

Yahya Aalaila

Machine Learning Researcher

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Google Scholar | GitHub | LinkedIn

Research profile

Machine learning researcher at DFKI with a background in applied mathematics. Research spans spatiotemporal event modeling, counterfactual reasoning in dynamical systems, and learning from imperfect labels. Develops methods and research software, designs experiments, and writes scientific papers.

Research experience

German Research Center for Artificial Intelligence (DFKI)

Data Science and its Applications, Kaiserslautern, Germany

Researcher (full-time)

Mar 2025–present

- Develop spatiotemporal point-process methods and experimental tools within the Eventful project, including context-aware forecasting and event-model evaluation.
- Lead research and implementation for Seahorse, a unified STPP benchmarking framework accepted at NeurIPS 2026, and HawkesNest, a synthetic benchmark for spatiotemporal patterns.
- Investigate environmental context for emergency medical service forecasting using AlphaEarth embeddings; accepted paper and presented poster at IJCAI-ECAI 2026 STRL.
- Research active relabeling and learning from imperfect labels, alongside ongoing work on context modulation and event-model interpretation.

Visiting researcher

Jun 2024–Feb 2025

Investigated the reliability of counterfactual reasoning in dynamical systems under chaos and uncertainty, leading to a *Scientific Reports* article. Developed the initial implementation for subsequent active-relabeling research.

Mohammed VI Polytechnic University (UM6P)

College of Computing, Benguerir, Morocco

Doctoral researcher

Jan 2022–Dec 2025

Research on kernel-based exploratory data analysis, semi-supervised clustering, and spectral dimensionality reduction, with applications to food security and precision agriculture. Doctoral studies ended following relocation to Germany; degree not completed. Funded by a full scholarship from Fondation Ibn Rochd pour les Sciences et l'Innovation.

Research intern

Apr–Sep 2021

Kernel-based learning for dimensionality reduction and classification.

Smart Data Analysis Systems (SDAS) Research Group

Benguerir, Morocco

Research assistant, Jan 2022–Jun 2024; **volunteer researcher**, Aug–Dec 2021. Collaborative research on mathematical formulations for machine learning and applications in agriculture and data analysis.

Technical skills and languages

Programming: Python, MATLAB, SciLab, R.

Languages: Arabic (native), English, French, Spanish.

Publications

Journal articles

- [1] Y. **Aalaila**, G. Großmann, S. Mukherjee, J. Wahl, and S. Vollmer. “Chaotic and complex dynamics expose the limits of counterfactual reasoning”. In: *Scientific Reports* 16, 16978 (2026). DOI.
- [2] M. Elhamdi, Y. **Aalaila**, E. M. Amhoud, and D. H. Peluffo-Ordóñez. “Heavy-Tailed Neighbor Retrieval Visualizer”. In: *IEEE Access* 14 (2026), pp. 67518–67534. DOI.
- [3] Y. **Aalaila**, I. Bachchar, H. Raki, S. Bamansour, M. Elhamdi, K. Benghzial, M. Ortega-Bustamante, L. Guachi-Guachi, and D. H. Peluffo-Ordóñez. “Joint Exploration of Kernel Functions Potential for Data Representation and Classification: A First Step Toward Interactive Interpretable Dimensionality Reduction”. In: *SN Computer Science* 5.1, 75 (2024). DOI.
- [4] H. Raki, Y. **Aalaila**, A. Taktour, and D. H. Peluffo-Ordóñez. “Combining AI Tools with Non-Destructive Technologies for Crop-Based Food Safety: A Comprehensive Review”. In: *Foods* 13.1, 11 (2024). DOI.
- [5] K. Benghzial, H. Raki, S. Bamansour, M. Elhamdi, Y. **Aalaila**, and D. H. Peluffo-Ordóñez. “GHG Global Emission Prediction of Synthetic N Fertilizers Using Expectile Regression Techniques”. In: *Atmosphere* 14.2, 283 (2023). DOI.
- [6] C. González-Castaño, Y. **Aalaila**, C. Restrepo, J. Revelo-Fuelagán, and D. H. Peluffo-Ordóñez. “Modelling of Proton Exchange Membrane Fuel Cells with Sinusoidal Approach”. In: *Membranes* 12.11, 1056 (2022). DOI.

