

# Zourkalaini Boubakar

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## EDUCATION

June 2023 – Present

**Sorbonne University**, Paris, France – *PhD candidate*

**Thesis:** "Machine Learning Research for Renewable Energy Forecast and Planning"

**Supervisor:** Professor Claire Monteleoni

**Lab:** ARCHES, INRIA-Paris

December 2020 – July 2022

**University Joseph Ki-Zerbo**, Ouagadougou, Burkina Faso - *Master of Science, Informatics for Climate Change: GPA: 17.59/20 (Rank 1<sup>st</sup>)*

A Master Research Program offered by the West African Science Service Center on Climate Change and Adapted Land Use (WASCAL) and funded by the German Federal Ministry of Education and Research (BMBF). The program aimed at training a critical mass of experts with adequate scientific computation and climate data management skills in West Africa.

**Thesis:** "Geo-temporal analysis of electricity consumption growth in Togo using deep learning"

**Relevant coursework:** Linux System Administration, High-Performance computing, Algorithms and Data Structures, Software Engineering, Spatial Data Analysis, Database Management Systems, Spatial Data Infrastructure, Climate Data Analysis, Modeling of Dynamics Complex Systems, Climate Modeling, Computing and Sustainability, Data Acquisition Techniques.

**Medium of Instruction:** English

**Other Activities:** Research Assistant, Mentoring

August - November 2020

**University of Cape Coast**, Cape Coast, Ghana - *English Proficiency*

An Advanced Intermediate Level Certificate offered by the Department of English in Partnership with WASCAL.

**Grade:** Listening (B), Speaking (B+), Reading (B), Writing (B+), and Grammar (A)

**Medium of Instruction:** English

October 2016 - December 2019

**University of Lomé, Ecole Polytechnique de Lomé**, Lomé, Togo - *Bachelor of Science in Computer Science: GPA 13.30/20 (Rank 3<sup>rd</sup>)*

**Dissertation title:** "Designing and implementation of an enterprise blockchain network"

**Relevant coursework:** Linear Algebra, Differential Calculus, Statistics and Probability, Operating Systems, Advanced Computer Systems Analysis and Design, Linux and System Programming, Computer Architecture and Technology, Database Administration, Algorithms and advanced programming, Networking and Security, Web Development, Software Design.

**Medium of Instruction:** French & English

**Other Activities:** Teaching Assistant (programming, Networking, and Security), Lead a Cybersecurity club.

September 2013 - July 2016

**College Chaminade Kara**, Kara, Togo – *High School Diploma (Baccalaureat Serie C)*

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**Major courses:** Mathematics and Physics

**Medium of Instruction:** French

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## EXPERIENCE

June 2023 – Present

**Institut National de Recherche en Informatique et Automatique (Inria)**, Paris, France – *Ph.D. Researcher in Machine Learning for Renewable Energy Forecasting and Planning*

**Team:** AI Recherche for Climate Change and Environmental Sustainability (ARCHES). ARCHES is an AI research project for Climate Change and Environmental Sustainability led by Professor Claire Monteoloni who is Choose France Chair in AI and a research director at INRIA Paris, and a computer science professor at the University of Colorado Boulder.

August 2022 – April

**WASCAL Competence Center**, Ouagadougou, Burkina Faso – *Research Assistant in Data Science and Artificial Intelligence*

**Team:** Data Management Department (DMD). DMD hosts and manages the WASCAL Data Infrastructure to deliver timely data services in support of the climate and environmental services provision and capacity-building programs of WASCAL.

**Activities:** Data management (Collection, Analysis, Modeling, etc.), App development, proposal writing, workshop training, conference organization, etc.

December 2021 – Jun 2022

**Electricity Company of Togo**, Lomé, Togo - *Graduate Research Assistant in Data Science*

- Investigation of the dynamics of electricity consumption in Togo over the last 30 years
- Predictive modeling of yearly residential electricity consumption using deep learning
- Development of an interactive data dashboard web application for the Dept. of Statistics.

December 2019 - July 2020

**MEGATRAM Sarl**, Lomé, Togo – *Computer Engineer*

- Software and hardware maintenance; Installation of computer equipment; network design and administration; configuration and security of routers; User Management; System Administration.

September 2019 - December 2019

**Atlantique Telecom Togo (Moov Africa)**, Lomé, Togo - *Undergraduate Internship in Networking and System Administration*

- IT Support: Users management and working domain, Server Backup, and Data Recovery, Users' computer hardware and application installation, configuration, security and maintenance, and network cabling
- Design and implementation of an enterprise blockchain network: A distributed database (based on blockchain technology) for sharing confidential documents.

