

Dr. BLONDELLE MELINA ATSAFACK

Machine Learning Engineer | AI & IoT Research Engineer | Predictive Maintenance Specialist
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PROFESSIONAL SUMMARY

Machine Learning Engineer and AI researcher specializing in Industrial AI, IoT-enabled predictive maintenance, anomaly detection, and smart energy systems. PhD holder in Internet of Things and Embedded Computing Systems at the University of Rwanda – African Centre of Excellence in Internet of Things (ACEIoT). Experienced in developing AI-driven monitoring systems for hydropower plants using deep learning models, time-series forecasting, edge computing, real-time supervision frameworks, and industrial IoT architectures. Skilled in Python, machine learning, data analytics, cloud-connected systems, and industrial monitoring platforms for sustainable infrastructure applications.

CORE TECHNICAL SKILLS

- Programming: Python, SQL, MATLAB, Arduino, Raspberry Pi
- Machine Learning & AI: LSTM, LSTM Autoencoders, Deep Learning, Time-Series Forecasting, Anomaly Detection, Predictive Analytics
- Data Science: Data Preprocessing, Data Visualization, Industrial Data Analytics, Statistical Analysis
- IoT & Embedded Systems: Industrial IoT, Edge Computing, Sensor Integration, Remote Monitoring
- Industrial Systems: SCADA Fundamentals, PLC Fundamentals, RTU Systems, LabVIEW
- Cloud & Deployment: AWS Fundamentals, Flask, Heroku, Git/GitHub
- Tools: LaTeX, Microsoft Office Suite, Technical Documentation, Scientific Presentations

PROFESSIONAL EXPERIENCE

Data Scientist Researcher – Predictive Maintenance

Kavumu Hydropower Plant | Kigali, Rwanda | January 2024 – September 2025

- Developed AI-driven predictive maintenance and monitoring systems for hydraulic turbine operations.
- Designed real-time anomaly detection frameworks using deep learning models for industrial time-series data.
- Implemented IoT-enabled remote supervision systems for hydropower plant infrastructure.

- Integrated operational data streams into monitoring dashboards for performance analysis and fault detection.
- Performed industrial data analytics and visualization to support operational reliability and maintenance decision-making.
- Collaborated on sustainable energy research initiatives focused on smart infrastructure and digital transformation.

IT Assistant Lecturer

Inter-States University Congo-Cameroon | Sangmelima, Cameroon | March 2020 – September 2022

- Delivered lectures and laboratory sessions in programming, networking, and information technology.
- Introduced students to Internet of Things (IoT) systems and embedded computing applications.
- Supported curriculum development for technology-focused academic programs.
- Mentored students on technical projects involving software development and industrial technologies.

EDUCATION

PhD in Internet of Things – Embedded Computing Systems

University of Rwanda – African Centre of Excellence in Internet of Things (ACEIoT)
Kigali, Rwanda | September 2022 – July 2026

Visiting PhD Scholar

Worcester Polytechnic Institute (WPI)

Worcester, Massachusetts, USA | September 2024 – September 2025

Master of Science in Computer Science

University of Ngaoundere
Cameroon | 2017

SELECTED PROJECTS

- AI-Driven Predictive Maintenance for Hydropower Plants – Developed machine learning frameworks for anomaly detection and predictive maintenance using industrial turbine data.
- IoT-Based Remote Monitoring System – Designed cloud-connected and edge-based supervision architectures for hydropower infrastructure monitoring.
- Real-Time Industrial Monitoring Dashboard – Integrated operational data streams into visualization and supervision systems using Python and LabVIEW.

PUBLICATIONS

1. B. M. Atsafack, D. Juma, G. Rushingabigwi, and C. Kabiri, "LSTM Autoencoder-Based Real-Time Anomaly Detection for Univariate Hydraulic Turbine Time-Series Data," *IEEE Sensors Journal*, Early Access, 2026.
<https://ieeexplore.ieee.org/document/11552893>
2. Atsafack, B. M., Kabiri, C., & Rushingabigwi, G. (2025). A multi-model predictive framework for unsupervised anomaly detection in univariate time-series data from hydraulic turbine units. *Energy Reports*.
<https://www.sciencedirect.com/science/article/pii/S2352484725006997?via%3Dihub>
3. Atsafack, B. M., Kabiri, C., & Rushingabigwi, G. (2025). Predictive Maintenance for Hydraulic Turbine Units: A Comparative Deep Learning Approach Using IoT Data in Real Time. *IEEE Access*.
<https://ieeexplore.ieee.org/document/11153812>
4. Atsafack, B. M., Nzanywayingoma, F., Kabiri, C., & Rushingabigwi, G. (2024). Remote Monitoring of Micro-Hydropower Plants Using Python. *International Conference on Green Energy, Computing and Sustainable Technology (GECOST)*.
<https://ieeexplore.ieee.org/document/10475070>

AWARDS & HONORS

PASET Regional Scholarship and Innovation Fund (RSIF) PhD Scholarship – Awarded for research in ICT, Artificial Intelligence, and Renewable Energy Systems (2022).

LANGUAGES

French: Native/Fluent

English: Professional Proficiency