Michelle Jonika

Computational Biologist · Molecular Biologist

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Summary

As a computational biologist, I enjoy the puzzle-like nature of coding genetics and genomics problems, specifically bringing this approach to the evolution of genomic content and sex chromosomes. Detail-oriented planning, project management, experimental design, and clear communication are important to my critical thinking and problem solving strategies for research. I am pursuing a Ph.D. in Genetics and Genomics at Texas A&M University with an expected graduation date of Spring 2023, and I am interested in career paths in industry intersecting genetics, genomics, data science, and molecular biology.

Expertise

Genomics:	SRA, Trimmomatic, bwa, samtools, bamtools, GATK, PLINK, BUSCO, rrBLUP, GEMMA
Genetics:	Genome structure evolution, Sex chromosome evolution, Morphometrics, Genomic analysis, Genome assembly
Molecular Biology:	Primer optimization, gDNA/DNA extraction, RNA extraction, PCR, qPCR, Gel visualization/imaging
Programming:	R, Linux/Unix, Git, tidyverse, conda, SQL, Python, LaTeX, HTML/CSS
Data Science:	Large dataset management (>20Gb), Bayesian statistics, Phylogenetics, Simulations, Data Visualization (ggplot2)
Soft Skills:	Project management, Public Speaking, Leadership, Multi-disciplinary Collaboration, Adaptive problem solving

Education

Ph.D. in Genetics and Genomics (Graduate Business Certificate)

College Station, Texas

Texas A&M University | Advisor: Heath Blackmon — Aug. 2018 - May 2023

- Dissertation: The Rise and Fall of DNA Sequences Among Sequence Classes and Genomic Compartments

B.S. in Forensic and Investigative Science (Minor: Genetics)

College Station, Texas

Texas A&M University | Advisor: Aaron M. Tarone — Aug. 2014 - May 2018

- Thesis: Genes as Markers of Sex for Forensic Entomology

Experience

PetDx

San Diego, California

Bioinformatics Intern | Bioinformatics and Data Science Team — June 2022 - Aug. 2022

- Leveraged high-complexity data set to predict canine cancer types
- Used machine learning (Random Forest) approaches to train and evaluate different models
- Performed extensive data evaluation to curate sample metrics, obtain balanced training and testing sets and identify meaningful model parameters

Bayer Crop Science

St. Louis, Missouri

Data Science Intern | Genomics Discovery and Application Team — May 2021 - Aug. 2021

- Identifying historic data to test for epistasis and designing a follow-up experiment to test for epistasis
- Developing a statistical testing framework to identify interactions between introgressed loci
- Three-month, full-time position exposure in an industry setting
- Establishing multi-disciplinary connections with teams with expertise in data science, genomics, and precision breeding

Ph.D. Research | Advisor: Dr. Heath Blackmon

College Station, Texas

Texas A&M Interdisciplinary Program in Genetics and Genomics | Texas A&M Department of Biology — Aug. 2018 - May 2023

- Developing an R package **(Lo et al. 2019)** to characterize microsatellite evolution and applying this package to characterize microsatellite evolution across 300 million years of insect evolution **(Jonika et al. 2020)**
- Elucidating the role of centromere type in insect chromosome evolution **(Ruckman et al. 2020)**
- Designing an automated genomic pipeline and TensorFlow based machine learning application to categorize genomic characteristics for 100s of mammalian species totaling 1000s of TB of genomic data

Post-baccalaureate Research Technician | Advisor: Dr. Aaron M. Tarone

College Station, Texas

Texas A&M Department of Entomology — May 2018 - Aug. 2018

- Completed additional experimentation and formal writing from undergraduate thesis project **(Jonika et al. 2020)**
- Applied new sex determination methodology and primer optimization to additional applications in forensic entomology **(Pimsler et al. 2021)** and stem cell research **(Pitonak et al. 2022)**

