Kayode Olumoyin

Contact

kayode.olumoyin@moffitt.org
+1-813-745-4988

https://github.com/okayode
https://okayode.github.io

Education

- Ph.D., Computational Science, Middle Tennessee State University, Murfreesboro, Tennessee, **May, 2022.**
  Dissertation Topic: *Data-driven deep neural networks for epidemiological and biochemical models*
  Advisor: *Dr. Abdul Q. M. Khaliq*
- M.A., Computational and Applied Mathematics, Bowling Green State University, Bowling Green, Ohio, **August, 2016.**
  Advisor: *Dr. So-Hsiang Chou*
- M.A., Mathematics, Marshall University, Huntington, West Virginia, **May, 2013.**
  Dissertation Topic: *Solutions of dynamic equations on time scales with jumps*
  Advisor: *Dr. Bonita Lawrence*
- B.Sc., Mathematics, University of Agriculture, Abeokuta, Nigeria, **January, 2009.**

Research Interest

Data-driven Machine Learning and Deep Learning approach to Mathematical Oncology and Mathematical Biology, Agent Based Modeling, Infectious Disease Modeling, and Fractional Differential Equations Modeling.

Experience

- Applied Postdoctoral Fellow, Integrated Mathematical Oncology, Moffitt Cancer Center, Tampa, FL, **August, 2022 – Present.**
  Project: *Development of Adoptive T-cell Bladder Cancer Incorporating Patient-Specific tumor Microenvironment*
  Advisor: *Dr. Kasia Rejniak*
- Adjunct Faculty, Mathematics Department, Middle Tennessee State University, Murfreesboro, TN, **Fall, 2021 – Spring, 2022.**
- Adjunct Faculty, University Studies Department, Middle Tennessee State University, Murfreesboro, TN, **Fall, 2019.**
- Lecturer, University Studies Department, Middle Tennessee State University, Murfreesboro, TN, **Fall, 2016 – Summer, 2019.**
- Graduate Teaching Assistant, Mathematics Department, Bowling Green State University, Bowling Green, OH, **Fall, 2013 – Spring, 2016.**
- Graduate Teaching Assistant, Mathematics Department, Marshall University, Huntington, WV, **Fall, 2011 – Spring, 2013.**
- National Youth Service Corp **(volunteer program)**, Borno, Nigeria, **August, 2009 – July, 2010.**
- Student Industrial Work Experience Scheme (SIWES), National Universities Commission (NUC), Abuja, Nigeria, **February, 2008 – March, 2008.**

Awards

- Travel award to attend the inaugural Mathematical Oncology meeting in Spring 2023 (MATHONC23), April 30 – May 3, 2023, Phoenix, Arizona.

- Best presentation award at CBAS Graduate Research Showcase, February 5, 2021, Middle Tennessee State University, Murfreesboro, Tennessee.
- SIAM student travel award to attend 2020 SIAM conference on Mathematics of Data Science (MDS20), May 5 – 7, 2020, Cincinnati, Ohio.
- Winifred O. Stone Presidential Graduate Scholarship Award for Diversity Enhancement, 2013 & 2014, Bowling Green State University.
- First Position (Team), National Mathematics Competition for University Students (NAMCUS), 2008, Abuja, Nigeria.
- Silver Medalist (Individual), National Mathematics Competition for University Students (NAMCUS), 2008, Abuja, Nigeria.

Publications

- Olumoyin, K.D., Aydin, A.M., Bunch, B.L., Pilon-Thomas, S., Poch, M., Rejniak, K.A. A Machine Learning Protocol for Predicting Expansion of Tumor Infiltrating Lymphocytes in Patients' Bladder Tumors, (in preparation).
- Hu, A., Ojwang, A.M.E, Olumoyin, K.D., Rejniak, K.A. LinG3D: Visualizing the Spatio-Temporal Dynamics of Clonal Evolution, (under review), BMC Bioinformatics.
- Olumoyin, K.D. Data-driven deep Neural Networks for epidemiological and biochemical models, Ph.D. dissertation, Middle Tennessee State University, **2022**.
- Olumoyin, K.D., Khaliq, A.Q.M., Furati, K.M. Multi-variant COVID-19 model with heterogeneous transmission rates using deep neural networks. *arXiv:2205.06834v1* **2022**. https://doi.org/10.48550/arXiv.2205.06834
- Olumoyin, K.D, Khaliq, A.Q.M., Furati, K.M. Data-driven deep learning algorithm for Asymptomatic COVID-19 model with varying mitigation measures and transmission rate. *Epidemiologia* **2021**, 2, 471 – 489. https://doi.org/10.3390/epidemiologia2040033
- Olumoyin, K.D, Khaliq, A.Q.M., Furati, K.M. Data-driven deep learning algorithms for time-varying infection rates of COVID-19 and mitigation measures. *arXiv:2104.02603v3* **2021**. https://doi.org/10.48550/arXiv.2104.02603
- Olumoyin, K.D. Solutions of Dynamic Equations on Time Scales with Jumps, M.A. thesis, Marshall University, **2013**.

