SARAH FOBI MENSAH

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RESEARCH INTERESTS

- Apply dimensionality reduction techniques to analyse high-dimensional data, with a focus on health-related datasets to enhance interpretability and reveal key patterns.
- Design and analyse clinical trials and observational studies, applying advanced statistical methods and machine learning techniques to optimize drug development, evaluate treatment outcomes, and enhance therapeutic strategies and patient care.
- Conduct statistical consulting and data science projects, using expertise in data analysis and machine learning to address complex problems and optimize processes across various domains.
- Explore innovative approaches in data science and machine learning to enhance predictive modeling and analytical capabilities, with applications ranging from healthcare to finance and engineering.

PROFESSIONAL EXPERIENCE

Statistical Consultant January 2024 – May 2024

- Determined the appropriate statistical methodology to assess quantitative survey responses.
- Analysed the effectiveness of storybook-based training on Alzheimer's disease education for children and adults, using a mixed-effects model.
- Collaborated with clients to discuss underlying assumptions and explain statistical procedures in an understandable manner to ensure clarity and transparency throughout the analysis process.

Graduate Research Assistant December 2023 – May 2024

- Investigated how sparse principal component analysis enhances the interpretability of principal components compared to traditional principal component analysis.
- Explored the strengths of sparse contrastive PCA, it's limitations and feasibility for reducing the dimension of high-dimensional metabolomics data to make them more interpretable and easier for analysis.

Funded by: National Institute of Arthritis and Musculoskeletal and Skin Diseases (1R01AR081489-01A1)

Research Assistant October 2021 - July 2022

- Assisted in constructing predictive models using six machine learning algorithms to classify alcohol and drug abuse based on risk factors across South Africa's nine provinces.
- Supported the development and validation of machine learning models to predict alcohol and drug abuse using an imbalanced dataset.

Data Analytics Intern
KPMG, Australia July 2020 – August 2020

- Identified data quality issues with the dataset presented by the Sprocket Central company and created visualizations to help the company better understand its customers.
- Analysed the company's dataset using RMF (Recency, Frequency and Monetary) analysis to help the company determine which customers it should target to increase its revenue and value.

EDUCATION

Ph.D. Statistics Expected 2027
Montana State University, Bozeman, MT

M.S. Statistics, GPA: 3.89 May 2024
Montana State University, Bozeman, MT

B.S. Actuarial Science, GPA: 3.89 September 2021
Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

TEACHING EXPERIENCE

Graduate Teaching Assistant, Department of Mathematical Sciences, MSU August 2022 – December 2023
Courses taught: STAT 216 (Introduction to Statistics), STAT 337 (Intermediate Statistics with R)

- Provided hands-on instruction with R software, teaching data wrangling, visualization, and interpretation, and guided students in performing statistical analysis and drawing data-driven conclusions.

TECHNICAL SKILLS

Programming Languages: R Studio (Markdown, Quarto), Python, SAS
Database: SQL

Project Management Tool: Git/GitHub
Statistical Methods: Regression analysis, Bayesian data analysis, Hypothesis testing, Experimental design

PROFESSIONAL ASSOCIATIONS

Member, American Statistical Association — March 2024 - present
Member, Royal Statistical Society — January 2024 - present

AWARD/ LEADERSHIP EXPERIENCE

Scholarship Awardee, Ghana Scholarship Secretariat — May 2021
Judicial Committee Chair, Actuarial Science Students' Association-KNUST Chapter — September 2020 – August 2021
Deputy Finance Chair, Actuarial Science Students' Association of Ghana — September 2019 – May 2020

PUBLICATIONS

Odoom, Christopher, Alexander Boateng, **Sarah Fobi Mensah**, and Daniel Maposa. "Modeling of the Daily Dynamics in Bike Rental System Using Weather and Calendar Conditions: A Semi-Parametric Approach." *Scientific African* (2024): e02211.

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

Boateng, Alexander, Christopher Odoom, Eric Teye Mensah, **Sarah Mensah Fobi**, and Daniel Maposa. "Predictive Analysis of Misuse of Alcohol and Drugs using Machine Learning Algorithms: The Case of using an Imbalanced Dataset from South Africa." *Appl. Math* 17, no. 2 (2023): 261-271.

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