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## PUBLICATIONS

**Peer-Reviewed Conference Proceedings**

**Geo-temporal analysis of electricity consumption growth in Togo**

2022 IEEE PES/IAS PowerAfrica Conference

**Z. Boubakar**, N. Williams, A. A. B. Diallo and Y. Lare

 **Best Paper Award of the Postgraduate Forum**

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## Peer-Reviewed Articles

*In preparation*

### Predictive modeling of electricity demand in Togo Using deep learning

Z. Boubakar *et al.*

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## RELEVANT SKILLS

- Data analysis and visualization with Python, and Dash (Proficient)
- Machine Learning with TensorFlow and Keras (Proficient)
- C/C++ programming language (Proficient), and Java, and Climate Modeling with the Weather Research and Forecasting (WRF) Model (Knowledgeable)
- High-Performance Computing (HPC) (Knowledgeable)
- Visualization and analyses of maps and geospatial information with QGIS (Knowledgeable)
- Excellent Scientific Research, and Writing ability
- Web Development with HTML, CSS, JavaScript, PHP, Laravel, Node.js, SQL
- Visualization and analysis of complex gridded datasets with Ferret and CDO
- Ability to quickly learn a new programming language
- Communication and Leadership

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## ACHIEVEMENTS AND AWARDS

- **Secured full funding to Participate in CITADEL AI & Application Summer School co-organized by the Virtual University of Burkina Faso and the University of Luxembourg, Koubri, Burkina Faso, September 2022.** Only 30 participants were selected among students and professionals in Data Science/AI in Burkina Faso. I was the only Togolese selected to participate. The summer school ended up with a hackathon on **Security challenges and the contribution of AI: Analysis of the security issues in Burkina Faso using heterogeneous data sources.**
- **Secured full funding to participate in the 2022 IEEE PES/IAS Power Africa Conference in Kigali, Rwanda, August 2022.**  
I was selected among less than 35 students globally to attend. **I submitted my first academic paper at this conference, and the paper won the best student paper award.**
- **West African Science Service Center on Climate Change and Adapted Land Use (WASCAL) Scholarship Recipient, Togo, 2020.**  
I was the only one selected from over 100 applicants from Togo who applied for the graduate program. I received a full scholarship.
- **Togo National Scholarship Recipient, University of Lomé, 2018/2019:**  
I was awarded this scholarship for excellent academic performance in the 2018/2019 academic year. It was a full scholarship.
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- **Togo National Scholarship Recipient, University of Lomé, 2016/2017:**  
I was awarded this scholarship for excellent academic performance in the 2016/2017 academic year. It was a full scholarship.
- **National Entrance Exam of Ecole Polytechnique de Lomé, University of Lomé, 2016:**  
I was selected among the 30 students from over 500 applicants who competed for the Bachelor in Computer Science. Ecole Polytechnique hosts the only national (public) Computer Science program in the overall country.

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## PROFESSIONAL TRAINING AND WORKSHOP

April 2022 – Present

**The International Environmetrics Society (TIES)**, Online, USA – *Webinar Series on Data Science for Environmental Sciences*

January – April 2023

**The Abdus Salam International Centre for Theoretical Physics (ICTP)**, Online, Trieste, Italy – *Workshop on Climate Data and Seasonal Forecast Analysis Techniques*

January - April 2023

**European Center for Medium-Range Weather Forecasts (ECMWF)**, online, University of Luxembourg Competence Center – *Online MOOC on Machine Learning in Weather and Climate*

January 2023

**MIT Introduction to Deep Learning**, Online, USA– *Yearly Bootcamp on fundamentals of deep learning*

December 2022

**WASCAL Science Symposium**, Ouagadougou, Burkina Faso

November 2022

**Computing Community Consortium (CCC) Catalyst**, Online, USA – *Virtual Climate Convergence Accelerator Workshop*

October 2022

**Kaggle**, Online MOOC– *Intermediate Machine Learning*

September 2022

- **Virtual University of Burkina Faso**, Koubri, Burkina Faso – *Summer School on Artificial Intelligence and Application*
- **NASA's Applied Remote Sensing Training (ARSET)**, Online, USA – *Selecting Climate Change Projection Sets for Mitigation, Adaptation, and Risk Management Applications*
- **NVIDIA GTC Workshop**, Online, USA

August 2022

**IEEE PES/IAS Power Africa Conference**, Kigali, Rwanda

June 2022

**National Center for Atmospheric Research**, online, USA – *Trustworthy Artificial Intelligence for Environmental Science (TAI4ES)*

