

Zachary A. Mays

Contact Information

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Research Interests

Host-microbe interactions, microbial ecology, computational biology, and machine learning applications for large-scale biological data analysis, with particular interest in metagenomics and microbiome research for biomedical applications.

Education

University of Michigan, Ann Arbor, MI

Master of Science in Health Informatics, 2025 – May 2027

Texas State University, San Marcos, TX

Master of Science in Biology (Bacterial Genetics), 2019 – 2020

Thesis: "The effects of captivity on the microbiome of the endangered Comal Springs riffle beetle (*Heterelmis comalensis*)"

Advisor: Dr. Camila Carlos-Shanley

Thesis Research Support Fellowship

Texas State University, San Marcos, TX

Bachelor of Science in Biology, 2014 – 2018

Dean's List

Research Experience

Graduate Research Assistant | Texas State University, San Marcos, TX | January 2019 – December 2020

- Conducted research on insect-microbe symbioses in BSL-2 laboratory, focusing on bacterial community dynamics in endangered beetle species
- Extracted, sequenced, and analyzed over 300 genes and 20 bacterial genomes associated with *Heterelmis comalensis* for U.S. Fish and Wildlife Service conservation efforts
- Performed large-scale metagenomic analysis of over 100GB of sequencing data using STAR cluster supercomputer and advanced bioinformatics pipelines

- Applied DADA2 pipeline, nBLAST, and MicrobiomeAnalyst for comprehensive genomic and metagenomic data analysis
- Used R statistical packages (vegan, phyloseq) for microbial community analysis and ecological modeling
- Supervised graduate and undergraduate researchers in laboratory protocols and computational methods
- Resulted in peer-reviewed publications and direct conservation applications for endangered species management

Professional Experience

Senior Data Scientist | General Dynamics Information Technology, Remote | March 2023 – Present

- Engineer features from Medicare/Medicaid claims data using healthcare coding systems (ICD9/10, CPT, HCPCS, RBCS) for machine learning applications
- Lead development of AWS SageMaker pipeline processing 100+ million healthcare records daily
- Collaborate with senior management to translate analytical results for healthcare policy applications
- Achieved >20% performance improvement in predictive modeling accuracy

Market Analyst | Innovista Health Solutions, Remote | July 2021 – September 2022

- Developed risk assessment algorithms for healthcare member populations using clinical nursing data
- Conducted population-level statistical analysis identifying quality improvement opportunities
- Implemented machine learning solution saving organization \$1M annually
- Advised on natural language processing applications for healthcare document analysis

Molecular Technologist | Innovative Gx Laboratories, San Antonio, TX | February 2021 – July 2021

- Led validation testing and statistical analysis for pharmacogenomics panel development
- Managed interdisciplinary team of 3 scientists across 6 molecular validation projects
- Ensured data integrity and consistency across testing protocols
- Presented validation findings to Medical Director for clinical panel launch
- Authored standard operating procedures and trained laboratory personnel

Medical Scribe | GoScribes, New Braunfels, TX | January 2017 – January 2018

- Documented patient encounters in emergency department settings
- Managed electronic medical record data entry and clinical workflow systems

Publications

1. Mays Z, Hunter A, Campbell LG, Carlos-Shanley C. The effects of captivity on the microbiome of the endangered Comal Springs riffle beetle (*Heterelmis comalensis*). FEMS Microbiol Lett. 2021 Sep 22;368(17):fnab121. doi: 10.1093/femsle/fnab121. PMID: 34494105.
2. Mays, Z.A., et al. "The effects of captivity on the endangered Comal Springs riffle beetle, *Heterelmis comalensis*." [Thesis], 2021.
<https://digital.library.txst.edu/items/9ce53a0d-1475-4a55-a440-3a1fb4177bdb>

Conference Presentations

Presented findings orally at ASM Texas Branch

Honors and Awards

- **Dean's List** | Texas State University | 2018
- **Thesis Research Support Fellowship** | Texas State University | 2019-2020

Teaching Experience

Graduate Instructional Assistant | Texas State University, San Marcos, TX | August 2018 – May 2021

- Prepared and instructed undergraduate laboratory courses: Introductory Biology, Medical Microbiology, Applied Biotechnology, and Bacterial Genetics
- Developed curriculum materials and assessment tools
- Mentored undergraduate students in laboratory techniques and research methods

Technical Skills

Programming Languages: Python, R, SQL, Bash, HTML, CSS, JavaScript

Bioinformatics Tools: DADA2, nBLAST, MicrobiomeAnalyst, STAR aligner

Statistical Software: R (vegan, phyloseq), SciPy, Pandas, Scikit-Learn

Machine Learning: MLFlow, SHAP, TensorFlow applications

Data Management: AWS SageMaker, AWS Glue, PySpark, ETL processes

Visualization: Tableau, PowerBI, ggplot2, Seaborn

Laboratory: BSL-2 protocols, DNA extraction and sequencing, bacterial culture, molecular validation

High-Performance Computing: STAR cluster supercomputer, cloud computing platforms