Kachinga **Silwimba**

Data Scientist | Machine Learning & HPC Specialist | Climate Modeling & Big Data Analysis Expert | Geospatial Analysis Expert

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Summary

Innovative and results-driven Data Scientist with over 3 years of experience leveraging machine learning, high-performance computing (HPC), and geospatial analysis to solve complex environmental and scientific challenges. Proficient in Python, TensorFlow, and PyTorch, with a proven ability to reduce computational overhead, improve predictive accuracy, and deliver impactful insights. Published author and presenter at international conferences with a strong commitment to advancing climate data science through interdisciplinary collaboration.

Technical Skills

Programming & Scripting	Python, R, MATLAB, Java, Bash, Scala, PySpark, Linux, SQL
Machine Learning & AI	TensorFlow, PyTorch, Keras, Scikit-learn, Deep Learning, Generative AI, Large Language Models
Big Data & Cloud Computing	Hadoop, Spark, AWS, Google Cloud, GPU Acceleration, HPC clusters
Climate & Scientific Tools	GIS, Xarray, Dask, NetCDF, Zarr, CLM5, WRF, CDO, NCO
Data Management & MLOps	GitHub version control, Docker, Singularity, CI/CD pipelines
Data Visualization & Analysis	Matplotlib, Cartopy, Holoviews, Plotly, Tableau, Microsoft Office suite
Software Eng. & HPC Opt.	Slurm job scheduling, memory management, load balancing, containerization for HPC environments
Model Interpretability	SHAP, Sobol, Fourier Sensitivity Analysis

Work Experience

Boise State University — *Boise, ID*

Graduate Research Assistant (Data Scientist) — *Aug. 2021 – Present*

- Accelerated model data analysis by leveraging Python, Xarray, and Dask on GPU-accelerated HPC clusters, significantly enhancing research.
- Improved model accuracy and reliability through Evidential Deep Learning for uncertainty quantification using PyTorch.
- Implemented Self-Organizing Maps (SOM) and Empirical Orthogonal Functions (EOF) workflows in Python and Dask, refining spatial climate pattern analysis and improving validation metrics.
- Facilitated cross-disciplinary collaboration with climate scientists, integrating Git and Docker to ensure efficient and reproducible workflows.
- Enhanced machine learning models by incorporating climate domain knowledge with TensorFlow, improving simulation accuracy.
- Disseminated research findings through peer-reviewed publications and international conference presentations, utilizing Matplotlib and Cartopy to advance climate data science.

William Averette Anderson Fund for Hazard & Disaster Mitigation Education & Research — *USA*

William Averette Anderson Fund Fellow (BAF Fellow) — *Sep. 2024 – Present*

- Enhanced disaster resilience expertise through focused training on grant writing, publishing, and community-engaged research.
- Established connections with disaster management leaders at national conferences and workshops.
- Gained insights into regional research and emerging trends through networking and professional development presentations.

NSF National Center for Atmospheric Research (NCAR) — *Boulder, CO*

Advanced Study Program Graduate Research Fellow (GVP Fellow) — *Mar. 2024 – Jun. 2024*

- Assessed Climate Land Model parameters using Python-based adaptive learning, significantly improving computational efficiency.
- Conducted detailed analysis of simulation datasets using Python and Xarray, contributing to improved land surface models.
- Facilitated the integration of advanced statistical methods into model evaluations through collaboration with a multidisciplinary team, enhancing prediction accuracy.

Oryx Energies Zambia Ltd — *Ndola, Zambia*

Data Analyst (Student Intern) — *Oct. 2018 – Nov. 2018*

- Analyzed petroleum product quality and supported research on energy market trends, informing strategic decision-making.
- Assisted in preparing reports and presentations based on research findings.

Education

Boise State University (BSU) — *Boise, ID*

Ph.D. in Computing (Data Science) — *Expected Fall 2025*

- Research Focus: Machine Learning for Climate and Hydrological Modeling with Emphasis on Uncertainty Estimation and Interpretability.

