

Raymond Lesiyon

Aurora Colorado -80011

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Research Interests

Areas of interest: Computational Biolgy, Natural Language Processing, Large Language Models, Protein Language Models, Knowledge Graphs, Network Analysis

Education

Michigan State University

East Lansing, MI

Master of Science in Computational Math Science and Engineering (CMSE), GPA - 3.94

2021-2023

- **Coursework:** Mathematical Foundation for Data Science, Numerical Linear Algebra, Data Mining, Statistical Genetics, Genomic Data Handling: Unix and Python, Genomics and Sequencing Analysis, RNA-Seq Data Analysis

Michigan State University

East Lansing, MI

B.Sc in Biosystems Engineering — Minor in CMSE, GPA - 3.92

2017-2021

- Graduated Magna Cum Laude
- MasterCard Foundation Scholar Program Recipient
- Dean's Honors List : Fall 2021 - Spring 2021
- MasterCard Foundation(MCF) Scholar Program Recipient, 2017
- **Coursework:** Bioinformatics and Computational Biology, Methods for Parallel Computing, Medical Microbiology

Research experience

Informatic Professional

2023-Present

UNIVERSITY OF COLORADO, ANSCHUTZ

Aurora, Colorado

Labs: JRaviLab, Department of Biomedical Informatics — CU Anschutz, **Wale Lab**, Department of Microbiology - MSU

Mentors: Dr. Janani Ravi, Dr. Nina Wale

Project 1: Evolution of Bacterial Traits in Relation to its host association and pathogenicity

- Optimized phylogenetic regression analysis with modular R code, speeding up 200+ model iterations and improving insights into bacterial traits and pathogenicity.
- Applied Akaike Information Criterion (AIC) for model selection improving accuracy, and reliability of evolutionary biology research
- Bootstrapped the modelling process to modelling results.

Project 2: MicroGenomeR: An R data package for standardizing and integrating bacterial data from diverse datasources

- Adapted Austraits multiple datasets integration pipeline to effectively harmonize 26+ microbial datasets into a central source with consistent units and trait values.
- Enabled efficient storing, and loading of microbial traits data at strain and species levels using memory-optimized file format: parquet and RDA.

Technical Aide

Jun 2021- Aug 2021

MICHIGAN STATE UNIVERSITY

East Lansing

Labs: Steibel Juan Lab, Department of Animal Science, MSU

Mentors: Dr. Steibel Juan

Project: Hyperparameter tuning for Long short-term memory (LSTM), model trained on Detecting Agonistic Behavior of Pigs in a Single-Space

- Leveraged Slurm workload manager for running LSTM deep learning algorithms on high-performance computing clusters, achieving optimized resource utilization and computational efficiency.
- Performed hyper-parameters tuning for LSTM model enhancing model performance on classifying agonistic pig's behaviors.

Biosensor Intern

Jun 2019- Aug 2020

FRAUNHOFER USA INC.

East Lansing

Mentors: Dr. Suzanne Witt

Project: Immobilizing antibodies into Boron-doped diamond surface for detecting COVID-19 spike protein

- Designed and implemented a data visualization dashboard with Tkinter and Pandas, streamlining the analysis of data from 37 biosensor fabrication experiments and enhancing decision-making.
- Functionalized antibody biosensor using N-hydroxysuccinimide (NHS) immobilization technique to boron-doped diamond surface for the purpose of detecting COVID-19 spike protein.
- Involved in testing immobilized antibody biosensors using electrochemical impedance to ascertain the binding of COVID-19 spike protein.

Undergraduate Research Assistant

Jun 2019- Aug 2020

MICHIGAN STATE UNIVERSITY

East Lansing

Labs: MIDI Lab, Department of Biomedical Engineering, MSU

Mentors: Dr. Adam Alessio

Project: Classification of ovarion torsion using machine learning with radiological features

- Performed ovarion torsion classification with radiological features using decision trees classifiers, random trees, and logistic regression through Sci-kit learn
- Employed ROC curve, accuracy, specificity, and sensitivity metrics to evaluate models performance on ovarion torsion.

