

# Etienne LASALLE

## Ph.D. in Mathematics

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My research topics are statistics related to graph-structured data. During my thesis, I developed and studied tools for multi-scale graph comparisons based on heat diffusion and topological data analysis. The statistical guarantees obtained on these objects ensure the asymptotic validity of two-sample tests. Implementing these methods allowed me to confront them with more applied problems, particularly in the context of machine learning and neural network classifiers. Now, as a post-doc, I am working on graph inference via compressive learning methods.

Statistics   Graphs   Topological data analysis   Compressive learning

## 🏛️ ACADEMIC POSITIONS

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2023- *Post-doc*, ENS de Lyon (LIP) and Inria (Ockham).  
On compressive learning and graph data.  
Advisors : Rémi Gribonval and Paulo Gonçalves.

## 🎓 STUDIES

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2019-2022 *Ph.D*, Université Paris-Saclay and Inria Saclay, France.  
Statistical foundations of topological data analysis for graph-structured data.  
Supervision : Frédéric Chazal and Pascal Massart.

2015-2019 *Ecole Normale Supérieure Paris-Saclay*.  
‣ 2019 *Graduated from ENS Paris Saclay*, France  
‣ 2018 *MSc in Probability and Statistics*, Université Paris-Saclay, France

2012-2015 *Preparatory classes*, Lycée Faidherbe, Lille, France

## “ PUBLICATIONS

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### Preprints

2023 **Compressive Recovery of Sparse Precision Matrices.** T. Vayer, E.L., R. Gribonval, P. Gonçalves.  
[arxiv:2311.04673](#)

### Publications

2023 **Eve, Adam and the Preferential Attachment Tree.** A. Contat, N. Curien, P. Lacroix, E.L., V. Rivoirard.  
Accepted in *Probability Theory and Related Fields*  
[arxiv:2303.04752](#)

2021 **Heat diffusion distance processes : a statistically founded method to analyze graph data sets.**  
Accepted in *J. of Applied and Computational Topology*.  
[arxiv:2109.13213](#)

## AWARDS

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- 2021 *Winner of a Math-Company challenge (AMIES)*. With O. Hacquard and V. Lebovici.  
Reconstruction of trajectories from noisy real life 3D detection of people.

[Challenge AMIES](#)

## TALKS

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- Nov. 2023 **MIA Workshop : Dimension reduction for learning and visualization**, ENS de Lyon, France.  
Compressive recovery of sparse precision matrices.
- Mai 2023 **Seminar of the DATA department**, LJK, Grenoble, France.  
Statistical comparison of graph-structured data and its application to distribution shift detection.
- Jan. 2023 **Meeting of the EcoNet project**, Campus Agro Paris-Saclay, France.  
Statistical comparison of graph structured data.
- Jan. 2023 **Workshop on Random Geometry**, CIRM, Luminy, France.  
Finding Adam in the nearest-neighbor tree.
- Nov. 2022 **working group of the Probability-Statistics team**, LMO, Orsay.  
Testing SBM vs Erdős-Renyi, [\[article\]](#). With L. Martins-Bianco and Z. Naulet.
- June 2022 **Journées de Statistique de la SFdS**, Lyon, France.  
Analyse statistique de graphes, via des processus de diffusion de la chaleur.
- June 2022 **Machine Learning and Signal Processing Seminar**, ENS, Lyon.  
Heat diffusion distance processes for graphs and their application to distribution shift detection.
- June 2022 **Celeste team's seminar**, LMO, Orsay.  
Heat diffusion distance processes for graphs, application to distribution shift detection.
- May 2022 **working group of the Probability-Statistics team**, LMO, Orsay, France.  
Presenting *Density estimation from unweighted k-nearest neighbor graphs*, [\[article\]](#).  
With A. Contat and N. Curien.
- May 2022 **Datashape team seminar**, Porquerolles, France.  
Detecting distribution shifts using activation graphs from neural networks
- Mar. 2022 **working group of the Probability-Statistics team**, LMO, Orsay, France.  
Presenting *Identifying the deviator*. [arxiv:2203.03744](#)
- Dec. 2021 **Forum des Jeunes Mathématicien.ne.s**, Besançon, France.  
*Statistical analysis of graph structured data, via heat diffusion processes.*
- Oct. 2021 **Colloque Jeunes Probabilistes et Statisticiens**, Ile d'Oléron, France  
*Statistical analysis of graph structured data, via heat diffusion processes.*
- Oct. 2021 **working group of the Probability-Statistics team**, LMO, Orsay, France.  
Presenting *Finding Adam in random growing trees*. [arxiv:1411.3317](#)
- Oct. 2021 **Datashape seminar**, INRIA Saclay, France.  
*Statistical analysis of graph structured data, via heat diffusion processes.*
- Mar. 2021 **Vulgarization seminar for Ph.D. students**, Université Paris-Saclay, France.  
*Gaussian approximations for random functions.*