African Institute for Mathematical Sciences (AIMS) — *Kigali, Rwanda*

M.Sc. in Mathematical Sciences (Climate Science Major) — *Aug. 2020 – Jul. 2021*

- Thesis: Evaluation of CMIP5 and CMIP6 Models for Simulating Precipitation Extremes in Southern Africa.

Copperbelt University (CBU) *Kitwe, Zambia*

B.Sc. in Physics *May 2015 – Oct. 2019*

- Senior Project: Developed a Mechanical Valve Releasing Mechanism Utilizing Harmonic Motion Principles for Efficient Fluid Control.

Leadership

SIAM (Society for Industrial and Applied Mathematics) BSU Chapter *Boise, ID*

Vice President *Apr. 2024 - PRESENT*

- Increased member engagement by 30% through strategic initiatives.
- Organized seminars and workshops, facilitating networking opportunities for students with industry professionals.

LEAP (Learning the Earth with Artificial Intelligence and Physics) *NYC, NY*

LEAP Tier 2 Member *Jan. 2024 – Present*

- Collaborated on projects integrating physical models with AI for improved climate projections.
- Evaluated models against observational data, ensuring scientific integrity and improved prediction reliability.

SIAM (Society for Industrial and Applied Mathematics) BSU Chapter *Boise, ID*

Financial Officer *Dec. 2021 – Dec. 2023*

- Managed an annual budget exceeding $5,000, ensuring financial transparency and efficiency.
- Secured 20% additional funding through grants and sponsorships, supporting chapter initiatives.

CUPS (Copperbelt University Physics Society) *Kitwe, Zambia*

Co-Founder & Project Coordinator *May 2016 – Oct. 2019*

- As co-founder, initiated and led physics seminars, competitions, and outreach programs, resulting in over 1500 student engagements and a 40% increase in participation.
- Established partnerships with faculty and external stakeholders, securing resources that enabled successful event execution.

Certificates & Awards

Awards

2025	**AWWA PNWS Scholarship**, Pacific Northwest Section-American Water Works Association scholarship	*Vancouver, WA*
2025	**CESM Travel Award**, Community Earth System Model Tutorial	*Boulder, Co*
2024	**Bill Anderson Fund Fellow (2024)**, William Averette Anderson Fund	*USA*
2024	**ASP GVP Fellow**, NSF NCAR Advanced Study Program Graduate Student	*Boulder, Co*
2024	**SIAM Travel Award (AN24)**, Annual General Meeting Conferences	*Spokane, WA*
2024	**SIAM Travel Award (MDS24)**, SIAM Conference on Mathematics of Data Science (MDS24)	*Georgia, AT*
2021	**Graduate Merit-Based Gem Scholarship**, Financial Aid and Scholarships	*Boise, ID*
2021	**Graduate Assistantship**, Boise State University Grant Funding	*Boise, ID*
2021	**AIMS Masters Scholarship**, Mastercard Foundation Graduate Scholarship	*Kigali, Rwanda*
2015	**Government Scholarship on National Merit**, Copperbelt University Undergraduate Scholarship	*Kitwe, Zambia*

Certificates

2024	**NASA Open Science Certificate**, NASA's Transform to Open Science (TOPS)	*USA*
2024	**Responsible Conduct of Research**, CITI Program	*USA*
2024	**LEAP Momentum Bootcamp in Climate Data Science** , LEAP	*Manhattan, NY*
2023	**LeaderShape**, LeaderShape Summer Institute	*Cascade, ID*
2022	**CLM5 Point Simulations**, NSF NCAR Comunity Land Model version 5 training certificate	*Boulder, CO*
2022	**WRF Tutorial Training**, NSF NCAR Weather Research and Forecasting Model (WRF) training certificate	*Boulder, CO*
2020	**IBM Machine Learning**, IBM Digital - Nation	*USA*