# Kachinga **Silwimba**

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

*1910 University Drive, 83725, Boise, ID, USA*

☐ (+1) 208-831-0244 | ✉ kachingasilwimba@u.boisestate.edu | ⌨ kachingasilwimba | in kachinga-silwimba

## 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

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| **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

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| 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

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| 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* |