Clément ADANDE

Data Scientist | ML & NLP Engineer | Numerician | Research Scientist | Full-Stack Dev | Teaching Assistant

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Profile

Passionate and detail-oriented AI and Mathematics professional with expertise in developing and deploying advanced machine learning models, numerical analysis, and web applications. Recipient of prestigious awards such as the Google DeepMind Scholarship and CEA-SMA Scholarship, demonstrating academic excellence in Artificial Intelligence and Mathematics. Experienced in research projects involving large language models, multilingual NLP, and finite element analysis. Proficient in Python, PyTorch, TensorFlow, FeniCS, Octave/MATLAB, and cloud platforms like Google Cloud, with a strong track record of collaborative research and problem-solving in both academic and hackathon settings. Actively seeking opportunities to apply cutting-edge technologies in solving real-world problems and driving innovation.

Honors and Awards

2024 **Google DeepMind Scholarship**
Awarded for academic achievement in Artificial Intelligence and Machine Learning.

2022–2023 **CEA-SMA Scholarship**
Awarded for academic excellence in Mathematics and its applications.

Oct 2023 **3rd Place, Fiscathon**
Participated in a hackathon organized by the Direction Générale des Impôts (Benin) and secured 3rd place by developing innovative solutions to tax-related challenges.

2017–2019 **DBSU Scholarship**
Awarded for academic excellence in Mathematics and its applications.

Education

Jan - Nov 2024 **Stellenbosch University, African Institute for Mathematical Sciences**, *South Africa*, Masters program - AI for Science (Fully-funded by **Google DeepMind**) link

Oct 2020 - Oct 2022 **University of Abomey-Calavi, Institute of Mathematics and Physic Sciences**, *Benin*, Masters in Fundamental Mathematics

2016-2019 **University of Abomey-Calavi, Faculty of Sciences and Technologies (FAST)**, *Benin*, Bachelors in Fundamental Mathematics

Skills

Programming	Python, C++, Bash
FEM Tools	FEniCS, Octave/Matlab
Cloud Service	Google Cloud Platform
Version Control	GitHub, HuggingFace
ML Libraries	Pytorch, TensorFlow, Pandas, Matplotlib, Seaborn
Web Development	HTML, CSS, WordPress, Django
Others	Streamlit, Google Colab, Kaggle, Rstudio, LaTeX

Research Projects

Jul - Oct 2024 **AI for Science Research Project**

Title: Multilingual Backpack Language Models, link

- Determine the effectiveness of Backpack Language Models (LMs) in a multi-lingual context
- Train a customized BPE tokenizer on Europarl and MultiUN corpora
- Write `Pytorch` scripts to train Backpack and GPT2 LLMs.
- Assess models' performance via perplexity, cloze task and lexical relationship task
- Create Virtual Machine on `Google Cloud Platform` for `Colab` and also general purpose.
- Use Cloud Shell to run Python scripts and Manage multiple terminal sessions one Cloud Shell window using the package `screen`.

Supervisor: Asst. Prof. Francois Meyer, *University of Cape-Town*

Aug - Oct 2022 **Numerical Analysis Master's Thesis**

Title: Non-conforming Finite Element Approximation for Some Evolution Problems and A-Posteriori Error Analysis

- Approximate the solution of heat equation and Stokes using the Backward Euler scheme in time and Crouzeix-Raviart finite elements in space.
- Bound and control the approximation error analysis by quantities independents to the exact solution named error estimators.
- Perform numerical test using Octave/Matlab to confirm the theoritical result.

Supervisor: Prof. Guy Degla, *Institut de Mathématiques et de Sciences Physiques (IMSP)*

Co-supervisor: Asst. Prof. Wilfrid Houedanou, *Faculté des Sciences et Techniques (UAC)*

Course Projects

May 2024 **Recommender systems based on collaboration filtering using Numpy**
Course project led by Prof. Ulrich Paquet, Director of AIMS South-Africa

Apr 2024 **Fine-tuning BLOOM-250M, a Hugging Face's LLM for question-answering task**
Course project led by Profs. Jan Buys and François Meyer, Assistant Professors at University of Cape-Town

Feb 2024 **Bird sound classification using CNN and Transfert learning with TensorFlow**
Course project led by Emmanuel Dufourq, head of Ecology Research Group at AIMS South Africa

June 2022 **Numerical Schemes and Optimization for PDE-Constrained Mass Transport**
Course project under Prof. Julien Salomon from Inria, focusing on discretization and optimization techniques implemented in Python.

June 2022 **Consistency, Stability, and Implementation of Higher-Order Numerical Schemes for the Heat Equation**
Course project under Prof. Bruno Després from Sorbone University, focusing on higher-order finite difference schemes for the heat equation, including theoretical analysis and Python implementation of numerical solutions.

