Raymond Lesiyon

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Research Interests

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

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, CO*

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 realiability of evolutionary biology research.

Project 2: MicroGenomeR: An R data package for integrating and harmonizing microbial data from various data sources.

- ⚬ 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, MI*

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 tunning for LSTM model enhancing model performance on classifying agonistic pig's behaviors.

Biosensor Intern   **Jun 2019- Aug 2020**
FRAUNHOFER USA INC.   *East Lansing, MI*
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 biosensors on boron-doped diamond surfaces using N-hydroxysuccinimide(NHS) techniques, and tested their ability to detect COVID-19 spike protein through electrochemical impedance measurements.

Undergraduate Research Assistant   **Jun 2019- Aug 2020**
MICHIGAN STATE UNIVERSITY   *East Lansing, MI*
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 - tidyvverse, ggplot, pandas

Publications

1. Wale*, **Lesiyon***, Cressler, Ravi. *Are bacterial (pathogens) special?*. Manuscript in preparation
2. **Lesiyon**, Ravi. *MicroGenomeR: An R data package for integrating and harmonizing microbial data from various data sources.* Manuscript 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

- **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, MI*
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, MI*
- 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*
- Led a school uniform donation initiative to provide uniform to 11 students from orphaned or low-income families, enhancing their access to education.

Academic Core Lead Tutor   **Spring 2020- Fall 2021**
MICHIGAN STATE UNIVERSITY, *Department of Computational Math Science and Eng.*   *East Lansing, MI*
- Guided tutors for smooth tutoring center operations and organized STEM review sessions to prepare students for exams.

International Orientation Leader   **Aug 2018**
MICHIGAN STATE UNIVERSITY, *Office of International Students*   *East Lansing, MI*
- Guided a group of 10 international students throughout 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*
- Assisted in community need assesment in Kokwa Island with Friends of Kenya Schools and Wildlife (FKSW) by activating as a translator

Industry experience

Software Development Intern **May 2022- Aug 2022**

Amazon *Seattle, WA*

Project: Developing a central messaging single page application, consolidating messages from different pages

o Collaborated with teams to design a strategic integration plan, built a React/TypeScript single-page app to improve user experience.