Yacine Belal, PhD Candidate

yacine.belal@liris.cnrs.fr
Yacine Belal
0604001065
Troyes, France

Education

Jan. 2022 – June 2025 — **Ph.D. in Computer Science** — INSA Lyon & iExec Blockchain Tech
Thesis title: *Trustworthy Collaborative Learning: Personalization, Privacy, and Robustness at the Edge*
Advisor: Dr. Sonia Ben Mokhtar
Defended: June 10, 2025

Sep. 2019 – Sep. 2021 — **M.Sc. in Computer Science** — University of Western Brittany
Specialization: *Intelligent, Interactive, and Autonomous Systems*

Publications

Journal Articles

1. Y. Belal, S. Ben Mokhtar, H. Haddadi, J. Wang, and A. Mashhadi, "Survey of federated learning models for spatial-temporal mobility applications," *ACM Transactions on Spatial Algorithms and Systems*, vol. 10, no. 3, pp. 1–39, 2024. DOI: 10.1145/3666089.
2. Y. Belal, A. Bellet, S. B. Mokhtar, and V. Nitu, "PEPPER: empowering user-centric recommender systems over gossip learning," *Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.*, vol. 6, no. 3, 101:1–101:27, 2022. DOI: 10.1145/3550302.

Conference Proceedings

1. Y. Belal, M. Maouche, S. B. Mokhtar, and A. Simonet-Boulogne, "Inferring communities of interest in collaborative learning-based recommender systems," in *Proceedings of the IEEE International Conference on Distributed Computing Systems (ICDCS)*, To appear, 2025. URL: https://hal.science/hal-05007813.
2. S. Yadav, Y. Belal, B. Lagesse, and A. Mashhadi, "Benchmarking clustered federated learning algorithms for next-point prediction," in *Proceedings of the IEEE International Conference on Distributed Computing in Smart Systems and the Internet of Things (DCOSS-IoT)*, To appear, 2025.

Pre-Prints

1. Y. Belal, M. Maouche, S. B. Mokhtar, and A. Simonet-Boulogne, *Granite: A byzantine-resilient dynamic gossip learning framework*, 2025.
2. O. Touat, J. Brunon, Y. Belal, *et al.*, *Scrutinizing the vulnerability of decentralized learning to membership inference attacks*, 2024.

Research Experience

Oct. 2022 – June 2024 — **Intern Co-Supervisor** — INSA Lyon
- Supervised two Master's students on decentralized anomaly detection in ECG signals.
- Supervised one Bachelor's student on adversarial attacks in federated learning.

Jan. 2021 – Aug. 2021 — **Research Intern** — LIRIS Lab, INSA Lyon
- Implemented gossip learning algorithms for recommendation and sentiment analysis.
- Reviewed the literature on personalized federated learning.

Teaching Experience

2024-2025 **Network Programming**
Delivered 48 hours of lab sessions to 4th-year engineering students starting from October 2024. Topics included socket programming, client-server architectures, and practical network development in C.

2022–2024 **INSA Math Summer School: Algebra, Calculus & Probability**
Delivered 48 hours of foundational mathematics lectures across the 2023 and 2024 summer sessions for incoming first-year engineering students. Covered core topics in Linear Algebra, Calculus, and Probability.

2023-2024 **Stream Processing**
Delivered 20 hours of lab sessions to 5th-year engineering students in 2024. Covered concepts and tools for real-time data processing, including stream models, windowing, and frameworks like Apache Kafka and Flink.

2022–2023 **Cloud Computing and Big Data Applications**
Delivered 40 hours of lab sessions to fifth-year engineering students.
Covered: web scraping, data storage and processing in *AWS*, and data analysis/visualization with pandas.

2021–2022 **Privacy-Preserving Distributed Machine Learning**
Delivered 24 hours of lab sessions to fifth-year engineering students.
Covered: distributed architectures, federated learning, differential privacy, and data heterogeneity.

Technical Skills

Programming	Python, C++, CUDA, Java.
Machine learning Frameworks	Pytorch, Scikit-Learn.
Privacy Enhancing Technologies	Differential Privacy (TensorFlow Privacy, DP-SGD).
Collaboration tools	Git, Docker, Weights & Biases.

Miscellaneous

Notable Talks

Jan. 2025 **PEPR Cybersécurité Winter School** — Autrans, France
Title: *Byzantine Resilience in Dynamic and Sparse Gossip Learning*

Mar. 2024 **PEPR IA Workshop** — Grenoble, France
Title: *Byzantine Resilience in Gossip Learning*

Apr. 2023 **Atelier sur la Protection de la Vie Privée APVP 2023** — Besançon, France
Title: *Inferring Communities of Interest in Collaborative Learning-based Recommender Systems*

Sept. 2022 **IMWUT / UbiComp 2022** — Cambridge, UK
Title: *PEPPER: Empowering User-Centric Recommender Systems over Gossip Learning*

Certificates

- **Convex Optimization** - Imperial College London
- **Statistics with R** - Université Paris-Saclay
- **Getting Started with Accelerated Computing in Cuda C/C++** - NVIDIA

Languages

- Arabic (native), French (fluent), English (fluent)

References

Available on Request