

# Kachinga Silwimba

DATA SCIENTIST | MACHINE LEARNING & HPC SPECIALIST | EARTH SYSTEM MODELING & BIG DATA ANALYSIS EXPERT | GEOSPATIAL ANALYSIS EXPERT

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## Summary

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Innovative and results-driven Data Scientist with over four 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

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<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>	DVC, 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

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### Boise State University

Boise, ID

GRADUATE RESEARCH ASSISTANT

Aug. 2021 – Present

- Build end-to-end Python data pipelines (pandas, Xarray, Dask) with GPU acceleration to reduce model–simulation data processing time by 50%.
- Apply Evidential Deep Learning for uncertainty quantification (UQ) to improve prediction error by ~20%; document methods for reproducibility.
- Design and productionize Self-Organizing Maps (SOM) and Empirical Orthogonal Functions (EOF) workflows for spatiotemporal pattern discovery and classification, improving validation metrics by ~30%.
- Lead cross-functional collaborations and implement MLOps practices (Docker, Git, MLflow) to deliver versioned, containerized, and traceable experiments.
- Integrate domain knowledge into model architectures to enhance simulation fidelity and decision support.
- Publish peer-reviewed work and present to technical and non-technical audiences at international venues, translating complex results into actionable insights.

### NSF National Center for Atmospheric Research (NCAR)

Boulder, CO

CISL VISITING SCHOLAR (CVP)

Sep. 2025 – May 2026

- Serve in the Computational and Information Systems Laboratory (CISL) Visitor Program (CVP) to develop an evidential Community Land Model (CLM) emulator supporting Ph.D. research.
- Develop uncertainty-aware machine learning approaches for model emulation with an emphasis on calibration, validation, and scalable deployment.
- Coordinate cross-institutional milestones and knowledge transfer between NCAR and Boise State University.

### William Averette Anderson Fund for Hazard & Disaster Mitigation Education & Research

USA

WILLIAM AVERETTE ANDERSON FUND (BAF) FELLOW

Sep. 2024 – Present

- Engage in structured training on dissertation design, experimental design, grant/proposal development, scholarly publishing, and community-engaged research.
- Build professional networks with researchers and practitioners via national conferences, workshops, and mentorship.
- Expand knowledge of region-specific hazards and emerging practices through presentations and peer exchange at professional development events.

### NSF National Center for Atmospheric Research (NCAR)

USA

ADVANCED STUDY PROGRAM GRADUATE RESEARCH FELLOW

Mar. 2024 – Jun. 2024

- Assessed Community Land Model (CLM) v5 parameters using adaptive learning techniques, improving computational efficiency by 25%.
- Executed large-scale simulations on HPC systems and analyzed high-dimensional outputs to inform land-surface model refinements.
- Applied statistical methods and experimental design principles to model evaluation, enhancing prediction skill and reliability.
- Collaborated across disciplines to integrate advanced statistical techniques into evaluation pipelines.

## Education

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## **Boise State University (BSU)**

PH.D. IN COMPUTING (DATA SCIENCE MAJOR)

Boise, ID

Expected Fall 2025

- Research Focus: Artificial intelligence for earth system modeling with emphasis on uncertainty estimation and interpretability.

## **African Institute for Mathematical Sciences (AIMS)**

M.SC. IN MATHEMATICAL SCIENCES (CLIMATE SCIENCE MAJOR)

Kigali, Rwanda

Aug. 2020 – Jul. 2021

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

## **Copperbelt University**

B.Sc. IN PHYSICS

Kitwe, Zambia

May 2015 – Oct. 2019

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

# **Leadership & Extracurricular Activities**

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## **SIAM (Society for Industrial and Applied Mathematics) BSU Chapter**

VICE PRESIDENT

Boise, ID

Apr. 2024 - May 2025

- Increased member engagement by 30% through innovative chapter initiatives.
- Organized seminars and workshops featuring industry experts, connecting students with 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 a \$5,000+ annual budget, ensuring financial transparency and efficiency.
- Secured 20% additional funding through grants and sponsorships.

## **CUPS (Copperbelt University Physics Society)**

CO-FOUNDER & PROJECT COORDINATOR

Kitwe, Zambia

May 2016 – Oct. 2019

- Launched and led physics seminars, competitions, and outreach programs, engaging over 200 students and increasing participation by 40%.
- Partnered with faculty and external stakeholders to secure resources for successful event implementation.

# **Certificates & Awards**

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## **AWARDS**

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 Community Land Model version 5 training certificate	USA
2022	<b>WRF Tutorial Training</b> , NSF NCAR Weather Research and Forecasting Model (WRF) training certificate	USA
2020	<b>IBM Machine Learning</b> , IBM Digital - Nation	USA