ABBAHADDOU YASSINE

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abbahaddou.github.io

RESEARCH EXPERIENCE

University of Oxford April 2025 - Present
Visiting PhD Student
Supervisors : Xiawen Dong
- Universal Generalization Bound for Graph Neural Networks.

Ecole Polytechnique, CS Department September 2022 - Present
PhD candidate
Supervisors : Fragkiskos D. Malliaros , Johannes F. Lutzeyer
- Theoretical Foundations of Graph Neural Networks.

New York University May 2024 - August 2024
Visiting PhD Student
Supervisor : Prof. Amine Mohamed Aboussalah
- Graph Augmentation with Gaussian Mixture Models for Enhanced GNN Generalization.
- Dynamic Mode Decomposition-Based Metric for Evaluating Generative Models on Time Series.

Ecole Polytechnique, CS Department January 2022 - June 2022
Research Engineer
- Graph machine learning.

Naver Labs Europe April 2021 - October 2021
Research Intern
Supervisor : Jean-Michel Renders
- Deep exposure models for unbiased recommendation.

INRIA October 2020 - April 2021
Research Assistant,
Supervisor : Fragkiskos D. Malliaros
- Extension of deep learning algorithms to nonEuclidean data represented as Multilayer Networks (graphs).
- Application to the problem of graph-based multi-omics data integration in bioinformatics.

French National Center for Scientific Research - CNRS October 2018 - June 2019
Research Assistant,
Supervisor : Ludovic Goudenège & Gautier Viaud
- The study of Partial Differential Equation mixed with free boundary problems.
- Deep Learning algorithms for stochastic control problems on finite horizon in high-dimension.

Hedge Fund of La Française Group March 2020 - August 2020
Research Intern
- Optimal Control Algorithms for Long/Short Equity Trades in Variance Swap Pairs Strategies.

Societe Generale Corporate and Investment Banking September 2019 - February 2020
Exotic Equity Derivatives Trading/Research Intern
- Calibration of Stochastic Volatility models for pricing Exotic Equity Derivatives, e.g. Autocalls.
- Dynamic Hedging Optimization: An Optimal Control Approach.

EDUCATION

University of Oxford *April 2025 - Present*
Visiting PhD Student

Ecole Polytechnique *July 2022 - Present*
PhD in Graph machine learning.

Ecole CentraleSupelec Paris-Saclay *September 2017 - December 2022*
Master of Science and Bachelor of Science, Applied mathematics & Engineering.
High honors

MVA Master (Mathematics, Vision, Learning) - ENS Paris Saclay *September 2021 - December 2022*
Master's degree in Mathematics, Machine Learning and Computer Vision.
High honors

CPGE Moulay Youssef, MPSI - MP *September 2015 - September 2017*
An intensive program in Mathematics, Physics, Engineering science and Computer science.

PUBLICATIONS

Y. Abbahaddou, S. Ennadir, F. Malliaros, J. Lutzeyer, A. M. Aboussalah, and M. Vazirgiannis. Graph Neural Network Generalization With Gaussian Mixture Model Based Augmentation. In *The Forty-Second International Conference on Machine Learning (ICML), 2025*.

Y. Abbahaddou, S. Ennadir, J. Lutzeyer, and M. Vazirgiannis. Bounding the expected robustness of graph neural networks subject to node feature attacks. In *The Twelfth International Conference on Learning Representations (ICLR), 2024*.

S. Ennadir, **Y. Abbahaddou**, M. Vazirgiannis, and H. Bostrom. A simple and yet fairly effective defense for graph neural networks. In *The Thirty-Eighth AAAI Conference on Artificial Intelligence, 2024*.

Y. Abbahaddou, F. Malliaros, J. Lutzeyer, and M. Vazirgiannis. Post-Hoc Robustness Enhancement in Graph Neural Networks with Conditional Random Fields. arXiv: 2411.05399, 2024. Submitted to NeurIPS 2025.

S. Ennadir, **Y. Abbahaddou**, J. Lutzeyer, M. Vazirgiannis, and H. Bostrom. Adversarially Robust Graph Classification: A Pooling-Based Defense Framework. Submitted to NeurIPS 2025.

Y. Abbahaddou, A. M. Aboussalah. DMD-GEN: A Geometry-Aware Metric for Mode Collapse in Time Series Generative Models. arXiv: 2412.11292, 2024. Submitted to NeurIPS 2025.

K. Oublal, **Y. Abbahaddou**, S. Albergel, Malo Guichard, D. Benhaiem, E. Le Borgne. FOREMET: A Disentangled Variational Graph for Global and Regional Downscaling Meteorological Forecasting. Submitted to NeurIPS 2025.

Y. Abbahaddou, F. Malliaros, J. Lutzeyer, and M. Vazirgiannis. ADMP-GNN: Adaptive Depth Message Passing GNN. Submitted to CIKM 2025.

Y. Abbahaddou, F. Malliaros, J. Lutzeyer, and M. Vazirgiannis. Centrality Graph Shift Operators for Graph Neural Networks. arXiv: 2411.04655, 2024. Submitted to TMLR.

S. Ennadir, **Y. Abbahaddou**, M. Vazirgiannis, and H. Bostrom. A simple and yet fairly effective defense for graph neural networks. In *ICML 2023 Workshop AdvML-Frontiers*.

Y. Abbahaddou, J. Lutzeyer, and M. Vazirgiannis. Graph neural networks on discriminative graphs of words. In *NeurIPS Workshop: New Frontiers in Graph Learning, 2023*.

TEACHING

INF554 Course - Ecole Polytechnique *Machine and Deep learning.*
INF581A Course - Ecole Polytechnique *Advanced Deep learning.*

SKILLS AND LANGUAGES

Languages French, English, Arabic. **Skills** Python, R, JAVA, Matlab, SQL, VBA.

TALKS

GNNs & Generalization. *June 2025 at The University College of London.*
GNNs & Robustness. *April 2025 at The University of Oxford.*
GNNs & Robustness. *April 2024 at Technology Innovation Institute (TII).*
Theoretically Upper-Bounding the Adversarial Robustness of GNNs. *31th March 2024 at Morocco AI.*
Deep exposure models for unbiased recommendation. *October 2021 at Naver Labs Europe.*

ACHIEVEMENTS & AWARDS

Top 1% students in Morocco (Concours National Commun ranking 2017).
French Government's Major-Excellence Scholarship (37,830 €) [Given to the top 40 Students].
CIUP Merit Scholarship (5,000 €).
Research Grant from Institut Louis Bachelier (5,000 €).
NYU Visiting Research Scholarship (10,000 $).
BME International Experience Grant (5,000 €).
Participated in the Regional Mathematical Olympiad, Morocco.

EXTRA-CIRRUCULAR

Sport: Football, Mixed Martial Arts.
Interest: Photography.