

Kayode Olumoyin

EDUCATION ○ **Ph.D.** Computational Science

Middle Tennessee State University, Murfreesboro, TN, 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, OH, 2016

Advisor: Dr. So-Hsiang Chou

○ **M.A.** Mathematics

Marshall University, Huntington, WV, 2013

Dissertation Topic: Solutions of dynamic equations on time scales with jumps

Advisor: Dr. Bonita Lawrence

○ **B.S.** Mathematics

University of Agriculture, Abeokuta, Nigeria, 2009

RESEARCH ○ Mathematical Oncology, Machine Learning, Deep Learning, Agent Based Modeling, Infectious
INTEREST Disease Modeling, Ordinary and Partial Differential Equations, Fractional Differential Equations, Numerical Partial Differential Equations.

- EXPERIENCE ○ **Applied Postdoctoral Fellow**, Moffitt Cancer Center 2022 – present
Project: Development of Adoptive T-cell Bladder Cancer Incorporating Patient-Specific tumor Microenvironment
Advisor: Dr. Kasia Rejniak
- **Adjunct Faculty**, Middle Tennessee State University 2021 – 2022
Mathematics Department
- **Adjunct Faculty**, Middle Tennessee State University Summer 2019
University Studies Department
- **Lecturer**, Middle Tennessee State University 2016 – 2019
University Studies Department
- **Graduate Teaching Assistant**, Bowling Green State University 2013 – 2016
Mathematics Department
- **Graduate Teaching Assistant**, Marshall University 2011 – 2013
Mathematics Department

PUBLICATIONS ○ REFEREED

- **Olumoyin, K.D.**, Aydin, A.M., Bazargan, S., 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.**, 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>

○ PREPRINTS

- **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.** Learning differential equations from data. *arXiv:2205.11483v1* **2022**. <https://doi.org/10.48550/arXiv.2205.11483>
- **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>

○ CONFERENCE ABSTRACTS

- Lawrence, B.A., **Olumoyin, K.D.**, Peterson, M.K. Solutions of dynamic equations on a sequence of converging time scales. AMS Fall Central Sectional Meeting, Washington University, St. Louis, Missouri, **October 18 – 20, 2013**. http://www.ams.org/meetings/sectional/2204_program_saturday.html

AWARDS ○ **MATHONC23:** Travel award to attend the inaugural Mathematical Oncology meeting, Phoenix, Arizona, April 30 – May 3, 2023

- **CBAS Graduate Research Showcase:** Best presentation award, Middle Tennessee State University, February 5, 2021
- **SIAM MDS20:** Student travel award, Cincinnati, Ohio, May 5 – 7, 2020
- **Winifred O. Stone Presidential Graduate Scholarship Award for Diversity Enhancement:** Bowling Green State University, 2013 & 2014
- **National Mathematics Competition for University Students (NAMCUS):** First Position (Team), National Mathematical Center (NMC), Abuja, Nigeria, 2008
- **National Mathematics Competition for University Students (NAMCUS):** Silver Medalist (Individual), National Mathematical Center (NMC), Abuja, Nigeria, 2008

CONFERENCE ○ Minisymposium

SESSION - Advances in computational modeling of novel tumor treatments, 2024 SIAM Conference on the Life Sciences

ORGANIZED

- CONFERENCE PRESENTATIONS
- *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*. 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**.
 - *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 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**.
- POSTER PRESENTATIONS
- *An Early Determination of Patients Eligibility using a Data Science Approach*, 2023 AACR Special Conference: Translating Cancer Evolution and Data Science: The Next Frontier, Boston, Massachusetts, **December 03 – 06, 2023**.
 - *A Machine Learning Protocol for Predicting Expansion of Tumor Infiltrating Lymphocytes in Patients' Bladder Tumors*, Moffitt Quantitative Science Octoberfest, **October 23, 2023**.
 - *ML-PETIL: A Machine Learning Predictor of the Expansion of Tumor Infiltrating Lymphocytes in Patients' Bladder Tumors*, 13th Annual Moffitt Scientific Symposium, **May 16 – 17, 2023**.
 - *Data-driven deep learning algorithm for Asymptomatic COVID-19 model with time-varying transmission rate*, Modeling in a Heterogeneous World, XVIII Red Raider Mini-symposium, held at Texas Tech University, Lubbock, Texas, **August 20 – 21, 2021**.

- WORKSHOPS
- *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.**
 - *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.**
- CONFERENCE 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.**
- PROFESSIONAL MEMBER-
- Society for Industrial and Applied Mathematics (Early Career Member)
 - Society for Mathematical Biology (Standard Member)
- SHIP
- Pi Mu Epsilon (West Virginia beta)
- SKILLS
- Python, TensorFlow, Keras, PyTorch, R, Julia, C, Matlab, Mathematica, Linux, MPI
- STUDENT MENTORING AND OUTREACH
- **High School Internship Program - Integrated Mathematical Oncology (HIP-IMO)**
 - **Risheet Jajoo**, Student Intern, 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*
 - **Great American Teach-In (GATI):** I gave a talk to kindergarteners titled “*Mathematics can improve Cancer outcomes*” at Sand Pine Elementary School, Pasco County Schools, FL, **November 15, 2023**
 - **Student Athletics Enhancement Center (SAEC)** Middle Tennessee State University, Murfreesboro, TN, **Fall, 2019 – Spring, 2020.**