Guillaume Gautier

Ph.D., 28 years old, French

Google Scholar
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Research interests

Computational statistics, Monte Carlo methods, point processes, simulation algorithms.
Interaction between optimization and simulation, e.g., randomized optimization problems.

Academic positions

August 2020 - now **Postdoctoral researcher**, *GIPSA-lab – GAIA team*, Grenoble, France.
Collaborators: Simon Barthelmé, Nicolas Tremblay and Pierre-Olivier Amblard.

Education

2017-20 **Ph.D. in Machine Learning**, *CRIStAL – École Centrale de Lille* , Lille, France.
Title: *On sampling Determinantal Point Processes (DPPs).*
Defense: 19 May 2020.
Supervisors: Rémi Bardenet and Michal Valko.
Jury president: Pierre-Oliver Amblard.
Reviewers: Agnès Desolneux, Romain Couillet.
Examiners: Frédéric Lavancier, Michalis Titsias, Sheehan Olver.

2015-16 **M.Sc. in Applied Mathematics**, *ENS Paris-Saclay*, Cachan, France.
MVA (Mathematics, Computer Vision, Machine Learning): Graphs in ML, MCMC Methods, Random Matrices, Convex Optimization, Probabilistic Graphical Models, Kernel Methods.

2014-15 **M.Sc. in Applied Mathematics**, *Université Lille 1*, Lille, France.
Probability & Statistics: Stochastic Processes, Percolation, Itô calculus.
Master thesis: *Phase transition in the configuration graph*. Supervisor: Chi Tran.

2012-15 **M.Sc. in Engineering**, *École Centrale de Lille*, Lille, France.
Data Analysis & Decision making : ML, Optimization, Statistical Estimation.

2010-12 **Classes préparatoires**, *Lycée du Parc*, Lyon, France.
Intensive preparatory courses in mathematics, physics and chemistry for competitive entrance exams to French Grandes Écoles.

Computer skills

Programming Python, Julia, R, MATLAB.
Documents LaTeX, Microsoft Office.
Versioning Git, GitHub.

Languages

Fluent **French**, mother tongue,
English, main working language.
Basic German, Portuguese, Chinese.

Software

DPPy **DPP sampling with Python**, Main developer.
Python toolbox for sampling Determinantal Point Processes (DPPs).
GitHub Documentation

Publications

See also Google Scholar or the list of publications on my homepage.

Journal papers

[J2] **G. Gautier**, R. Bardenet, and M. Valko. *Fast sampling from β-ensembles*. Statistics and Computing (in press), 2020.
paper arXiv:2003.02344 code

[J1] **G. Gautier**, G. Polito, R. Bardenet, and M. Valko. *DPPy: DPP Sampling with Python*. Journal of Machine Learning Research - Machine Learning Open Source Software (JMLR-MLOSS), 2019.
paper arXiv:1809.07258 code

Conference papers

[C2] **G. Gautier**, R. Bardenet, and M. Valko. *On two ways to use determinantal point processes for Monte Carlo integration*. Advances in Neural Information Processing Systems (NeurIPS), 2019.
paper code talk slides poster

[C1] **G. Gautier**, R. Bardenet, and M. Valko. *Zonotope Hit-and-run for Efficient Sampling from Projection DPPs*. International Conference on Machine Learning (ICML), 2017.
paper arXiv:1705.10498 code talk slides poster

Workshop papers

[W2] **G. Gautier**, R. Bardenet, and M. Valko. *Les processus ponctuels déterminantaux en apprentissage automatique*. French Colloquium on Signal and Image Processing (GRETSI), 2019.
paper code

[W1] **G. Gautier**, R. Bardenet, and M. Valko. *On two ways to use determinantal point processes for Monte Carlo integration*. Workshop on Negative Dependence in Machine Learning, International Conference on Machine Learning (ICML), 2019.
paper code talk slides poster

