

Research Internship Positions on Graph Representation Learning and Applications

► **Research theme:** Machine learning on graphs

► **Keywords:** Graph representation learning, graph neural networks, graph generative models, biomedical applications

► **Research groups:** CentraleSupélec, Inria Saclay (OPIS team), Université Paris-Saclay, Télécom Paris, LTCI, Institut Polytechnique de Paris

► Advisors: Fragkiskos Malliaros (fragkiskos.malliaros@centralesupelec.fr) and Jhony H. Giraldo (jhony.giraldo@telecom-paris.fr)

► Starting date and duration: 5-6 months starting in Spring 2024 (April/May)

Context

We have open research internship positions in the broader field of graph representation learning and applications. Topics of interest, which also correspond to current research activities of the group, involve (but are not limited to):

- Development of Graph Neural Network (GNNs) architectures, focusing on expressiveness and scalability (e.g., [1,2]).
- Spatio-temporal graph-based learning for time-series analysis (e.g., [3]).
- Geometric GNNs for molecular/atomic systems (e.g., [4] and our recent survey article [5]).
- Self-supervised learning on graphs (e.g., [6]).
- Graph generative models (e.g., [7]).
- Graph representation learning for biomedical applications (e.g., [8,9]).

Candidate profile

We are looking for candidates:

- Currently pursuing an M2 in Engineering, Data Science, Computer Science, Applied Mathematics, Statistics, or equivalent, with a strong background in machine learning, deep learning, and interest in working with graphs (Graph Neural Networks).
- Have strong programming skills in Python (including PyTorch).
- Have good communication skills.

Team and location

CentraleSupélec and Télécom Paris are premier engineering schools in France and constituent members of Université Paris-Saclay and Institut Polytechnique de Paris, respectively. Both universities are consistently ranked among the best universities worldwide (Shanghai Ranking, QS Ranking). CentraleSupélec and Télécom Paris are located on the outskirts of Paris (around 45 minutes by train from the center of Paris) at the center of the Paris-Saclay cluster—a fast-growing research and industrial ecosystem. The internship positions are part of the ongoing project *GraphIA – Scalable and Robust Representation Learning on Graphs* funded by ANR (French National Research Agency). The students will be integrated either within the Centre for Visual Computing (CVN), a joint laboratory between CentraleSupélec and Inria Saclay, or the MM Team at LTCI lab.

How to apply

Please send your application material (pdf format; in English) by email to Fragkiskos Malliaros and Jhony H. Giraldo, including the following:

- A full CV.
- A motivation letter explaining your interest in the position (max 1 page).
- Transcript of records (grades).

The applications will be reviewed on a rolling basis until the positions are filled.

References

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- [6] Y. Liu, M. Jin, S. Pan, C. Zhou, Y. Zheng, F. Xia, and P. S. Yu, "Graph self-supervised learning: A survey," *IEEE Trans. on Knowl. and Data Eng.*, vol. 35, no. 6, p. 5879–5900, 2023.
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