

Thibaut GERMAIN

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Paris, France

RESEARCH INTERESTS

My research interests lie at the crossroads between geometry, shape analysis, and machine learning for time series. More precisely, I am interested in developing shape-based machine learning methods for time series with a particular focus on biomedical applications.

EDUCATION

- 2021 - now** **Ph.D., Centre Borelli, Ecole Normale Supérieure Paris-saclay, France.** Thesis focusing on Pattern detection and shape analysis for physiological time series. Supervised by [Laurent OUDRE](#) and [Charles TRUONG](#)
- 2020** **Master of Science, Ecole Normale Supérieure Paris-saclay, France.** Master Mathématiques Vision et Apprentissage (MVA), highest honors.
- 2017** **Master of Science, Université Lyon 1, France.** Master Operational Research and Supply Chain.
- 2017** **Master's degree, Ecole des Mines de Saint-Etienne, France.** Master in supply chain engineering.

POSITIONS

- 2024** **Visiting researcher, Duke University, Durham, NC (USA).** One month visiting.
- 2020** **Research volunteer, Centre Borelli, France.** Assisted [Argyris KALOGERATOS](#) for simulating COVID-19 dynamical propagation within a hospital department. Four months volunteering.
- 2017 - 2019** **Supply chain engineer, Tempest Tech Corp., Fresno, CA (USA).** Standardizing and optimizing operational activities. Overseeing research and development activities. Management support: supervising the production team, training, and hiring.
- 2017** **Supply chain intern, Airbus Helicopters, Marignane, France.** Modeling and optimizing the supply chain of the H160 during its research and development phase. Evaluating the supply chain robustness through a sensitivity analysis.

TEACHING

- 2021 - 2024** **Teaching assistant (TD/TP), Ecole Normale Supérieure Paris-saclay, France.**
- Mathematical statistics and machine learning, (Graduate course).
 - Statistics for the French exam "Agrégation de mathématiques", (Graduate course).
- 2022** **Teaching assistant (TD/TP), Ecole Normale Supérieure Paris-saclay, France.**
- Introduction to measure theory, integration, and probability, (Undergraduate course).

STUDENTS

PhD

- Valerio GUERRINI, 2024 - , co-supervised with [Charles TRUONG](#) and [Laurent OUDRE](#), on "Unsupervised approaches for constructing semantic summaries from physiological signals. Application to behavioral study".

Graduate

- Valerio GUERRINI, M2 MVA, April-September 2024, co-supervised with [Charles TRUONG](#) and [Laurent OUDRE](#), on "Benchmark for motif discovery in time series".
- Lucas HAUBERT, M2 MVA, April-September 2024, co-supervised with [Chrysoula KOSMA](#) and [Laurent OUDRE](#), on "Toward shape-based losses for deep learning on time series".

Undergraduate

- Romain DELAUNAY and Hugo GAIBLE, L3 ENS Paris Saclay, April-June 2023, co-supervised with [Alexandre BOIS](#) and [Laurent OUDRE](#), on "Convolutional dictionary learning".
- William RAMOS and Oussama ZEKRI, L3 ENS Paris Saclay, April-June 2022, co-supervised with [Laurent OUDRE](#), on "Optimal transport and elastic measures on time series".

TALKS

1. "Shape analysis and machine learning for time series", ([Duke University](#), July 2024).
2. "Persistence-based Motifs Discovery in Time Series", ([Centre Borelli](#), June 2024).
3. "Linear-trend normalization for multivariate subsequence similarity search", ([ICDE 2024](#), May 2024).
4. "Interpretable classification of ventilation behaviors based on machine learning", ([Integrative Neuroscience and Cognitive Center \(INCC\)](#), January 2023).
5. "Une méthode de regroupement des comportements respiratoires basée sur des distances DTW entre séries temporelle & Comment les nouveaux outils permettent de redécouvrir des données ?", ([Maths & Medecine](#), December 2022).
6. "Unsupervised study of plethysmography signals through DTW clustering", ([EMBC 2022](#), July 2022).

PUBLICATIONS

Journal papers:

1. Thibaut Germain, Charles Truong, and Laurent Oudre. "Persistence-based motif discovery in time series". In: *IEEE Transactions on Knowledge and Data Engineering* (2024)
2. Thibaut Germain et al. "Unsupervised classification of plethysmography signals with advanced visual representations". In: *Frontiers in Physiology* 14 (2023), p. 1154328

International conference papers:

1. Thibaut Germain et al. "Shape analysis for time series". In: *Advances in neural information processing systems* (2024)
2. Thibaut Germain, Charles Truong, and Laurent Oudre. "Interactive motif discovery in time series with persistent homology". In: *Joint European Conference on Machine Learning and Knowledge Discovery in Databases*. Springer. 2024, pp. 383–387
3. Thibaut Germain, Charles Truong, and Laurent Oudre. "Linear-trend normalization for multivariate subsequence similarity search". In: *2024 IEEE 40th International Conference on Data Engineering Workshops (ICDEW)*. IEEE. 2024, pp. 167–175
4. Thibaut Germain et al. "Unsupervised study of plethysmography signals through DTW clustering". In: *2022 44th Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC)*. IEEE. 2022, pp. 3396–3400

National conference papers:

1. Thibaut Germain et al. "Détection non supervisée de motifs sur séries temporelles". In: *2023 29ème Colloque Francophone de Traitement du Signal et des Images (GRETSI)*. 2023
2. Thibaut Germain et al. "Approches non-supervisées et non-linéaires pour l'analyse de signaux de pléthysmographie". In: *2022 28ème Colloque Francophone de Traitement du Signal et des Images (GRETSI)*. 2022

REFERENCES

1. [Laurent OUDRE](#)

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2. [Eric KREJCI](#)

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