Conference papers (published and accepted)

- [7] Y. **Aalaila**, G. Großmann, and S. Vollmer. “Seahorse: A Unified Benchmarking Framework for Spatiotemporal Event Modeling”. In: *NeurIPS 2026, Evaluations & Datasets Track*. Accepted; proceedings forthcoming. 2026. arXiv: 2607.01022.
- [8] M. Bajja, Y. **Aalaila**, A. C. Umaquina-Criollo, L. Guachi-Guachi, and D. H. Peluffo-Ordóñez. “Kernelized Extension for Multiple-Expert-Learning Classifiers Using Support Vector Machines”. In: *Intelligent Computing: Proceedings of the 2024 Computing Conference*. 2024, pp. 66–79. DOI.
- [9] M. Ortega-Bustamante, W. Hasperué, D. H. Peluffo-Ordóñez, D. Imbaquingo, H. Raki, Y. **Aalaila**, M. Elhamdi, and L. Guachi-Guachi. “Interactive Information Visualization Models: A Systematic Literature Review”. In: *Computational Science and Its Applications – ICCSA 2023*. 2023, pp. 661–676. DOI.
- [10] H. Raki, J. González-Vergara, Y. **Aalaila**, M. Elhamdi, S. Bamansour, L. Guachi-Guachi, and D. H. Peluffo-Ordóñez. “Crop Classification Using Deep Learning: A Quick Comparative Study of Modern Approaches”. In: *Applied Informatics – ICAI 2022*. 2022, pp. 31–44. DOI.
- [11] A. C. Umaquina-Criollo, J. D. Tamayo-Quintero, M. N. Moreno-García, Y. **Aalaila**, and D. H. Peluffo-Ordóñez. “Developments on Support Vector Machines for Multiple-Expert Learning”. In: *Intelligent Data Engineering and Automated Learning – IDEAL 2021*. 2021, pp. 587–598. DOI.

Workshop papers

- [12] Y. **Aalaila**, M. Elhamdi, G. Großmann, D. Jenson, E. Semenova, and S. Vollmer. “When Context Compensates for Sparse Event History: AlphaEarth for Spatio-Temporal Point-Process Forecasting”. In: *IJCAI-ECAI 2026 STRL Workshop*. Accepted workshop paper; poster presented. 2026. arXiv: 2607.01082.

Preprints

- [13] Y. **Aalaila**, S. Mukherjee, G. Großmann, and S. Vollmer. *HawkesNest: A Multi-Axis Synthetic Benchmark for Spatiotemporal Pattern Complexity*. Preprint. 2026. arXiv: 2606.16863.
- [14] Y. **Aalaila**, S. Bamansour, M. Elhamdi, and D. H. Peluffo-Ordóñez. *Semi Supervised NCC: Introducing Prior Knowledge To Normalized Cut Clustering*. TechRxiv preprint. 2023. DOI.

Education

MSc in Applied Mathematics

2019–2021

Cadi Ayyad University, Faculty of Sciences Semlalia, Marrakesh, Morocco. Specialisation: mathematical modeling of random phenomena.

BSc in Applied Mathematics

2015–2019

Cadi Ayyad University, Faculty of Sciences Semlalia, Marrakesh, Morocco. Specialisation: abstract algebra. Final-year research on integral transforms and fixed-point methods for differential equations.

Computer science exchange

Apr 2024–Mar 2025

RPTU Kaiserslautern-Landau, Germany.

Open-source research software

Seahorse. Unified framework for training, tuning, and evaluating spatiotemporal event models under a consistent experimental protocol.

github.com/YahyaAalaila/seahorse | [Documentation](#)

HawkesNest. Synthetic benchmark for controlled evaluation across different forms of spatiotemporal pattern complexity.

github.com/YahyaAalaila/HawkesNest

Teaching and supervision

Teaching assistant, UM6P College of Computing

Teaching assistance with Prof. Diego Peluffo for:

- *Advanced Topics and Seminars in Data Science: Time Series* (Sep–Nov 2023).
- *Deep Learning for Time Series Forecasting: An Introduction* (Sep 2022–Jan 2023).
- *Introduction to Digital Signal Processing* (Feb–May 2022).

Ongoing co-supervision. Student, Computer Science, RPTU Kaiserslautern-Landau (8 June 2026–present). Project: *Data-Driven Landslide Nowcasting Across Europe using Point Processes*. Co-supervisor providing regular research guidance.

Previous supervision. Student mini-projects and one final-year project at UM6P.

Selected presentations

Seahorse — NeurIPS 2026

Dec 2026 (*scheduled*)

Poster presentation, Evaluations & Datasets Track; in preparation.

AlphaEarth for spatiotemporal event forecasting

2026

Poster presented at the IJCAI-ECAI STRL workshop.

UM6P Doctoral Day

2023; 2022

Posters on unsupervised and semi-supervised spectral clustering (2023), and kernel-based formulations for exploratory data analysis (2022).

Support vector machines for multiple-expert learning

2021–2022

Keynote, WOMIS' club, Universidad Internacional del Ecuador (2022); talks at IDEAL and the UM6P Applied Machine Learning Seminars (2021).