Francis Biney

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Present position

Dept. of Mathematical Sciences, University of Texas at El Paso,Texas USA
Faculty   **Sept. 2013 - Present**
Teaching , grading homework and quizzes, proctoring exams and supervising student project.

- Statistical Methods
- Actuarial and Financial Mathematics
- Probability
- Calculus I, II & III
- Mathematics for Social Science

Research Interests

Statistical and Machine Learning, Data Science, Categorical data analysis, Time series analysis, Multivariate analysis, Stochastic Processes, Computational statistics, Mathematics and Statistics of financial Market.

Education

University of Texas at El Paso, El Paso, Texas USA
   M.Sc. Computational Science, August 2020

University of Texas at El Paso, El Paso, Texas USA
   M.Sc. Statistics, May 2012

Kwame Nkrumah University of Sc. and Tech., Kumasi, Ghana
   MPhil. Mathematics (Financial Mathematics), June 2010

Kwame Nkrumah University of Sc. and Tech., Kumasi, Ghana
   B.S. Mathematics (First Class Hons), May, 2005

Honors and Awards

KNUST: Dean's List of Distinguished Students, 2001-2005

Academic Experience

University of Texas at El Paso, El Paso, Texas USA
Research Assistant and Graduate Student   **Sept. 2010 - May 2012**
Tutoring student on mathematics and statistics, grading homework, quizzes and proctoring exams.

- Statistics
- Probability
- Calculus I, II & III

- Differential Equations

Reviewer
Handbook of Modeling High-Frequency Data in Finance, Wiley.

Kwame Nkrumah University of Sc. and Tech., Kumasi, Ghana
Instructor **Sept., 2008 - June, 2010**
Co-taught final year course, Mathematics of Financial Derivatives in Actuarial Science program. Shared responsibility for lectures, exams, homework assignments, and grades.

- Probability and Statistics   Sept. 2009 - June 2010.
- Quantitative methods for Business Student   Sept. 2008 - August 2009.

PUBLICATIONS
- Analyzing Medical Data Using Statistical learning models, *Mathematics,2021.*
- Study of volatility structures in Finance and Geophysics,*Handbook of Modeling High-Frequency Data in Finance, Wiley,2014.*
- Long Correlation Applied to the study of Memory effects in High-frequency (Tick)data *Handbook of Modeling High-Frequency Data in Finance, Wiley,2014.*
- Analysis of Generic Diversity in the Fossil Record, Earthquake series and High-frequency financial data, *Handbook of Modeling High-Frequency Data in Finance, Wiley,2013.*
- Pricing of Foreign Currency Options in a Developing Financial Market. *European Journal of Scientific Research, 2010.*

RESEARCH
MSc Thesis
Comparing predictive performance of Statistical learning models on medical data. This work investigates the prognosis of medical data including Breast cancer, Heart disease and Prostate cancer by using 10 Machine learning models. We use the models to identify risk factors that contribute significantly to these diseases. The models considered ranged from Logistic regression to Deep-feedforward neural network. The model selection and hyperparameter tuning were done using bias-variance tradeoff and cross-validation. The model's performance and generalization were improved for each method, by applying early stopping, dropout and removed non-significant variables to avoid overfitting. Different predictive performance measures were used including prediction accuracy, sensitivity and specificity depending on the nature of the response distribution and whether balanced or imbalanced to compare the models.

MSc Thesis
Study of volatility structures in Finance and Geophysics using GARCH models. We investigated the underlying volatility processes in high frequency (tick) data, earthquake series, explosive series and financial indices. We also examined the applicability of a range of GARCH specifications for modeling volatility of these series in order to identify similarities and differences in the volatility structures. The GARCH variants considered include the basic GARCH, IGARCH, ARFIMA (0,d,0)-GARCH and

FIGARCH specifications.

MPhil Thesis
Pricing of Foreign Currency Options in under Developed Financial Market. In the thesis an approach to the valuation of foreign currency options in an underdeveloped financial market was presented. This included the application of the GARCH model which resulted in the marginal volatility measure. Further, the pricing of basic foreign currency options in the local market was obtained from the marginal volatility measure. The Ghanaian financial market was used to illustrate the model.

PROFESSIONAL
EXPERIENCE

Center for Institutional Evaluation Research and Planning, University of Texas at El Paso, TX. (http://irp.utep.edu/cierp)

Summer Research Work   **June, 2012 - Aug. 2012**
Group Work : Developing peer groups for University of Texas at El Paso system to be used by the chancellor prior to peer reccommendation, which will serve as an analytic tool for budgeting, performance measurement and trend analysis.
Individual Work : Multivariate (Factor, Cluster, Discriminant) analysis for dimension reduction in variables, grouping of institutions and distinguishing among institution.
Work environment: R, SAS, Excel

Enhanced New Student Orientation, University of Texas at El Paso, TX.

Assistant supervisor   **June, 2012 - Aug. 2012**
Coordinate activities of instructors (teaching assistants) in mathematics workshop for freshers on Algebra through Calculus.

Internal Revenue Service, Statistics Department, Western Region, Ghana

Statistician   **Jan. 2006 - Sept. 2006**
Analyze daily revenue collected and write monthly report on collected revenue.

St. Mary's Boys' Senior High, Takoradi, Ghana

Teacher   **Sept., 2006 - August, 2008**
Teaches Mathematics, Physics, grade assignments, quizzes and proctor exams.

Self Employed, Kumasi, Ghana

Teacher   **Sept., 2008 - June, 2010**
Teaches Quantitative Analysis (Statistics and Probability) to Master of Business Administration (MBA) student from KNUST school of Business.

PROFESSIONAL
AFFILIATION

- American Statistical Association (ASA)
- American Mathematical Society (AMS)

PRESENTATIONS IN CONFERENCES	• AMS virtual meeting 2020 University of Texas at El Paso, September 2020.
	• Modeling High Frequency Data in Finance 2012 Stevens Institute of Technology New Jersey,July 2012.
	• Joint Statistical Meetings 2012 San Diego, California, July 2012.
	• 10th Joint UTEP/NMSU Workshop on Mathematics, Computer Science and Computational Sciences.
	• International Conference on Mathematics and its Applications, University of Ghana, Legon, Ghana. June 16-20, 2010.

COMPUTER SKILLS	• Statistical Packages: Competency in R, MATLAB, SAS, Minitab and SPSS.
	• Applications: LaTeX, MS Access, MS Excel, MS Word, MS Powerpoint.
	• Operating Systems: Windows, Mac OSX, Linux (Ubuntu).

REFERENCES

• Prof. Maria C. Mariani
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• Prof. I. K. Dontwi
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Kumasi- Ghana
e-mail: ikdontwi@hotmail.com/ ikdontwi@yahoo.com