## RESEARCH ACTIVITIES

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### Editorial Activities

- 2024 *Reviewing activity for the Bernoulli Journal*
- May 2023 *Review of a communication proposal, 2023 edition of the GRETSI conference,*  
*Special session : Graph Learning and Learning with Graphs.*

## Organization of scientific events

Sept. 2023 *Participation in the organization of the IXXI day : Frugality and machine learning.*

[Event page](#)

## Research Internships

- 2018-2019 *Pre-doctoral internship (1 year)*, EPFL, Lausanne, Switzerland.  
Probabilistic and statistical studies of topological features for random graph analysis, in the context of Neuro-science. (@ [kathryn.hess@epfl.ch](mailto:kathryn.hess@epfl.ch))
- 2018 *Master internship (4 months)*, INRIA-Saclay, Palaiseau, France.  
Development of anomaly detection methods based on tools and features from topological data analysis. (@ [frederic.chazal@inria.fr](mailto:frederic.chazal@inria.fr))
- 2017 *Master internship (4 months)*, Simon Fraser University, Vancouver, Canada.  
Bio-Informatics : unsupervised clustering on tuberculosis genomic data.  
(@ [cedric.chauve@sfu.ca](mailto:cedric.chauve@sfu.ca), @ [leonid@sfu.ca](mailto:leonid@sfu.ca))
- 2016 *Internship*, ENS Paris-Saclay, Cachan, France.  
Numerical Hydrology : modeling water flow on elevation grids.  
(@ [moreljeanmichel@gmail.com](mailto:moreljeanmichel@gmail.com), @ [marc.lebrun.ik@gmail.com](mailto:marc.lebrun.ik@gmail.com))



## TEACHING

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### At IUT d'Orsay

- 2019-2022 *Modélisation* (linear algebra, diagonalization, Python practicals)
- 2020-2022 *Probabilités/Statistiques* (usual discrete and continuous distributions, approximation theorems, central limit theorem, estimators, statistical tests)
- 2019-2020 *Mathématiques Discrètes* (logic, linear algebra basics)

### Others

- May 2023 *What does it mean to be a researcher in math?* A. Ribot High-School, Saint-Omer, France.  
Presentation's content : studies, some fields of research (in statistics), a typical day/week.
- Jan 2021 *Scientific mediation*, with la Maison d'Initiation et de Sensibilisation aux Sciences.  
Construction and animation of "science/society" debate sessions for high-school students.
- 2017-2018 *Mentoring*, three students from the Villebon-Charpak institute, Orsay, France.



## SKILLS

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### Code and IT

- > [Python](#) [Github](#) [R](#)
- > [GUDHI](#) (Python library for TDA)
- > [LaTeX](#) [ipe](#)

### Languages

French	●	●	●	●	●
English	●	●	●	●	○
German	●	○	○	○	○



## INTERESTS

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- > Climbing
- > Hiking, skiing, paragliding.
- > Music, photography.