Guillaume Gautier

3rd-year Ph.D. student

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Education

2017 - now **Ph.D. in Machine Learning**, *CRIStAL – SequeL & SigMA teams*, Lille, France.
Fast Sampling of Determinantal Point Processes. Supervisors: Michal Valko and Rémi Bardenet.

2015 - 2016 **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 - 2015 **M.Sc. in Applied Mathematics**, *Université Lille 1*, Lille, France.
Probability & Statistics: Stochastic Processes, Percolation, Itô.
Master Thesis: *Phase transition in the configuration graph*, Chi Tran.

2012 - 2015 **M.Sc. in Engineering**, *École Centrale de Lille*, Lille, France.
Data Analysis & Decision making: ML, Optimization, Statistical Estimation.

2010 - 2012 **Classes prépatatoires**, *Lycée du Parc*, Lyon, France.
Intensive preparatory courses in **Mathematics & Physics** for competitive entrance exams to French Grandes Écoles.

Internships

2016 – 6 mth **Research**, *CRIStAL – SigMA team*, Lille, Rémi Bardenet.
Determinantal Point Processes and matroids.

2015 – 5 mth **Research**, *Lawrence Berkeley National Laboratory*, Berkeley, CA, Sylvain Costes.
- Image processing algorithm for human DNA breaks diagnosis (MATLAB– DIPimage),
- Image classification algorithm for fuzzy pictures (Python).

Teaching

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

2018 – 36h **L3 tutorial sessions**, *Analysis for Engineers*, Augustin Mouze, École Centrale de Lille.
- (26h) Measure, integration and distribution theory.
- (10h) Refresher on mathematics essentials: matrix calculus, differential equations, convergence of sequences, topology.

2017 – Fall **M2 class projects**, *Graphs in Machine Learning*, Michal Valko, MVA – ENS Paris Saclay.
I supervised Juliette Millet and Sébastien Deschamps, and Quentin Chan Wai Nam for their respective class project.
- The goal was to review *Line Graphs of Weighted Networks for Overlapping Communities*, and apply this edge-centric point of view to reveal overlapping communities in the application of their choice: few tomes of One Piece. GitHub page.
- The goal was to review *Graph sampling with determinantal processes*, and implement the key algorithms to efficiently sample a graph signal for reconstruction purposes. GitHub page.

2017 – 14h **L3 tutorial sessions**, *Analysis for Engineers*, Augustin Mouze, École Centrale de Lille.
Measure and integration theory.

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

2017 – Spring **M1 research project**, École Centrale de Lille.
I supervised Robin Quillivic, a 1st-year master student on a *Playful discovery of Point Processes*.
The aim of this master project is to introduce students to the research environment and tools. At scientific level, the goal was to get him familiar with the main concepts of point processes (correlation functions, simulation strategies, etc.) and then see some applications of his interest in social science.

2016 – Fall **M2 class projects**, *Graphs in Machine Learning*, Michal Valko, MVA – ENS Paris Saclay.
I supervised Nicolas Jouvin and Victor Pellegrain for their class project.
The goal was to review Evans and Lambiotte's paper, *Line Graphs of Weighted Networks for Overlapping Communities*, and apply this edge-centric point of view to reveal overlapping communities in the application of their choice: the first Harry Potter book.

Software

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

Computer skills

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

Languages

French Mother tongue
English Fluent
German Basic

Awards/Grants

2019 NeurIPS travel grant, Vancouver, Canada.
2017 ICML travel grant, Sydney, Australia.

Miscellaneous

- Basketball
- Hiking
- Cycling
- Traveling

Publications

See also Google Scholar

Journal papers

[GPBV19] Guillaume Gautier, Guillermo Polito, Rémi Bardenet, and Michal Valko. "DPPy: DPP Sampling with Python". In: *Journal of Machine Learning Research - Machine Learning Open Source Software (JMLR-MLOSS), in press* (2019).

Conference papers

[GBV19c] Guillaume Gautier, Rémi Bardenet, and Michal Valko. "On two ways to use determinantal point processes for Monte Carlo integration". In: *Neural Information Processing Systems (NeurIPS), in press*. 2019.

[GBV17] Guillaume Gautier, Rémi Bardenet, and Michal Valko. "Zonotope Hit-and-run for Efficient Sampling from Projection DPPs". In: *International Conference on Machine Learning (ICML)*. 2017. URL: http://proceedings.mlr.press/v70/gautier17a.

Workshop papers

[GBV19b] Guillaume Gautier, Rémi Bardenet, and Michal Valko. *Les processus ponctuels determinantaux en apprentissage automatique*. 2019. URL: http://researchers.lille.inria.fr/~valko/hp/publications/gautier2019processus.pdf.

[GBV19d] Guillaume Gautier, Rémi Bardenet, and Michal Valko. *On two ways to use determinantal point processes for Monte Carlo integration*. 2019. URL: https://negative-dependence-in-ml-workshop.lids.mit.edu/wp-content/uploads/sites/29/2019/06/icml_camera_ready.pdf.

In preparation

[GBV19a] Guillaume Gautier, Rémi Bardenet, and Michal Valko. "Fast sampling of beta-ensembles". 2019.