

# 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, Python (Beginner), LaTeX, HTML/CSS, Shiny

**Data Science:** Large dataset management (>20Gb), Bayesian statistics, Phylogenetics, Simulations, Data Visualization (ggplot2), Software Development

**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 - Forensic Genetics | Topic: Genetic Testing | Sep. 2022 | 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: Chrysin Morphometrics
- Mentee: Grace Fischer | Topic: Tribolium Dispersal Patterns

## Management & Outreach

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### 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

### 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

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- 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

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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 Progenitor Cell 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 Holo-centric and Monocentric Clades. *PLOS Genetics* 16(10):e1009076.

**M.M. Jonika**, C.E. Hjelmén, 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