January 2022

**WASCAL Competence Center**, Online, Ouagadougou, Burkina Faso – *Python and Microwave Links Processing Workshop*.

October - December 2021

**Oxford Climate Society, University of Oxford**, Online, UK – *Nine-week School of Climate Change*

October 2021

**WASCAL Competence Center**, Ouagadougou, Burkina Faso – *Workshop on Vegetation Mapping Using Google Earth Engine*

May 2021

- **WASCAL Competence Center & German Aerospace Center**, Ouagadougou, Burkina Faso – *Workshop on Satellite-based open data collection and processing on Google Earth Engine*
- **Institut Pierre-Simon Laplace (IPSL) Virtual Spring School**, Online, France – *Workshop on the Observation of the planet Earth, from space, airborne and surface instrumentation*

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April 2019

- **Agence National de le Security des Systemes d'Information (ANSSI)**, Online MOOC, France – *SecNum Academie - Module (Grade)*

Panorama de la SSI (82%), Securite de l'authentification (84%), Securite sur Internet (84%), Securite du Poste de Travail et Nomandisme (82%)

- **Cisco Networking Academy**, Online MOOC, USA – *Introduction to Cybersecurity - (Grade: 75%)*

Concepts and importance of cybersecurity – characteristics, and impacts of different types of attacks - how to protect yourself from cyberattacks - techniques used to protect organizations, the existing cybersecurity certifications

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## VOLUNTEERING AND LEADERSHIP

August 2022–Present

**IEEE Smart Village (ISV)**, – *Member of Africa Working Groups*

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## PROJECTS

December 2020 – November 2021

**West African Science Service Center on Climate Change and Adapted Land Use (WASCAL), University Joseph Ki-Zerbo**, Ouagadougou, Burkina Faso:

- **Computer Vision Modeling using Deep Learning**

Used Tensorflow/Keras (Python) to design and deploy a model for images classification tasks using Convolutional Neural Network.

- **Simulation of a hybrid model for a power grid system generating energy from photovoltaic panels, wind turbines, and hydropower**

Used Python programming language to design a hybrid model for efficient analysis, monitoring, estimation, and future prediction of power consumption in a smart grid system

- **Development of WASCAL Infrastructure Web Mapping Platform**

Used HTML/CSS/JavaScript to design an interactive Web App displaying WASCAL institutions, Graduate school programs, and related information in west Africa.

- **Earth Surface Temperature data processing using python and parallel programming, and Berkeley Earth Data for the period 1750-2022**

Developed a python program for retrieving the maximum, average, and minimum temperatures of any city by entering the name of the city as input. The program execution time is minimized using parallel programming.

- **Temperature forecasting using Deep Learning**

Developed a python program for forecasting temperature using different Recurrent Neural Networks architectures trained with the Jena climate dataset.

- **Pi Estimation using Monte Carlo Method**

Used C/C++ adopting the parallel programming technique to estimate the Pi value.

- **Review of the Monitoring, Reporting Verification (MRV) status of Togo's National Communications (NCs)**

Identified the major greenhouse gases covered in Togo's NC1, NC2, NC3, and NC4 and the methods used for their analysis in the national inventory. Verified per each NC the various MRV types: MRV of emissions, MRV of NAMAs, MRV of adaptation, and MRV of support.

- **The situational Analysis of Togo's Spatial Data Infrastructure (SDI), the stakeholders involved, and strategies for its sustainable development**

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Performed Strength, Weakness, Opportunity, and Threat (SWOT) analysis of the SDI in Togo and identified the various active stakeholders needed for the successful implementation of SDI, and suggested possible sustainable strategies

- **Projected Change in Temperature and Precipitation over West Africa between the period 1981-2010 and the period 2030-2059 using MIROC6 outputs data.**

Plotted maps of changes in temperature and precipitation over West Africa. Performed time-series/anomalies analysis of the trends to compare the present and future climate changes.

- **Spatial analysis of climate data, and climate signal and trend analysis over West Africa for the period 1901-2014.**

Computed the climatology and Plotted maps of temperature and precipitation over West Africa and analyzed the spatial variation of these variables. Analyzed the time series anomalies over the time frame of the study.

October 2016 - December 2019

**Ecole Polytechnique de Lomé, University of Lomé, Lomé, Togo**

- **Design and deployment of an enterprise Blockchain network**

Used Hyperledger Fabric framework to design a blockchain network for sharing confidential documents in a secured environment.

- **Design and implementation of Proxy server**

Designed and implemented a proxy server under a Windows Server environment as part of a tutorial project.

- **Implementation of various mathematical problems in a programming language**

Designed and implemented a proxy server under a Windows Server environment as part of a tutorial project.

- **Design and implementation of Stock management application**

Designed and implemented a stock management application using UML/Java/Java EE, and PHP/MySQL.

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## INTERESTS AND HOBBIES

- Research
- Reading Articles
- Teaching
- Learning and discovering new things
- Sport (Football)

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## LANGUAGES

**French** - Native or bilingual proficiency

**English** - Full professional proficiency