TEMITOPE O. BENSON

(406) 209-5114 • tbenson2@buffalo.edu • GitHub • LinkedIn • Buffalo, New York

EDUCATION

University at Buffalo, Buffalo, NY **In View**
Ph.D. Computational and Data-Enabled Science and Engineering
Research Assistant: Mathematical and Physics-Informed Machine Learning Models of Cancer Cells
Relevant Coursework: Deep Learning, Data-Oriented Computing 1 & 2, Applied Mathematics 2, High Performance Computing, Graph theory

Oklahoma State University, Stillwater, OK Transfer date: **Jan 2021**
Ph.D. Applied Mathematics GPA: 4.0 / 4.0
Research Assistant: Computational modeling of Cancer Cell Migration
Teaching Assistant: Linear Algebra, College Algebra (Taught the entire class)
Relevant Coursework: Machine Learning, Numerical Linear Algebra, Applied Mathematics, Applied Numerical Computing for Scientists and Engineers

Montana State University, Bozeman, MT **Aug 2017 - May 2019**
M.S. Mathematics. GPA: 3.81 / 4.0
Teaching Assistant: Contemporary Mathematics, Survey of Calculus, Calculus 1, 2 (Taught the entire class)
Relevant Coursework: Advance Linear Algebra, Abstract Algebra, Finite Volume Method, Topology, Numerical Analysis, Mathematical Biology, Numerical Linear Algebra and Optimization

University of Ibadan, Ibadan, Nigeria, **Jun 2015 - April 2017**
M.Sc. Mathematics.
Tutorial Assistant: Mathematics for Non-Major, Algebra, Calculus and Trigonometry (Assist the Prof. in charge)
Relevant Coursework: Functional Analysis, Commutative Algebra, Partial Differential Equation, Fourier Series, Mathematical modeling

University of Ibadan, Ibadan, Nigeria **Jan 2010 – May 2014**
BSc. Mathematics (First Class Honors) GPA: 6.1 / 7.0

RESEARCH INTERESTS

Artificial Intelligence and Data science, Mathematical modeling, Computational Biology, Cancer Metastasis, and Biomedicine

EXPERIENCE

University at Buffalo, Buffalo, NY **Jan 2021 – Present**
Graduate Researcher Assistant (under Prof. Ashlee Ford Versypt)
- Data wrangling, data visualization, and exploratory data analysis of large dataset for cancer cell migration using Python
- Validation of an in-silico model of biological system using experimental data
- Prepared materials for reports, presentations, and submission to peer-reviewed journal for publication

JP Morgan Chase & Co, Columbus, OH **Jun 2022 – Sep 2022**
AI & Data Science Summer Associate
- Using Deep learning, NLP, Computer vision, Reinforcement learning, Time series, cryptography to answer and explore business and research questions that are unique to JP Morgan Chases data assets and stakeholders.

Oak Ridge National Laboratory, Knoxville, TN **Jun 2021 – Aug 2021**
Graduate Researcher Intern (under Fan Junchuan)
- Data wrangling, data mining, data visualization, and exploratory spatial data analysis of large dataset for POI co-location/Motif mining for Land use classification using Geopandas, Gensim and Python packages
- Used Frequent itemset, association rule Algorithm (Market Basket Analysis) for rule mining
- Prepared reports, presentations, poster and writing an article for submission to peer-reviewed journal for publication

Oklahoma State University, Stillwater, OK **Aug 2019 – Jan 2021**
Graduate Teaching and Research Assistant
- Perform multiscale computational modeling and simulation using open source compucell3D
- Analyzed statistical data using both modern and traditional methods
- Plan and prepare lecture, grade and proctor in-class assignments, section work, quizzes and Examinations

Montana State University, Bozeman, MT **Aug 2017 – Jul 2019**

Graduate Teaching Assistant

- Plan and prepare lecture materials for undergraduate mathematics course
- Set, grade and proctor in-class assignments, section work, quizzes and Examinations
- Provide support to students in Math Learning Center and office hour

