

# 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

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

- 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

VICE PRESIDENT

Boise, ID  
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)

LEAP TIER 2 MEMBER

NYC, NY  
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

FINANCIAL OFFICER

Boise, ID  
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)

CO-FOUNDER & PROJECT COORDINATOR

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

### CERTIFICATES

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