Teaching & Mentorship

Teaching Assistant

Department of Biology | Department of Biochemistry

- Anatomy and Physiology | Spring 2022 | Texas A&M
- Critical Writing in Biology | Fall 2020, Spring 2021 |Texas A&M
- Introduction to Genetics Laboratory | Spring 2019 | Texas A&M
- Guest Lecture - Bioinformatics | Topic: Genetic Privacy | Oct. 2019 | Texas A&M
- Guest Lecture - Bioinformatics | Topic: Genetic Privacy | Nov. 2021 | Utah Valley University

Graduate Student Mentor

Undergraduate Research Assistants

- Mentee: Johnathan Lo | Topic: Microsatellite Characterization and Evolution
- Mentee: Abhi Arekere | Topic: Carnivore Chromosome Number Evolution
- Mentee: Ragan Miller, Joseph Ward, Leen Fardoun | Topic: Chrysina Morphometrics
- Mentee: Grace Fischer | Topic: Tribolium Dispersal Patterns

Management & Outreach

Genetics Society of America

Early Career Leadership Program - Career Development Subcommittee — Jan. 2020 - Current

- Contribute career development blog pieces for Genes to Genomes blog
- Curate resources contributing to a career development toolkit and early career researcher newsletters
- Organize career development workshops for bimonthly workshop series and TAGC conference

Genetics Graduate Student Association

President | Vice President | Graduate Student Representative | Seminar Committee — May 2019 - Current

- Facilitate monthly graduate student association meetings
- Oversee communication between current graduate students, genetics faculty, and the program executive committee
- Represented the genetics interdisciplinary program in the graduate and professional student government

Coding Workshop Facilitator and Instructor

F: Facilitator | T: Taught | *: Co-taught — Apr. 2019 - Current

- Texas Genetics Society R Workshop, TGS - F (150 attendees)
- R Hackday, Texas A&M Department of Biology - T* (50 attendees)
- R Workshop, Aggie Veterans Who Code - F (15 attendees)

Texas A&M College of Science

Outreach Committee | Women in Science and Engineering — Jan. 2019 - Current

- Participated in various outreach activities important to the mission of the College of Science and Women in Science and Engineering
- Served on the Women in Science and Engineering outreach committee and organized school STEM nights

Texas Genetics Society

Board Member - Student Representative — Mar. 2020 - Mar. 2022

- Organize annual Texas Genetics Society meeting

Awards & Grants

2022 **Texas A&M Data Science Ambassador,** Texas A&M University

2022 **Research Excellence,** Interdisciplinary Genetics and Genomics Program

2021 **Outstanding PhD Student Poster Presentation,** Texas Genetics Society

2020 **Outstanding PhD Student Oral Presentation,** North America Forensic Entomology Association

2019 **Genetics Graduate Student Association Travel Grant,** Interdisciplinary Genetics and Genomics Program

Selected Publications

M. Pitonak, M. Aceves, P.A. Kumar, G. Dampf, P. Green, A. Tucker, V. Dietz, D. Miranda, S. Letchuman, **M.M. Jonika**, D. Bautista, H. Blackmon, J.N. Dulin. 2022. Effects of Biological Sex Mismatch on Neural ProgenitorCell Transplantation for Spinal Cord Injury in Mice. Nature Communications. In Print.

M.M. Jonika, J.M. Alfieri, T. Sylvester, A.R. Buhrow, H. Blackmon. 2022. Why Not Y Naught. Heredity. 129. 75-78.

S. Ruckman*(Co-first author), **M.M. Jonika*(Co-first author)**, C. Casola, H. Blackmon. 2020. Chromosome Number Evolves at Equal Rates in Holocentric and Monocentric Clades. PLOS Genetics 16(10):e1009076.

M.M. Jonika, C.E. Hjelmen, A.M. Faris, A.S. McGuane A.M. Tarone. 2020. An Evaluation of Differentially Spliced Genes as Markers of Sex for Forensic Entomology. J. of Forensic Science 65(5): 1579-1587

J. Lo, **M.M. Jonika**, H. Blackmon. 2019. micRocounter: Microsatellite Characterization in Genome Assemblies. G3 9(10): 3101-3104