

Thibaut GERMAIN

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Paris, France

EXPERIENCE

- 03/2025 - today** **Postdoctoral researcher, [Centre de Mathématiques Appliquées de Polytechnique \(CMAP\)](#), Palaiseau, France.** Postdoctoral position within the European project [Elias](#), focusing on the design of sustainable artificial intelligence to support sustainable development. The work centers on integrating dynamical systems modeling into machine learning frameworks to facilitate statistical analysis and system adaptation for simulation. Conducted in collaboration with [Vladimir KOSTIC](#), [Karim LOUNICI](#) and [Rémi FLAMARY](#).
- 01/2025 - 02/2025** **Postdoctoral researcher, [Centre Borelli](#), [Ecole Normale Supérieure Paris-Saclay](#), Gif-sur-Yvette, France.** Continuation of my PhD research in a postdoctoral position for two months, focusing on adapting some of the developed methods to deep learning approaches. It had led to one publication.
- 07/2024** **Invited researcher, [Duke University](#), Durham, NC (USA).** One-month research stay. Contributed to the development of tools for analyzing therapeutic progress in eating disorders from video data. Work focusing on detecting and quantifying facial emotion by combining signal processing and shape analysis methods.
- 01/2017 - 07/2019** **Supply Chain Engineer, [Tempest Tech Corp.](#), Fresno, CA (USA).** Firefighting equipment manufacturer. Main responsibilities included optimizing operational processes (production and logistics), supervising on-site research and development activities, and contributing to team management, including production team oversight, staff training, and recruitment.

TRAINING

- 10/2021 - 12/2024** **PhD in Applied Mathematics, [Centre Borelli](#), [Ecole Normale Supérieure Paris-Saclay](#), France.** Research focusing on shape detection and shape analysis for physiological time series. Link to the thesis manuscript: <https://theses.fr/s298010>. Co-supervised by [Laurent OUDRE](#) and [Charles TRUONG](#). Thesis defended after 37 months on December 6th, 2024 before a committee including:
- Jury chair:
 - [Alain TROUVE](#) (Professor, ENS Paris-Saclay)
 - Rapporteurs:
 - [Jessica LIN](#) (Associate professor, George Mason University)
 - [Romain TAVENARD](#) (Professor, Université Rennes 2)
 - Reviewers :
 - [Laurent YOUNES](#) (Professor, Johns Hopkins University)
 - [Guillermo SAPIRO](#) (Professor, Princeton University)
 - PhD supervisors:
 - [Laurent OUDRE](#) (Professor, ENS Paris-Saclay)
 - [Charles TRUONG](#) (Assistant professor, Université Américaine de Paris)
- 2021-2020** **Master of Science, [Ecole Normale Supérieure Paris-Saclay](#), France.** Master Mathématiques Vision et Apprentissage (MVA), Highest honors.
- 2017-2016** **Master of Science, [Université Lyon 1](#), France.** Master on operational research and supply chain.
- 2017-2014** **Engineer diploma, [Ecole des Mines de Saint-Etienne](#), France.** Master on logistic and production management.
- 2014-2012** **Classe préparatoire, [Lycée Victor Hugo](#), Besançon, France.** MPSI/MP*

TEACHING

During my PhD and postdoctoral work, I served as a teaching assistant at ENS Paris-Saclay for a total of 150 hours (eq. TD), and as an instructor at Ecole Polytechnique and CentraleSupélec for 48 hours (eq. CM). Tables 1 and 2 describe the hourly breakdown and the course content is described below.

Table 1: Teaching per year. Hours in eq. TD (Assistant) and eq. CM (Teaching).

Year	Assistant	Teacher
24 – 25		48
23 – 24	51	
22 – 23	45	
21 – 22	54	
Total	150	48

Table 2: Teaching per level/topic. Teaching hours are underlined. Hours in eq. TD and hours in eq. CM.

Level/Topic	Statistic	Programming
L3	14	
M1	66	
M2	<u>24</u>	<u>24</u>
Agrégation	70	
Total	130 + <u>24</u>	<u>24</u>

- 2025

Statistic and probability refresher, Ecole Polytechnique, M2 data science, 24h eq. CM.
Designed and taught a refresher course covering measure theory, random variables, modes of convergence, parametric statistical models, point estimation, optimality, and hypothesis testing.
- 2025

Programming with python, Ecole CentraleSupélec, M2 Exed, 24h ep. CM.
Improved and taught a course on Python programming for machine learning. The class was interactive, combining practical and live coding sessions.
- 2021 - 2024

Introduction to statistic and machine learning, ENS Paris-saclay, M1, 66h ep. TD.
Led and designed the set of exercises and coding workshops covering statistics (estimation, optimality, testing, linear models) and machine learning (generalization bounds, SVMs).
- 2021 - 2024

Agrégation de mathématiques, option probability and statistic (option A) – Oraux blancs., ENS Paris-saclay, M2, 70h eq. TD.
Led practical sessions on sampling, convergence, estimation, linear models, and hypothesis testing. Served on the mock oral examination jury.
- 2022

Introduction measure theory and probability, ENS Paris-saclay, niveau L3, 14 eq. TD.
Led practical sessions covering random variables, convergence, and conditional expectations.