University of Ibadan, Ibadan, Nigeria **Jun 2015 – Apr 2017**

Tutorial Assistant

- Provide tutorial assistant to undergraduate taking first year undergraduate mathematics
- Serve as mentor to senior student in mathematics and prepare them for annual mathematics competition

ACADEMIC PROJECTS

Face Recognition, Face Detection and Masked Face Regeneration (Skills: **Python**, **Pandas, Requests, BeautifulSoup**) **May 2021**

- Constructed a face mask detection system utilizing SSD object Detection to detect people with/without mask
- Researched on approaches to regenerate masked regions of faces using GAN based image completion techniques
- Demonstrated a unique approach to regenerate masked face regions by using Image-Image cycle GAN model
- Researched on self-supervised method for face mask detection algorithm

Scrapping Chicago marathon results (Skills: **Python**, **Pandas, Requests, BeautifulSoup**) **Mar 2021**

- Used Requests and BeautifulSoup to scrap detailed information about the top 50 male runners and recorded the data in a pandas Dataframe

Baby Names (Skills: **Python**, **Pandas, Matplotlib, Seaborn, Choropleth**) **Mar 2021**

- Analyzed this dataset for useful insight of name diversity, name popularity, gender specificity, name history, neutral name popularity

MNIST with K-means (Skills: **Python**, **Scikit-learn**) **Mar 2021**

- Implement K-means algorithm to split MNIST images into 10 clusters, then used this cluster centroids to train and improve the prediction accuracy and speed of the K-NN algorithm

Recognizing digits with K-NN (Skills: **Python, NumPy, Matplotlib**) **Feb 2021**

- Developed K-NN algorithm from scratch using NumPy to train and predict MNIST digit with an accuracy of 93

K-NN and K-means Algorithm (Skills: **Python**, **Scikit-learn**) **Dec 2020**

- Implement K-NN and K-means algorithm from scratch to perform both supervised and unsupervised learning, clustering
- Compare accuracy and results of my model with the in-built scikit learn

Decision Tree, Naïve Bayes and CNN (Skills: **Python, NumPy, Matplotlib, Keras, Tensorflow**) **Oct 2020**

- Developed Naïve Bayes and Decision tree algorithm from scratch using NumPy to train and predict the price of house depending on the age, number of bedrooms, land areas et Cetra with an accuracy of 60
- Implemented convolutional neural network classification approaches using an architecture inspired by Le-Net in Keras on Cifar-10 dataset to classify images with an accuracy of 92

Neural Network Backpropagation (Skills: **Python**, **NumPy Matplotlib**) **Oct 2020**

- Designed and implemented neural network feed forward and backpropagation algorithm from scratch with an accuracy of 96

Linear and locally weighted linear Regression (Skills: **Python, NumPy, Matplotlib**) **Sep 2020**

- Created a random dataset of 50 examples that model a particular polynomial equation, fitted a linear regression to the data. Implemented a polynomial basis function with an order of 2, 3, then added noise to the data using normal distribution. Then created a locally weighted linear regression model using data without noise for training and data with nose for testing. The least square error decrease drastically, showing an improving in our model.

AWARDS AND HONORS

- University at Buffalo Foundation Scholarship **2021**
- **PhysiCell** Workshop and Hackathon Honorarium, Indiana University Bloomington **2021**
- **Sustainable Horizon Institute** travel Grant to attend SIAM CSE **2021**
- **Society of Mathematical Biology** Annual Conference meeting **2020**
- **Computing Research Association**- Underrepresented Minorities and People with Disabilities (CRA URMD) Grad Cohort Workshop **2018, 2019, 2020**
- **Certificate of Academic Excellence**, Montana State University **2019**
- **Meritorious Award,** Graduate School Montana State University (Decline) **2019**

