Modamori Oluwayomi

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Education

MSc, Environmental Science (Data Science Specialization) – Thompson Rivers University, Kamloops, BC (Graduated Feb 2025)

Thesis: Advanced Wildfire Prediction with Machine Learning: Leveraging Metaheuristic Optimization and Spiral Based Algorithm for Feature Selection.

Supervisors: Dr. Mohamed Tawhid & Dr Emad Mohammed

CGPA: 3.67/4.33

BSc, Computer Science & Math – Oduduwa University – Ile Ife, Osun State, Nigeria.

2014 – 2019

Coursework: Data Structure, Algorithms, Compiler Construction, Numerical Methods, Artificial Intelligence.

CGPA: Upper Second Class Standing

Final Year Project: Designed and implemented a simulation-based modelling system, integrating algorithms for process optimization and predictive analysis of system behaviors under varying constraints.

Research Interests

- Reinforcement Learning and Optimization for high-dimensional, real-world problems
- Large Language Models for simulation guidance and transfer learning
- Multi-fidelity simulation and physics-informed AI for autonomous systems and environmental modeling
- Metaheuristic algorithms and spiral-enhanced optimization for feature selection in imbalanced datasets
- Geospatial AI and risk prediction for climate resilience, wildfire forecasting, and public safety

Research Experience

Graduate Researcher – Thompson Rivers University (2022 – 2025)

- Developed wildfire prediction models across 8 Canadian provinces using XGBoost, Random Forest, and metaheuristic optimization (PSO, EVO), achieving 92% recall and 85% F1-score for high-risk zone detection.
- Designed spiral-enhanced variants of the Liver Cancer Algorithm (Euler, Fermat, Hyperbolic), benchmarked via Friedman tests, improving precision by 15% on imbalanced wildfire datasets.
- Preprocessed 1M+ geospatial records (ERA5 climate + NASA FIRMS fire detections) to enable province-specific wildfire risk assessment pipelines.
- Created interactive dashboards in ArcGIS Pro and Power BI for wildfire monitoring and emergency management.

- Authored manuscript, "Improved Energy Valley Optimizer for Wildfire Prediction" (in preparation for Environmental Modelling & Software), advancing province-specific RL benchmarks.
- Authored manuscript, "Spiral-Enhanced Liver Cancer Algorithm for Wildfire Feature Selection" (in preparation for Journal of Computational Science), improving sensitivity by 10% for robust transfer learning.
- Presented at TRU Graduate Colloquium (2024) and ENVS 5400 Seminar (2025), engaging academic and public audiences.

Research Assistant – Thompson Rivers University (2021–2022)

- Built CNN-based vegetation risk classifiers with ResNet/EfficientNet using NDVI, DEM, and MODIS data (85% precision).

- Supported cumulative impact monitoring project on contaminants, fish, and caribou in the Northwest Territories.

Professional Experience

Data Analyst – MTN Nigeria (2020–2021)

- Designed Power BI dashboards and SQL ETL pipelines, boosting data processing efficiency by 20%.

- Conducted time-series forecasting for network performance, improving operational planning.

Data Analyst Intern – ARM Pension Managers, Lagos, Nigeria (2018)

- Assisted in cleaning and analyzing pension fund datasets to support financial reporting and compliance.

- Built Excel-based dashboards to track client contributions and fund performance.

- Contributed to quarterly risk assessments, improving reporting accuracy by 15%.

Publications & Manuscripts

- "Improved Energy Valley Optimizer for Wildfire Prediction" – under review at Environmental Modelling & Software. Benchmarked EVO and spiral-enhanced variants across Canadian provinces, establishing region-aware prediction benchmarks.
- "Spiral-Enhanced Liver Cancer Algorithm for Wildfire Feature Selection" – under review at Journal of Computational Science. Demonstrated spiral-informed LCA variants improved sensitivity by 10% over traditional metaheuristics.
- **MSc Thesis**: Advanced Wildfire Prediction with Machine Learning: Leveraging Metaheuristic Optimization and Spiral-Based Algorithms for Feature Selection. Thompson Rivers University Library, 2025.

Presentations & Posters

- **5-Minute Thesis Presentation** – Thompson Rivers University Graduate Colloquium (2024) – Presented MSc research on wildfire prediction and metaheuristic optimization to a broad academic audience.

- **Outreach Poster: "Wildfire Prediction with Machine Learning"** – TRU Undergraduate Seminar (2024) – Designed and delivered an accessible poster presentation to undergraduate students.

- **Poster: "Improved Energy Valley Optimizer for Wildfire Prediction"** – TRU Graduate Research Day (2024).

- **Poster: "Spiral-Enhanced Liver Cancer Algorithm for Feature Selection"** – TRU Graduate Research Day (2024).

- **Research Contribution: "AI for Wildfire Risk Mapping"** – FIREBC Community Workshop (2024). Contributed poster/report materials for stakeholder engagement.

- **Research Competition Submission: "Integrated Monitoring of Aquatic Contaminants and Their Ecosystem Impacts on Fish and Caribou" –** Northwest Territories CIMP Meeting (2025). Prepared and submitted geospatial analysis report/poster as part of a competitive review process.

Skills

Machine Learning & AI: Large Language Model, Natural Language Processing (PyTorch, TensorFlow), Reinforcement Learning, Metaheuristic Optimization

Programming & Data: Python, SQL, MATLAB, Swift

GIS & Remote Sensing: ArcGIS Pro/Online, QGIS

Visualization & Tools: Power BI, Tableau, Matplotlib, Seaborn

Workflow: Git, Jupyter