STUDENTS

PhD Student

- Valerio GUERRINI, 2024 - , co-supervised with Charles TRUONG and Laurent OUDRE, working on “Unsupervised approaches for constructing semantic summaries from physiological signals. Application to behavior analysis”. Already led to one publication:
Valerio Guerrmi, Thibaut Germain, Charles Truong, Laurent Oudre, and Paul Boniol. “Time Series Motif Discovery: A Comprehensive Evaluation”. In: *Proc. VLDB Endow.* 18.7 (Mar. 2025), pp. 2226–2239. ISSN: 2150-8097. DOI: [10.14778/3734839.3734857](https://doi.org/10.14778/3734839.3734857)

Master Students

- Valerio GUERRINI, M2 MVA, April–September 2024, co-supervised with Charles TRUONG and Laurent OUDRE, on “A benchmark for discovering recurrent patterns in time series”.
- Lucas HAUBERT, M2 MVA, April–September 2024, co-supervised with Chrysoula KOSMA and Laurent OUDRE, on “Shape-based loss functions for deep learning on time series”.

Undergraduate Students

- Romain DELAUNAY and Hugo GAIBLE, L3 ENS Paris-Saclay, April–June 2023, co-supervised with Alexandre BOIS and Laurent OUDRE, on “Convolutional dictionary learning for time series”.
- William RAMOS and Oussama ZEKRI, L3 ENS Paris-Saclay, April–June 2022, co-supervised with Laurent OUDRE, on “Optimal transport and elastic measures for time series”.

RESPONSIBILITIES

Seminar

- 2022 - 2024

"Panorama Recherche", ENS Paris-saclay.
Intended for incoming undergraduate students (L3) in the Mathematics Department. Its goal is to provide a broad overview of research in applied mathematics through presentations given by researchers from various fields. I was responsible for ensuring the smooth running of the seminar, welcoming and introducing invited speakers, and facilitating the discussion session.

Reviewer

- 2025

ICLR, NeurIPS (best reviewer awards), EJS (Electronic Journal of Statistics)
- 2024

NeurIPS

SOFTWARE DEVELOPMENT

All of my research projects have led to open-source Python implementations, available on my [GitHub](#). Several of these projects have been packaged into Python libraries or web applications, including:

1. **Interactive time series motif discovery:** A web application for discovering and visualizing motifs in time series. [\[link\]](#) [\[paper\]](#)
2. **Time series motif discovery library (TSMD):** A Python library for benchmarking time series motif discovery algorithms, including implementations of algorithms, datasets, and evaluation metrics. [\[link\]](#) [\[paper\]](#)
3. **Shape analysis for time series library (TS-PCA):** A Python package for unsupervised representation learning and principal component analysis of irregularly sampled time series with variable lengths, grounded in shape analysis methodology. [\[link\]](#) [\[paper\]](#)
4. **Ventilation behavior analysis tool:** A pilot project in online industrial data science, developed in collaboration with web developers. [\[paper\]](#)

TALKS

1. "Shape and operator embeddings of sequential data for machine learning" (INRIA Rennes, [MALT](#), November 2025)
2. "Spectral-Grassmann Wasserstein metric for operator representations of dynamical systems" (INRIA Saclay, [MIND](#), October 2025)
3. "Invariances and shape embedding for time series machine learning" (EDF R&D, May 2025)
4. "Detection and statistical analysis of temporal patterns" ([R&D Cognition Day](#), January 2025)
5. "Shape analysis and machine learning for time series" ([Duke University](#), July 2024)
6. "Persistence-based motif discovery in time series" ([Centre Borelli](#), June 2024)
7. "Linear-trend normalization for multivariate subsequence similarity search" ([ICDE 2024](#), May 2024)
8. "Interpretable classification of ventilation behaviors based on machine learning" ([Integrative Neuroscience and Cognitive Center \(INCC\)](#), January 2023)
9. "A method for clustering respiratory behaviors based on DTW distances between time series & how new tools enable rediscovery of data" ([Maths & Medicine](#), December 2022)
10. "Unsupervised study of plethysmography signals through DTW clustering" ([EMBC 2022](#), July 2022)

REFERENCES

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