Pascal Kingsley Kataboh

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SUMMARY

The primary focus of my research is to find out what role Hox genes play in colorectal cancer (CRC) by using mathematical modeling, machine learning and network analysis. My work has the potential to significantly advance cancer research and help those who are affected by CRC.

Education

- **University of Delaware** — Newark, DE
  PhD in Applied Mathematics; GPA: 3.8/4.0 — *Expected May 2025*

  Thesis:
  Modeling the Roles of Hox Genes in Colorectal Cancer (CRC) using Mathematical and Network Analysis.

- **University of Delaware** — Newark, DE
  Masters in Data Science; GPA: 3.9/4.0 — *Expected, May 2023*

- **Montana State University(transferred to UD)** — Bozeman, MT
  PhD in Applied Mathematics; GPA: 3.9/4.0 — *July 2019 - Aug 2020*

- **Ohio University** — Athens, OH
  Masters of Science in Mathematics; GPA: 3.63/4.0 — *May 2019*

- **University of Cape Coast** — Cape Coast, GH
  Bachelor of Science: Mathematics with Economics; GPA: 3.9/4.0 — *May 2016*

Research Interests

Primary Research Interests

◇ Application of mathematics in medicine, specifically focusing on developing mathematical models to understand the roles of the Hox gene in colorectal cancer (CRC).

◇ Machine learning and network models for large-scale medical data

◇ Development of algorithms for early cancer diagnosis and prognosis

◇ Statistical methods in evolutionary biology

◇ Deep and Reinforcement learning

Secondary Research Interests

◇ Heat transfer enhancement and dynamic behavior analysis in time

◇ Energy systems modeling and simulations.

Skills Summary

- **Languages**: Java, C++, Python, C, SQL, Unix scripting
- **Tools**: Kubernetes, Docker, Springboot, GIT, JIRA, Matlab, XCode, Postgres

Research Experience

- **University of Delaware** — Newark, DE
  Graduate Research Assistant — *Aug 2020 - Dec 2022*
  - ◇ Contributed to the drafting and publication preparation of a manuscript on cancer modeling
  - ◇ Performed bioinformatic analysis using gene expression data.
  - ◇ Assisted in *in silico* transcriptome sequence data analysis.
  - ◇ Used machine learning tools to analyzed gene(hox genes) expression data

Supervisors:
Dr. Gilberto Schleiniger, Dept of Mathematical Sciences, UD
Bruce Boman (MD, PhD), The Helen F. Graham Cancer Center and Research Institute, Christiana Care Hospital, DE

Research Projects/Capstones

- ◇ Used mathematical modeling to investigate the kinetic mechanisms that lead to development of stem cell overpopulation that drives tumor growth.
- ◇ Used deep learning to colorized images using *autoencoders*
- ◇ Implemented an image deblurring method using the SVD and GRMES techniques to restore the original details of blurred images with MATLAB.
- ◇ Completed a project on '*An Unconstrained Approach to Optimizing Similar Objective Functions'*, which involved utilizing optimization techniques to efficiently optimize related objective functions.
- ◇ Involved in a semester project on *'Ethical Theories for Big Data'*

PUBLICATIONS

- ◇ Augustine Kena Adjei, **Pascal Kingsley Kataboh**, Faustina Asante, Enoch Boyetey. A Binary Logistic Regression Analysis on the Factors Associated with High Blood Pressure and Its Related Heart Issues, Science Journal of Applied Mathematics and Statistics. Volume 10, Issue 3, June 2022, pp. 38-44.
- ◇ Augustine Kena Adjei, **Pascal Kingsley Kataboh**, Faustina Asante, Jonathan Gebechukwu Areji (2022); A Dummy Variable Regression Analysis of the impact of social media on university students' academic performance. A Case Study at the College of Arts and Sciences, the University of Alabama at Birmingham, USA; International Journal of Scientific and Research Publications (IJSRP) 12(5) 2250-3153
- ◇ Manuscript Under Review:" Title: Multi-Boiling Heat Transfer in Fins with Variable Thermal Conductivity and Internal Heat Generation: Developments of Universal Solutions using Homotopy Perturbation Method" Journal: Results in Engineering (Elsevier) Submission Date: December 2022
- ◇ Manuscript Under Review:" Title: Multi-Boiling Heat Transfer in Fins with Variable Thermal Conductivity and Internal Heat Generation: Developments of Universal Solutions using Differential Transformation Method" Journal: Power and Propulsion Research Submission Date: December 2022
- ◇ **Pascal Kingsley Kataboh** and Samuel Amihere."A comprehensive network analysis of the roles of Hox genes in colorectal cancer (CRC)" in progress.
- ◇ **Pascal Kingsley Kataboh** and Samuel Amihere."Investigating the roles of the Hox gene network using machine learning and stochastic simulation algorithms" in progress.
- ◇ **Pascal Kingsley Kataboh**, G.Schleiniger, and B. Boman."Modeling the link between the Hox genes and the Wnt , FGF, and retinoid pathways" in progress.

Recent Talks

- ◇ Jan. 2023 *Investigating the roles of the Hox gene network using machine learning algorithms* (U of Delaware Cancer Research Group, Newark, DE)
- ◇ Feb. 2023 *Abnormal cell division and modeling the interactions between different cell populations in the colonic crypt* (Hallenbeck Graduate Student Seminar (HGSS), Udel, Newark, DE)
- ◇ Nov. 2022 *Tissue Size as a Marker for a Transition Between Reaction-Diffusion Regimes in Spatio-temporal Distribution of Morphogens* (Hallenbeck Graduate Student Seminar (HGSS), Udel, Newark, DE)
- ◇ Sept. 2022 *Understanding and treatment of colon cancer through the integration of mathematical modeling and machine learning techniques* (U of Delaware Cancer Research Group, Newark, DE)
- ◇ Aug. 2021 *Navigating the Ethical Landscape: Exploring the Concerns Surrounding the Use of Cancer Data* (U of Delaware Cancer Research Group, Newark, DE)

Conference Participation

- ◇ Jan. 2023 *Special Seminar Series on Mathematical Data Science* (U of Delaware)
- ◇ Apr. 2023 *Collaboration Of Multidisciplines for Biomarker Testing; Implementation Needed for Effective Treatment and Decisions in mCRC (COMIBEND in mCRC)* (Washington DC)

◇ Feb. 2023 *National Cancer Institute (NCI) conference on "Variation to Biology: Optimizing Functional Analysis of Cancer Risk Variants"* (Virtual)

◇ Sep. 2022 *Sayas Numerics Day* (University of Maryland-Baltimore County, Baltimore, MD)

◇ Nov. 2022 2022 *Special Series on Applied Mathematics* (U of Delaware)

◇ Nov. 2021 *Graduate Students Forum* (U of Delaware)

Honors and Awards

- Selected in top 20 students for the Code House event organized by VMware in August15 - August17, 2016.
- Ranked first among batch of 60 students in my Computer Science Engineering Branch.
- Ranked fifth among batch of 500 students at High School Level A.I.S.S.E 2005