SKILLS

Programming Languages: Python, R, Matlab, C++

Computational tools: Unix/Linux, Git, High-performance computing clusters

Methodologies: Regression, dimensional reduction - Principal Component Analysis(PCA), data analysis & visualization - tidyverse, ggplot, pandas

Publications

1. bacteria-traits in-preparation
2. microgenomeR in-preparation
3. Junjie Jan, Janice Siegford, Dirk Colbry, **Raymond Lesiyon**, Anna Bosgraaf, Chen Chen, Tomas Norton, Juan Steibel. Evaluation of Computer Vision for Detecting Agonistic Behaviour of pigs in a Single-SpaceFeeding Stall Through Blocked Cross-Validation Strategies. 10.2139/ssrn.4098711
4. Suzanne T Witt, Alexis Rogien, Diana Weiner, James R Siegenthaler, **Raymond Lesiyon**, Noelle Kurien, Robert Rechenberg, Nina Baule, Aaron Hardy, Michael Becker. Boron doped diamond thin films for the electrochemical detection of SARS-CoV-2 S1 Protein. 10.1016/j.diamond.2021.108542

Presentation

Research and Technical Talks.....

- **July 24: Bioc2024 International Conference**, microgenomeR an R data package for aggregating microbial phenotypic, & genotypic trait.

Val Andel Institute, Grand Rapids Michigan

Posters.....

- **Aug 24: CU Anschutz Department of Biomedical Informatics Retreat**, Are (bacterial) pathogens special?
Aurora, CO
- **June 24: Quantitative Cell & Molecular Biology Symposium**, Are (bacterial) pathogens special?
Colorado State University, Fort Collins, CO
- **April 24: American Society of Microbiology Rocky Mountain Branch**, Are (bacterial) pathogens special?
University of Colorado Boulder, Boulder, CO

Teaching experience

Graduate Teaching Assistant

Aug 2021- Fall 2023

MICHIGAN STATE UNIVERSITY, *Department of Computational Math Science and Eng.*

East Lansing

CMSE 802: Methods in Computational Modeling

CMSE 202: Computational Modelling and Data Analysis II

Academic Tutor

Fall 2019- Fall 2021

MICHIGAN STATE UNIVERSITY, *College of Engineering*

East Lansing

- Tutored STEM students in calculus and physics, providing guidance and support in their coursework

Service and Leadership

Educational Support Initiative

Aug 2023

KOKWA ISLAND PRIMARY SCHOOL

Baringo, Kenya

- Donated uniforms to 11 students from orphaned or low-income families, improving access to education

Academic Core Lead Tutor

Spring 2020- Fall 2021

MICHIGAN STATE UNIVERSITY, *Department of Computational Math Science and Eng.*

East Lansing

- Guided others tutors to ensure smooth running of the tutoring center
- Planned and organized review section for STEM courses, ensuring students were well-prepared for exams

International Orientation Leader

Aug 2018

MICHIGAN STATE UNIVERSITY, *Office of International Students*

East Lansing

- Guided a group of 10 international students in their first week of enrolling at MSU

Maji Safi ni Uhai Initiative

Oct 2019

KAPKURES COMMUNITY

Bomet, Kenya

- Co-founderd Maji Safi ni Uhai Initiative, and secured \$4000 from MCF program to drill water kapkures community in Bomet, Kenya

Community Need Assessment Leader

Mar 2017 - May 2017

BARINGO SOUTH

Baringo, Kenya

- Lead a group of 10 students from Education and Social Empowerment Program(EaSEP) conduct community need assessment in Ilchamus community

Volunteer Teacher

Jan 2016 - June 2016

KOKWA PRIMARY SCHOOL

Baringo, Kenya

- Volunteered to teach STEM classes to grade eight students

Community Need Assessment Guide

Jan 2016

KOKWA ISLAND

Baringo, Kenya

- Helped in community need assesment in Kokwa Island with patternship with Friends of Kenya Schools and Wildlife (FKSW)