- **MT** Peaks Affiliates sponsored by NSF **2018-2019**
- Recipient of **travel grant** to attend Numerical Analysis Day Conference in Lawrence, Kansas **2018,2019**
- Economic Community of West African States (ECOWAS) **Merit Scholarship** Award **2016-2017**
- University of Ibadan **Graduate Scholarship** for First Class Graduates **2015-2017**
- NNPC Total E&P **Merit Scholarship Award** **2011-2014**
- MTN Foundation **Scholarship Awards** **2010-2014**
- Faculty of Science **Deans Role of Honors** **2011-2014**
- **Participation Certificate** in the International Mathematics Competition in Blagoevgrad, Bulgaria **2014**
- **Nigeria Mathematics Competition** for University Students (Participation and Gold Medal Award) **2013**

TECHNICAL SKILLS

Languages: Python (NumPy, Pandas, Scikit-learn, Matplotlib, PyTorch, Tensorflow, Keras, Plotly, Seaborn, Requests, Beautiful Soup), SQL (ite), R, MATLAB, Compucell3D, Tellurium, Jupyter Notebook, Google Colab, LaTeX, Html, Geopandas, NLTK, Gensim, C++

Frameworks and Tools: Bitbucket, Gitlab, GitHub, AWS, OpenMP, MPI, Hadoop, Apache Spark, Cuda

Machine Learning: Regression, Classification algorithm, Clustering, PCA, SVM, Random Forest, Decision Modeling, Data Mining, Data Analysis, Neural Networks, CNN, DNN, GNN, Network Analysis, Unsupervised Learning, Recommendation systems

Certifications:Introduction to Data Science, Python for Data Science, NLP with Python, Machine Learning, PMP, DBMS

Operating Systems: Windows, MacOS, Unix/Linux

PRESENTATION AND ABSRACT ACCEPTANCE

- Ashlee N. Ford Versypt, Nguyen Edalgo, **T. O. Benson**: A multiscale agent-based in silico model of metastatic cancer cell migration through a Remodeling Extracellular Matrix at the Midwest Tumor Microenvironment Meeting Kansas City. **May 2022**
- **T. O. Benson**, Ashlee N. Ford Versypt: A multiscale agent-based in silico model of cancer cell migration and invasion phenotype at the Institute of Artificial and Data Science Day, University at Buffalo. **April 2022**
- O.A. Ishola, **T.O. Benson,** Javier Vilcaez: Insight from machine learning application to flow prediction in highly heterogenous porous media at the AAPG annual convention and exhibition (online) **May 2021**
- O.A. Ishola, **T.O. Benson,** Javier Vilcaez: Application of machine learning to predict hydraulic tortuosity of highly heterogenous porous media at the American Chemical Society (online) **Apr 2021**
- **T. O. Benson**, Ashlee N. Ford Versypt: Validation of an In Silico Model of Metastatic Cancer Cell Migration through a Remodeling Extracellular Matrix at the Systems Approaches to Cancer Biology Conference (online) **Nov 2020**

PUBLICATIONS

- M. O. Adeniyi, S. I. Oke, M. I. Ekum, **Temitope Benson,** M. O. Adewole**:** Assessing the impact of public compliance on the use of non-pharmaceutical intervention with cost-effectiveness analysis on transmission dynamics of COVID-19: Insight from mathematical modeling. Published. **2022**
- **T. O. Benson**, Ashlee N. Ford Versypt: Validation of an In Silico Model of Metastatic Cancer Cell Migration through a Remodeling Extracellular Matrix. Preprint. **2022**
- M.M. Ojo, **T.O. Benson,** Adenike Shittu, Emile Franc Doungmo Goufo: Optimal control and cost-effectiveness analysis for the dynamic modeling of Lassa fever. Published. **2022**
- M.M. Ojo, B. Gbadamosi, **T.O. Benson,** O. Adebimpe, A.L. Georgina: Modeling the Dynamics of Lassa Fever in Nigeria Published. **2021**