

# SARAH FOBI MENSAH

Bozeman, MT 59715-4998

[nanamafobi98@gmail.com](mailto:nanamafobi98@gmail.com) | [sfmensah.github.io](https://sfmensah.github.io) | [linkedin.com/in/sarahfobimensah/](https://linkedin.com/in/sarahfobimensah/)

## RESEARCH INTERESTS

High dimensional data analysis (particularly in health-related applications), functional data analysis, dimensionality reduction techniques, regression modeling and machine learning.

## EDUCATION

- Ph.D. Statistics**, GPA: 3.9 Expected: 12/ 2027  
Montana State University, Bozeman, MT
- M.S. Statistics**, GPA: 3.89 05/2024  
Montana State University, Bozeman, MT
- B.S. Actuarial Science**, GPA: 3.89 09/ 2021  
Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

## WORK EXPERIENCE

### Montana State University, Bozeman, MT

#### Graduate Researcher 08/2024 - present

- Conducted statistical analysis of microcalorimeter data to study chondrocyte heat generation toward improving knowledge of chondrocyte central metabolism.
- Applied a Generalized Least Squares (GLS) model to account for non-constant variance which helped to accurately assess the differences in total heat generation across cell groups.
- Led initial findings to a manuscript submission within 4 months and currently expanding the research through functional data analysis to examine heat generation curves over time.

#### Graduate Research Assistant 12/2023 – 05/2024

- Explored dimensionality reduction techniques, including sparse PCA, to enhance interpretation and analysis of high-dimensional metabolomics data for early osteoarthritis diagnosis.
- Investigated the potential of sparse contrastive PCA to reduce the dimensionality of metabolomics data, making it manageable, more interpretable and useful for identifying early molecular markers of osteoarthritis.

Osteoarthritis grant funded by National Institute of Arthritis and Musculoskeletal and Skin Diseases (1R01AR081489-01A1)

#### Statistical Consultant 1/2024 – 05/2024

- Applied statistical methodologies including mixed-effects models to assess survey responses and analysed the impact of a training called “Using Storybooks to Teach Children and Adults About Alzheimer’s Disease” organised by Montana State University Extension under the direction of my collaborators.
- Clearly communicated statistical methods and findings to clients which ensured transparency and lead to informed decisions for program recommendations and development.

### KPMG, Australia (Virtual)

7/2020 – 8/2020

#### Data Analytics Intern

- Identified data quality issues with the dataset presented by the Sprocket Central company and created visualizations to help the company better understand its customers.
- Used RMF (Recency, Frequency & Monetary) analysis to help the company determine which customers it should target to increase its revenue (by about 15%) and customer lifetime value.

## TEACHING

### Montana State University, Bozeman (MSU), MT

#### Graduate Teaching Assistant

08/2022 - present

- Provided instruction on data wrangling, visualization, and hypothesis testing while guiding students to perform statistical analysis and derive data-driven conclusions.
- Collaborated with students during lab sessions and office hours to clarify statistical concepts and guide effective use of R programming for assignments and projects.

#### Course Assistant

Spring 2025 – STAT 337 (Intermediate Statistics with Computing)

Fall 2024 – STAT 337 (Intermediate Statistics with Computing)

Fall 2023 – STAT 337 (Intermediate Statistics with Computing)

Spring 2023 – STAT 216 (Introduction to Statistics)

Fall 2022 – STAT 216 (Introduction to Statistics)

#### Instructor

Summer 2024 – STAT 216 (Introduction to Statistics)

#### Tutor

Fall 2022 – Math and Stat learning center (MSC)

### Kwame Nkrumah University of Science and Technology (KNUST), Kumasi, Ghana

#### Undergraduate Teaching Assistant

10/2021 – 07/2022

Spring 2022 – STAT 371 (Regression Analysis)

Fall 2021 – STAT 153 (Statistical Methods I)

## AWARDS AND SCHOLARSHIPS

Full PhD assistantship award, Department of Mathematical Sciences, MSU

08/2024

Master of Science in Statistics, Montana State University

05/2024

Fee waiver scholarship, Department of Mathematical Sciences, MSU

02/2024

Full MS assistantship award, Department of Mathematical Sciences, MSU

08/2022

Academic excellence scholarship recipient, Ghana Scholarship Secretariat

05/2021

## VOLUNTEERING & LEADERSHIP

Student mentor, Actuarial Science Student Association, KNUST chapter

09/2019 – 05/2021

Judicial Committee Chair, Actuarial Science Student Association, KNUST chapter

09/2020 – 08/2021

Deputy Finance Chair, Actuarial Science Student Association of Ghana

09/2019 – 05/2020

## PUBLICATIONS

### Accepted and published

Modeling of the Daily Dynamics in Bike Rental System Using Weather and Calendar Conditions:

06/2024

A Semi-Parametric Approach

- Proposed a robust method using penalized splines quasi-Poisson regression to model bike rentals, revealing hidden relationships not identified by traditional parametric models which informed future transportation strategies.

Predictive Analysis of Misuse of Alcohol and Drugs using Machine Learning Algorithms: The Case of using an Imbalanced Dataset from South Africa

03/2024

- Compared six supervised machine learning algorithms to predict alcohol and drug abuse across South Africa's nine provinces and proposed an optimal predictive model.

## Under Review

Chondrocytes Embedded in Agarose Generate Distinct Metabolic Heat Profiles Based on Media Carbon Sources

- Determined if three-dimensionally encapsulated chondrocytes are capable of heat production toward improving knowledge of chondrocytes central metabolism.

## CERTIFICATIONS

Biomedical Responsible Conduct of Research Course, CITI Program	01/2024
IRB Social and Behavioral Research, CITI Program	01/2024
Git, Simplilearn	11/2023
Data Visualization in R with ggplot2, LinkedIn	11/2021
The Data Scientist's Toolbox, Coursera	03/2021
SQL for Data Science, Coursera	12/2020
Excel/VBA for Creative Problem Solving, Part 1, Coursera	11/2020
Python Data Structures, Coursera	11/2020
Programming for Everybody, Getting Started with Python, Coursera	10/2020

## TECHNICAL SKILLS

**Programming Languages:** R Studio (Markdown, Quarto, Stan, JAGS, Shiny), Python, SAS

**Database:** SQL

**Project Management Tool:** Git/GitHub

**Statistical Methods:** Functional data analysis, Bayesian data analysis, regression modeling, spatial data analysis, experimental design

## PROFESSIONAL AFFILIATIONS & HONOR SOCIETY

### American Statistical Association

Member	03/2024
Participant, JSM Diversity Mentoring Program	08/2024

### Royal Statistical Society

Student member	01/2024
----------------	---------

### The Honor Society of Phi Kappa Phi

Member, Montana State University	01/2024
----------------------------------	---------