Online Courses and Certifications

Nov 2024 **Kaggle**, *5-Day Gen AI Intensive Course with Google*, link

Aug 2024 **NVIDIA Deep Learning Institute**, *Building Transformer-Based NLP Application*, link

Jun 2024 **OpenAI**, *ChatGPT Prompt Engineering for Developers*, link

May 2024 **LangChain/Tavily**, *AI Agents in LangGraph*, link

Jul - Aug 2023 **Creating web site with WordPress**, *Tita Digital Skills by MTN Benin (link)*

Feb 2023 **Université de la Réunion**, *Mastering the bash shell*, link

Jul 2022 **Stanford University**, *Machine learning*, link

Jan 2021 **University of York**, *An Introduction to Deep Learning and Autonomous Systems*, link

Teaching Experience

Apr – May 2025 **Led Practical Sessions in Introduction to Python Programming**
For third-year undergraduate students in Mathematics, Computer Science, and Applications
Faculty of Science and Technology (FAST) – UAC

Mar 2025 **Led Tutorial Sessions in Numerical Simulation of Ordinary Differential Equations**
For third-year undergraduate students in Mathematics, Computer Science, and Applications
Faculty of Science and Technology (FAST) – UAC

Feb – Mar 2025 **Led Practical Sessions in Computer Tools and Statistics**
For first-year undergraduate students in the Physics and Chemistry program
Faculty of Science and Technology (FAST) – UAC

Feb 2025 **Led Tutorial Sessions in Partial Differential Equations**
For third-year undergraduate students in Mathematics, Computer Science, and Applications
Faculty of Science and Technology (FAST) – UAC

2016-2023 **Private Mathematics Tutors**, *Employed by parents of students*
Assisted high school students in improving their mathematics proficiency by providing customized methods to enhance their problem-solving skills.

Experience

Apr 2025 **Text Analyzer**, *École Mathématique Africaine (EMA) Bénin 2025*, link
Developed a simple text analyzer based on word counts to analyze and visualize text data, and generate a word cloud. The tool was created to help participants of EMA Bénin 2025 explore how AI can assist in understanding political discourse.

Feb 2025 **Forecast Sales Dashboard with Streamlit**, *Personal Project*, link
Developed a dashboard to forecast sales prices of a company based on a Kaggle dataset using Streamlit, Pandas and Prophet.

Jan 2025 **Prompting Claude AI – Automated Scheduling and Allocation System**, *Upwork*
Prompted Claude AI to generate a structured Excel-based scheduling and allocation system for a multi-day event with up to 450 participants per group, then developed a Python implementation to automate the process while ensuring compliance with complex constraints.

Jan 2025 **Develop a Django-based financial activity tracker web site**

Jan 2025 **Future Interns**, *Data Analyst Internship*

Dec 2024 **Multilingual and Zero-Shot Classification with Generative and Fine-Tuned LMs**, *Upwork*
Developed and evaluated multi-class classification models leveraging both generative LM (Mistral-7B-Instruct-v0.2) and fine-tuned transformer architectures (mBERT) on MARC dataset using English, French, German and Spanish.

2020-2022 **Editorial of the writing of the book "Les Annales de l'APMB, Série D, edition 2022"**, *Association of Mathematics Teachers of Benin (APMB)*
Typed the content of the book using LaTeX, collected contributions from various participants, and organized the structure and layout of the book.

2019-2020 **Mathematical course material for junior high school class**, *link*
Wrote course material using LaTeX for the mathematical curriculum in Benin, designed specifically for high school students in the scientific stream.

Schools and Conferences

Apr 2025 **Mathématiques, Sciences des données et Intelligence Artificielle: Enjeux et Défis**
Ecole Mathématique Africaine (EMA) Bénin
Université d'Abomey-Calavi (UAC) Bénin

Jul 2025 **Clinic on Meaningful Modeling of Epidemiological Data (MMED)**
South African Centre of Excellence in Epidemiological Modelling and Analysis (SACEMA)
African Institute for Mathematical Sciences (AIMS) South Africa

Scientific Communications

Apr 2025 **Physics-Informed Neural Networks (PINNs) for Numerical Simulation of Air Pollution in a Bounded Domain**, *Clément Adandé, Wilfrid Houedanou, Guy Degla*
Presented during EMA Bénin 2025

Jul 2024 **Modeling the transmission dynamics of influenza in a population subdivided into two groups using SEIRV models**, *S.K. Maswanganye, C.N.N Essuman, C. Adandé, T.N. Moropane*
During the MMED 2024 Workshop

Language Information

English Fluent (language of study in 2024) *Reading, writing, and speaking*

French Advanced (native) *Reading, writing, and speaking*

Volunteer Experience

March 2024 **Volunteer, Siyakhula Festival**, *African Institute for Mathematical Sciences (AIMS)*
Assisted with the logistic Event organised by AIMS for its 20th anniversary.

July 21st, 2021 **Teaching introduction to LaTeX**, *Institute of Mathematics and Physic Sciences (IMSP) link*
Assisted students in installing MikTeX, introduced them to the basic concepts of LaTeX, and guided them in writing their first document using LaTeX.

References

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Francois Meyer
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University of Cape Town
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