

CentraleSupélec/LISN

Researcher Position

Machine Learning Research



Position Overview

We are excited to announce a researcher position in the [LUSIS-CentraleSupélec](#) chair at the [LISN](#) laboratory (Laboratoire Interdisciplinaire des Sciences du Numérique on the Plateau de Saclay). We are seeking a highly motivated and skilled researcher to join our team in the field of machine learning. The ideal candidate should possess a strong enthusiasm for advancing research in one or several topics of the chair: anomaly detection in tabular data, time-series forecasting, sequential decision under a non-stationary environment, causality, and knowledge discovery, coupled with a profound passion for artificial intelligence. This position offers an exceptional opportunity to contribute to cutting-edge research while collaborating with a dynamic team of experts.

Context

LISN: The Interdisciplinary Laboratory of Numerical Sciences LISN is a joint research unit of the CNRS, University Paris-Saclay (12th in the Shangai ranking), INRIA and CentraleSupélec. The five departments and 17 research teams cover themes at the heart of the digital sciences, which are interdisciplinary in nature: artificial intelligence and data science, human-machine interaction, automatic language and speech processing, and bioinformatics. With over 450 staff members (researchers, postdocs, PhD students), LISN offers a vibrant research environment and access to powerful computing resources (Paris-Saclay mesocentre and the Jean Zay supercomputer).

Lusis: LUSIS Payments is a global software and services provider specializing in mission-critical online transaction processing for the retail payments industry, renowned for its TANGO platform—a high-performance transaction processing engine. Demonstrating a strong commitment to research and development, LUSIS established an Artificial Intelligence department in 2017, focusing on machine learning and deep learning applications in payment fraud detection and trading strategies.

Lusis-CS chair: In 2020, LUSIS, CentraleSupélec, and the LISN laboratory joined forces by creating a research chair to strengthen their collaboration in the field of Artificial Intelligence applied to the banking domain and to global health.

Lines of research:

1. fraud detection in credit cards payments: anomaly detection on tabular data using deep learning methods, which is our major take at the moment [6], resilience of methods regarding the concept drift, from both the user point of view (change of habits) or the fraudster point of view (new fraud methods) [4], anomaly detection in dynamic graphs ;
2. algorithmic trading: time-series forecasting, portfolio optimization using reinforcement learning [1] and/or other methods, sequential decision-making in non-stationary environments [3] ;
3. global health: identification of causal relations in patients data linking microbiome analysis to various conditions [2, 5], knowledge extraction from medical literature, causal inference, and hypothesis testing.

LUSIS is strongly committed to translating AI research into real-world applications. Particularly for fraud detection, LUSIS provides access to a dataset of over 600 million payments. For health-focused research, there is access to thousands of patient records thanks to industrial partnerships.

Candidate Profile

- PhD in Artificial Intelligence / Machine Learning.
- Postdoctoral experience: must have completed at least one postdoc in machine learning.
- Publication track record: Demonstrated capacity to publish in top-tier conferences. Quality of work will be judged on a selection of your best publications.
- Strong technical skills: proficient in Python and standard ML frameworks (e.g., PyTorch, TensorFlow), experience with high-performance computing environments (Unix, SLURM) and GPU-based distributed computation.
- Soft skills: strong scientific writing abilities. A meticulous approach to research, with attention to detail and reproducibility.
- Versatility: Ability to tackle diverse research tasks, from anomaly detection to sequential decision problems and causal inference.

Responsibilities

- High-impact research: develop and advance methods in the directions mentioned above.
- Collaboration and supervision: work closely with peers, supervise graduate students, and support PhD researchers—especially in designing experiments and drafting research papers.
- Publishing research findings in top-tier machine learning conferences and journals (NeurIPS, ICML, ICLR, IJCAI).
- Practical implementation: contribute to the development and validation of research solutions.

What We Offer

Duration: 24 months to 48 months, starting as soon as possible. Please note it generally takes around two months to obtain clearance for access to the laboratory.

Salary: 30-45k€ commensurate with experience.

Affiliation: The candidate will be affiliated with the LISN of Paris-Saclay University. The candidate will also work with the LUSIS AI team.

Resources: Access to high-performance computing clusters (Jean-Zay super computer), GPUs, and other state-of-the-art resources.

Real-world Impact: Direct involvement with global banking and healthcare datasets, ensuring significant potential for industry applications.

Professional Growth: Opportunities to collaborate with leading researchers in the field and attend major conferences. Potential to secure a permanent role in the future.

Application Process

Materials: Cover Letter, Research Statement, CV including contact information for at least two referees, List of Publications.

Submit To: Application files must be sent to fabrice.popineau@lisen.upsaclay.fr, fabrice.daniel@lusion.fr, bichlien.doan@lisen.upsaclay.fr and arpad.rimmel@lisen.upsaclay.fr.

Constraint: The LISN laboratory is in a Restricted Regime Zone (ZRR). A favorable opinion from the HFSD (High Official for Security and Defense) is mandatory, and obtaining it can take up to 2 months.

Applications will be reviewed on a rolling basis until the position is filled.

References

- [1] Donghee Choi et al. "DeepClair: Utilizing Market Forecasts for Effective Portfolio Selection". In: *Proceedings of the 33rd ACM International Conference on Information and Knowledge Management*. CIKM '24. Boise, ID, USA: Association for Computing Machinery, 2024, pp. 4414–4422. ISBN: 9798400704369. DOI: [10.1145/3627673.3680008](https://doi.org/10.1145/3627673.3680008). URL: <https://doi.org/10.1145/3627673.3680008>.
- [2] Ricardo Hernández Medina et al. "Machine Learning and Deep Learning Applications in Microbiome Research". In: *ISME Communications* 2.1 (1 Oct. 6, 2022), pp. 1–7. ISSN: 2730-6151. DOI: [10.1038/s43705-022-00182-9](https://doi.org/10.1038/s43705-022-00182-9). URL: <https://www.nature.com/articles/s43705-022-00182-9> (visited on 02/21/2024).
- [3] Yong Liu et al. "Koopman: Learning Non-stationary Time Series Dynamics with Koopman Predictors". In: *Advances in Neural Information Processing Systems*. Ed. by A. Oh et al. Vol. 36. Curran Associates, Inc., 2023, pp. 12271–12290. URL: https://proceedings.neurips.cc/paper_files/paper/2023/file/28b3dc0970fa4624a63278a4268de997-Paper-Conference.pdf.
- [4] Yvan Lucas and Johannes Jurgovsky. "Credit card fraud detection using machine learning: A survey". In: *CoRR* abs/2010.06479 (2020). arXiv: [2010.06479](https://arxiv.org/abs/2010.06479). URL: <https://arxiv.org/abs/2010.06479>.
- [5] Mineto Ota et al. *Causal Modeling of Gene Effects from Regulators to Programs to Traits: Integration of Genetic Associations and Perturb-seq*. Jan. 24, 2025. DOI: [10.1101/2025.01.22.634424](https://doi.org/10.1101/2025.01.22.634424). URL: <https://www.biorxiv.org/content/10.1101/2025.01.22.634424v1> (visited on 01/26/2025). Pre-published.
- [6] Hugo Thimonier et al. *Beyond Individual Input for Deep Anomaly Detection on Tabular Data*. 2023. arXiv: [2305.15121](https://arxiv.org/abs/2305.15121) [cs.LG].