Professional Membership

- Society for Industrial and Applied Mathematics (Early Career Member)
- Society for Mathematical Biology (Standard Member)
- Pi Mu Epsilon (West Virginia beta)

Conference Presentations

- *An Early Determination of Patients Eligibility using a Data Science Approach.* **poster presentation**, 2023 AACR Special Conference: Translating Cancer Evolution and Data Science: The Next Frontier, Boston, Massachusetts, **December 03 – 06, 2023.**
- *Steering Cancer Extinction in Metastatic Breast Cancer Using an Integrative Toxicity Metric.* (I participated in the winning team - Purple team, where I contributed a deep learning based toxicity index prediction code using temporal tumor burden, lab tests and patient reported outcome data), IMO

Workshop 11: Steering Evolution/Extinction, Integrated Mathematical Oncology (IMO) Workshop, Moffitt Cancer Center, Tampa, Florida, **October 29 – November 3, 2023.**

- *A Machine Learning Protocol for Predicting Expansion of Tumor Infiltrating Lymphocytes in Patients' Bladder Tumors.* **poster presentation**, Moffitt Quantitative Science Octoberfest, **October 23, 2023.**
- *A Machine Learning Protocol for Predicting Expansion of Tumor Infiltrating Lymphocytes in Patients' Bladder Tumors.* 17th U.S. National Congress on Computational Mechanics, (USNCCM17), Albuquerque, New Mexico, **July 23 – July 27, 2023.**
- *ML-PETIL: A Machine Learning Predictor of the Expansion of Tumor Infiltrating Lymphocytes in Patients' Bladder Tumors.* **poster presentation**, 13th Annual Moffitt Scientific Symposium, **May 16 – 17, 2023.**
- *ML-PETIL: A Machine Learning Predictor of the Expansion of Tumor Infiltrating Lymphocytes in Patients' Bladder Tumors.* Inaugural Mathematical Oncology meeting, Spring 2023 (MATHONC23), Phoenix, Arizona, **April 30 – May 4, 2023.**
- *Mathematical Modeling of Adoptive Immunotherapy in B16 Melanoma: A Physics-Informed Machine Learning Approach.* Mathematics and Statistics Department Colloquium, Bowling Green State University, Bowling Green, Ohio, event held Virtually, **November 4, 2022.**
- *Cancer Cachexia: No time to waste.* (I was one of three podium presenters for the Blue team), IMOX: Cancer Communities, Integrated Mathematical Oncology (IMO) Workshop, Moffitt Cancer Center, Tampa, Florida, **October 31 – November 4, 2022.**
- *Physics-informed Attention Neural Network: Learning the dynamics of Partial Differential Systems with an attention-based model.* **Lightening talk** at Holistic Design of Time-Dependent PDE Discretizations, Topical Workshop held at ICERM, Providence, Rhode Island, **January 10 – 15, 2022.**
- *Data-driven deep learning algorithm for Asymptomatic COVID-19 model with time-varying transmission rate.* **poster presentation**, Modeling in a Heterogeneous World, XVIII Red Raider Mini-symposium, held at Texas Tech University, Lubbock, Texas, **August 20 – 21, 2021.**
- *Data-driven deep learning algorithms for COVID-19 time-varying infection rates and mitigation measures.* mini-symposium at SIAM Conference on Computational Science and Engineering, CSE21, event held Virtually, **March 1 – 5, 2021.**
- *Learning time-varying COVID-19 infection rate from data.* CBAS Graduate Research Showcase, Middle Tennessee State University, Murfreesboro, Tennessee, **February 5, 2021.**
- *The Marshall–Simpson Differential Analyzer Project: Mechanical Interpretations of Mathematical Equations* (co–presented with Dr. Bonita Lawrence and Molly Peterson), Simpson College, Iowa, **March 18, 2013.** `https://simpsoncollegemath.blogspot.com/`
- *Generalization of First Order Linear Differential and Difference Equations.* 40th Annual Mathematics and Statistics Conference, Miami University, Oxford, Ohio, **September, 2012.**

Conferences Attended

- *Cancer AI Research: Computational Approaches Addressing Imperfect Data.* National Cancer Institute, **April 03 – 04, 2023.**, (Virtual attendance)
- *Digital Twins in Biomedical Sciences Workshop.* National Academies, **January 30, 2023.**, (Virtual attendance)
- *SIAM Conference on Mathematics of Data Science (MDS22).* San Diego, California, **September 26 – 30, 2022.**, (Virtual attendance)
- *PDE Based Neural Network Approach Using Noisy Data in Facial recognition.* SIAM conference on Mathematics of Data Science (MDS20), Cincinnati, Ohio, **May 5 – 7, 2020.**

- MANNA (Modeling, Analysis and Numerics for Nonlocal Applications), Santa Fe, New Mexico, **December 11 – 15, 2017.**
- Informal Analysis Seminar, Kent State University, Ohio, **April 11 – 13, 2014.**
- 96th Annual Meeting of the Mathematical Association of America, Ohio Section, Spring 2012, Xavier University, Cincinnati, Ohio, **April, 2012.**
- The 31st Southeastern-Atlantic Regional Conference on Differential Equations, Georgia Southern University, Georgia, **September, 2011.**

Student Mentoring

- **Risheet Jajoo**, Student Intern, High School Internship Program - Integrated Mathematical Oncology (HIP-IMO), Moffitt Cancer Center, Tampa, FL, **June 5, 2023 – July 28, 2023.**
  Project Topic: *A Genetic Algorithm based Manifold Learning Feature Selection Approach using Bladder Cancer Patients Data*
- Student Athletics Enhancement Center, Middle Tennessee State University, Murfreesboro, TN, **Fall, 2019 – Spring, 2020.**

Programming Skills
Python, TensorFlow, Keras, PyTorch, R, FEniCS, C, MPI, Matlab, Mathematica