research intern
Électricité De France R&D

Apr. 2018 – Aug. 2018 · Chatou (France)

Proposed Markovian approaches for soiling estimation & cleaning optimization in solar power plants.

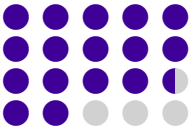
Development intern
Foris AI

June 2017 – Aug. 2017 · Santiago (Chile)

Combined linear programming & local search for university timetabling.

LANGUAGES

French
English
German
Spanish



Julia
Python

EDUCATION

PhD in applied mathematics
École des Ponts (CERMICS) | SNCF

Sep. 2019 – Aug. 2022 · Champs-sur-Marne (France)

High-dimensional latent variable models for temporal processes with missing data. Differentiable combinatorial optimization layers within learning pipelines. Applications to railway incident prediction and traffic management.
With Y. De Castro & A. Parmentier.

Master's degree in applied mathematics
ENS Paris-Saclay (M2 *Mathématiques Vision Apprentissage*)

Sep. 2018 – Aug. 2019 · Cachan (France)

Courses in machine learning & optimization.

Engineering degree
École polytechnique

Apr. 2016 – Mar. 2018 · Palaiseau (France)

Courses in applied mathematics & computer science.
Ranked 1st in the national entrance examination.

Scientific preparatory classes
Lycée Louis-le-Grand (MPSI – MP*)

Sep. 2013 – June 2015 · Paris (France)

Courses in mathematics & physics.

INTERESTS

Open source development
Contributor to several Julia packages.
Member of the JuliaGraphs organization.
Reviewer for JuliaCon 2021, 2022, 2023.

Community service
Maintainer of https://phd-resources.github.io/
PhD representative at École des Ponts.

Music
Pianist, singer & songwriter (1k YouTube subscribers).
Participated in a student musical.

Games & sports
Strategic competitive and cooperative board games.
Circus arts, ultimate frisbee, bouldering.

Public speaking
National debating champion with Polytechnique:
- 2017 (in French, as team captain);
- 2019 (in English, as coach).

Took part in several Model UN conferences.

PREPRINTS

Bouvier, L., G. D, A. Parmentier, and T. Vidal. Solving a Continent-Scale Inventory Routing Problem at Renault. Submitted to Transportation Science. 2022. arXiv: 2209.00412 [math]. preprint.

D, G., L. Baty, L. Bouvier, and A. Parmentier. Learning with Combinatorial Optimization Layers: A Probabilistic Approach. Submitted to the Journal of Machine Learning Research. 2022. arXiv: 2207.13513 [cs, math, stat]. preprint.

D, G. and Y. De Castro. Minimax Estimation of Partially-Observed Vector AutoRegressions. Submitted to the Electronic Journal of Statistics. 2022. arXiv: 2106.09327 [eess, math, stat]. preprint.

D, G. "Machine Learning and Combinatorial Optimization Algorithms, with Applications to Railway Planning". PhD thesis. École des Ponts ParisTech, 2022.

PATENTS

Stephan, P. and G. D. "Method for Determining a Soiling Speed of a Photovoltaic Generation Unit". Pat. WO2020115431A1 (WO). Electricite De France. 2020.

TALKS

D, G. "Every Solution, Everywhere, All at Once: Turning Optimization Solvers into Probability Distributions". Seminar (Swiss Data Science Center, Lausanne). 2023.

– "Every Solution, Everywhere, All at Once: Turning Optimization Solvers into Probability Distributions". Workshop talk. Workshop "Exploring Synergies: Machine Learning Meets Physics & Optimization" (Zuse Institute, Berlin). 2023.

– "Graphs in Julia - on the Edge of Glory". Workshop talk. Julia and Optimization Days (Paris). 2023.

– "What Is the Gradient of a Linear Program? Automatic Differentiation on a Polytope". Conference talk. Journées Polyèdres et Optimisation Combinatoire (Clermont-Ferrand). 2023.

– "Writing Fast Julia Code". Workshop talk. Julia and Optimization Days (Paris). 2023.

Bouvier, L., G. D, L. Baty, and A. Parmentier. "Learning with Sign-Dependent Combinatorial Optimization Layers: A Multiplicative Perturbation Approach". PGMO Days (Saclay, France). 2022.

Bouvier, L., G. D, and A. Parmentier. "Large Neighborhood Search and Structured Prediction for the Inventory Routing Problem". Conference talk. 23ème Congrès Annuel de La Société Française de Recherche Opérationnelle et d'Aide à La Décision (Villeurbanne - Lyon, France). 2022.

D, G. "Learning with Combinatorial Optimization Layers: A Probabilistic Approach". Seminar (MIT CSAIL, Cambridge). 2022.

– "Recherche d'itinéraires dans un réseau ferroviaire : apprendre à mieux optimiser". Conference talk. Journées SMAI MODE 2022 (Limoges). 2022.

D, G., L. Bouvier, and L. Baty. "InferOpt.jl: Combinatorial Optimization in ML Pipelines". Conference talk. JuliaCon. 2022.

D, G. and A. Parmentier. "Learning to Solve Stochastic Multi-Agent Path Finding". 23ème Congrès Annuel de La Société Française de Recherche Opérationnelle et d'Aide à La Décision (Villeurbanne - Lyon, France). 2022.

D, G. and M. Tarek. "ImplicitDifferentiation.jl: Differentiating Implicit Functions". Conference talk. JuliaCon. 2022.

D, G. "Pourquoi Les Trains Sont-Ils Toujours En Retard ?" Seminar. Séminaire Gaussbusters (IRMAR, Rennes). 2021.

– "Understanding Railway Delay Propagation through Latent Variable Models". Seminar. "Decision, Algorithms and Geometry" Seminar (École des Ponts, Paris). 2021.

D, G., Y. De Castro, and A. Parmentier. "Delay Propagation on a Suburban Railway Network". Conference talk. 21ème Congrès Annuel de La Société Française de Recherche Opérationnelle et d'Aide à La Décision (Montpellier, France). 2020.

– "Delay Propagation on a Suburban Railway Network". Conference talk. PGMO Days (Saclay, France). 2019.