





Guillaume Gautier


Ph.D., 29 years old, French

 Google Scholar
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Research

Keywords Computational statistics, Monte Carlo methods, point processes, simulation algorithms.
Qualif. CNU 26 (mathématiques appliquées), 61 (signal).

Experience

- Apr. 2021 - **Research Software Engineer**, CNRS – CRIStAL – SigMA team, Lille, France.
- Mar. 2022 Working for the projects led by [Rémi Bardenet](#):
 - ERC *Blackjack*: “Fast Monte Carlo integration with repulsive point processes”,
 - Chaire IA *Baccarat*: “Bayesian learning of expensive models, with applications to cell biology”.
- Aug. 2020 - **Postdoctoral researcher**, CNRS – GIPSA-lab – GAIA team, Grenoble, France.
- Mar. 2021 Investigation of Partial Rejection Sampling (PRS), see [PartialRejectionSampling.jl](#) .
Collaborators: [Simon Barthelmé](#), [Nicolas Tremblay](#) and [Pierre-Olivier Amblard](#).

Education

- 2017-20 **Ph.D. in Machine Learning**, CRIStAL – SigMA, SequeL – École Centrale de Lille, France.
Title: *On sampling Determinantal Point Processes (DPPs)*. [T1]
Defense: 19 May 2020. Supervisors: [Rémi Bardenet](#) and [Michal Valko](#).
- 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 aux Grandes Écoles (PC)**, 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 L^AT_EX, Microsoft Office.
Versioning Git,  GitHub.



Languages

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




Software - GitHub

- structure-factor **Companion package of [Pre2]**, Co-developer.
Python package for estimating the structure factor and study hyperuniformity of point processes.
 Code  Documentation
- DPPy **DPP sampling with Python [J1]**, Main developer.
Python package for sampling Determinantal Point Processes (DPPs).
 Code  Documentation
- "PRS.jl" **PartialRejectionSampling.jl**, Main developer.
Julia module for Partial Rejection Sampling (PRS).
 Code  Documentation







Publications

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












Preprints

- [Pre1] D. Hawat, **G. Gautier**, R. Bardenet, and R. Lachière-Rey. *On estimating the structure factor of a point process, with applications to hyperuniformity*. 2022.
 paper  arXiv:2203.08749  code








Journal papers

- [J2] **G. Gautier**, R. Bardenet, and M. Valko. *Fast sampling from β -ensembles*. *Statistics and Computing*, 2021.
 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*. *Colloque francophone de traitement du signal et des images (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 (137h)

- 2021 **Python - M3**, *École Centrale de Lille*, [Pierre Chainais](#).
16h Tutorial and practical sessions.
Essentials of version control system with `git`,
Essentials of Python programming, packaging and documentation.  [GitHub](#)
- 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 ≈ 64 h.
 - [Robin Quillivic](#), *Discovery of point processes*.
Discovering the key concepts of the theory of point processes (correlation fonctions, simulation strategies, etc.) and application to social sciences.

Reviewing

- NeurIPS: 2021, 2020.
- ICML: 2021, 2020 (Top reviewer), 2019, 2018.
- AISTATS: 2019
- IJCAI 2017.

Talks

- 2020 - Aug. **GIPSA-lab**, *Working group on graphs point processes*, Online.
Partial Rejection Sampling (a gentle introduction), [PartialRejectionSampling.jl](#) 
- 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 - Jul. ICML top 33% reviewer award.
- 2019 - Dec. NeurIPS travel grant, Vancouver, Canada.
- 2017 - Aug. ICML travel grant, Sydney, Australia.