Thesis

[T1] **G. Gautier**. *On sampling determinantal point processes*. Ph.D. thesis. École Centrale de Lille, 2020.
paper code talk slides

Popularization

[P1] **G. Gautier**, R. Bardenet, and M. Valko. *Un dé pipé aux multiples facettes pour améliorer les moteurs de recherche*. CNRS info - Résultats Scientifiques - Informatique, 2017.
paper

Teaching (121h)

2019 – **Data Mining - M1 Mathematics and Finance**, *Université de Lille*, Émilie Kaufmann.
15h Practical sessions.
Python with scikit-learn: k-Means, regression (lin, log), decision trees, SVMs, unsupervised learning.

2017-18 – **Analysis for Engineers - L3**, *École Centrale de Lille*, Augustin Mouze.
50h Tutorial sessions.
- (40h) Measure, integration and distribution theory.
- (10h) Refresher on mathematics essentials: matrix calculus, differential equations, convergence of sequences, topology.

2017 – **Signal Processing - L3**, *École Centrale de Lille*, Pierre Chainais.
56h Tutorial and practical sessions.
Filtering, time-frequency analysis, sampling theory.

Supervision (5 master student projects)

2017-19 **Class project, M2 MVA, Graphs in Machine Learning**, *ENS Paris-Saclay*, Michal Valko.
Individual or duo project, accounting for 60% of the course grade.
- Nicolas Jouvin and Victor Pellegrain.
  Review of *Line Graphs of Weighted Networks for Overlapping Communities* of Evans and Lambiotte, and application to community detection of characters in *Harry Potter* books.
- Quentin Chan Wai Nam. GitHub
  Review of *Graph sampling with determinantal processes* of Tremblay, Amblard and Barthelmé, and implementation of the key algorithms for graph signal reconstruction.
- Juliette Millet and Sébastien Deschamps. GitHub
  Review of *Line Graphs of Weighted Networks for Overlapping Communities* of Evans and Lambiotte, and application to community detection of characters in *One Piece* mangas.
- Bérénice Courant. GitHub
  Review and implementation of sampling algorithms for uniform and non-uniform spanning trees on graphs.

2017 **Research project, M1**, *École Centrale de Lille*.
Individual project accounting for the validation of 2 courses $\approx$ 64h.
- Robin Quillivic, *Discovery of point processes*.
  Dicovering the key concepts of the theory of point processes (correlation fonctions, simulation strategies, etc.) and application to social sciences.

Responsabilities

Reviewing

- NeurIPS 2020.
- ICML 2020 (top 33%), 2019, 2018.
- AISTATS 2019.
- IJCAI 2017.

Talks

2020 - Aug. **GIPSA-lab**, *GAIA team presentation*, Grenoble, France.
On adding a list of numbers (and other one-dependent dpps), A. Borodin, P. Diaconis, and J. Fulman.

2019 - Jun. **ICML - Workshop Negative Dependence in ML**, *Oral presentation*, Long Beach, CA, USA.
[W1] On two ways to use determinantal point processes for Monte Carlo integration.

Mar. **Laboratoire Paul Painlevé**, *Working group on Point Processes*, Lille, France.
[J1] Tutorial session on DPPy. GitHub

2018 - Dec. **CRIStAL**, *SigMA team presentation*, Lille, France.
How to make your research reproducible?

2017 - Aug. **ICML**, *Oral presentation*, Sydney, Australia.
[C1] Zonotope Hit-and-run for Efficient Sampling from Projection DPPs.

Jun. **INRIA**, *SequeL team seminar*, Lille, France.
How to sample DPPs?

Feb. **CRIStAL**, *SigMA working group*, Lille, France.
Random graphs in *Recueil de modèles aléatoires*, J. Chafaï, F. Malrieu.

Grants and Awards

2020 - juil. ICML Top 33% reviewer award.

2019 - déc. NeurIPS travel grant, Vancouver, Canada.

2017 - août ICML travel grant, Sydney, Australia.