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

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 **(In Prep)**

Teaching & Mentorship

Teaching Assistant

College Station, Texas

Department of Biology | Department of Biochemistry — Fall 2020 - Spring 2021

- Introduction to Genetics Laboratory | Fall 2020, Spring 2021
- Critical Writing in Biology | Spring 2019
- Guest Lecture - Bioinformatics | Topic: Genetic Privacy | Oct. 2019

Graduate Student Mentor

College Station, Texas

Undergraduate Research Assistants — Aug. 2018 - Current

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

Management & Outreach

Texas Genetics Society

Board Member - Student Representative — Mar. 2020 - Current

- Organize annual Texas Genetics Society meeting

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

Awards & Grants

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

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

2020 **Genetics Graduate Student Oral Presentation Award,** Interdisciplinary Genetics and Genomics Program

2019 **Texas Ecolab Fund Grant,** "Evolution of Sex Chromosomes in Tiger Beetle Species of the Southern U.S."

2019 **1st Place Genetics Science Art Competition,** Interdisciplinary Genetics and Genomics Program

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

Publications

M.L. Pimsler, C.E. Hjelmen, **M.M. Jonika**, A. Sharma, S. Fu, M. Bala, S.H. Sze, J.K. Tomberlin, A.M. Tarone. 2021. Sexual Dimorphism in Growth Rate and Gene Expression Throughout Immature Development in Wild Type Chrysomya rufifacies (Diptera: Calliphoridae) Macquart. Frontiers in Ecology and Evolution. 9: 368.

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, J. Lo, H. Blackmon. 2020. Mode and Tempo of Microsatellite Evolution across 300 Million Years of Insect Evolution. Genes 11:945.

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

R. D. Perkins, J.R. Gamboa, **M.M. Jonika**, J. Lo, A. Shum, R.H. Adams, H. Blackmon. 2019. A Database of Amphibian Karyotypes. Chromosome Research 27: 313-319.

B. Guard, J Honneffer, A Jergens, **M.M. Jonika**, L. Toresson, Y. Lawrence, C. Webb, S. Hill, J. Lidbury, J. Steiner, J. Suchodolski. 2018. Longitudinal Assessment of Microbial Dysbiosis and Fecal Bile Acids Concentrations in Dogs with Chronic Inflammatory Enteropathy. J. of Vet. Internal Med. 33:1295-1305.