Michelle Marie Jonika
Postdoctoral Research Scholar
Texas A&M University
michellejonika.github.io
michellemjonika@gmail.com

EDUCATION

Ph.D., Genetics and Genomics   **2018-2023**
Texas A&M University   College Station, TX
Dissertation: *Patterns and Processes in the Evolution of Sequence Classes and Genomic Compartments*
Research Adviser: Heath Blackmon

B.S., Forensic and Investigative Science   **2014-2018**
Texas A&M University   College Station, TX
Thesis: *Genes as Markers of Sex for Forensic Entomology*
Research Adviser: Aaron M. Tarone

EXPERTISE: Bioinformatics, Genetics, Genomics, Evolutionary Biology, Phylogenetics, Data Science

SKILLS:

Genomics: NGS Analysis and Pipeline Development (SRA, Trimmomatic, bwa, samtools, GATK), Genome Assembly (HiFiasm, MitoHiFi, QUAST, BUSCO), RNASeq (FastQC, bowtie2, DESeq2), GWAS (PLINK, GEMMA), Genomic Prediction (rrBLUP)

Genetics: Evolutionary Biology (Genome Structure Evolution, Mammalian Sex Chromosome Evolution, Morphometrics), Veterinary Medicine (Clinical Data Evaluation, Cancer Prediction), Crop Science (Epistasis, Introgression)

Molecular Biology: Primer Optimization, gDNA/DNA Extraction, RNA Extraction, PCR, qPCR, Gel Visualization, Flow Cytometry

Programming: R, Linux/Unix, tidyverse, Python, LaTeX, HTML/CSS, R Shiny, Git/GitHub, VSCode, BitBucket, Docker, JIRA, conda, Large Dataset Management [>20 Gb], Machine Learning, Bayesian Statistic, Phylogenetics, Simulations, Data Visualization, Software Development, Cloud Computing, HPC Cluster Computing

Soft Skills: Project Management, Public Speaking and Communication, Leadership, Multi-disciplinary Collaboration, Adaptive Problem Solving, Multi-tasking, Self-Motivated, Time Management, Strategic Planning

RESEARCH GRANTS AND MAJOR FELLOWSHIPS

2022 – Data Science Ambassador, Texas A&M Institute of Data Science, Texas A&M University – $2,000

2019 – The Evolution of Sex Chromosomes in Charismatic Tiger Beetle Species of the Southern United States, Texas Ecolab Fund – $18,521

2018 – 2023 – STEM Fellowship, Texas A&M University. Interdisciplinary Genetics Program – $215,000

PEER-REVIEWED PUBLICATIONS

14. T. Sylvester, Z. Hoover, C.E. Hjelmen, **M.M. Jonika**, L.T. Blackmon, J.M. Alfieri, J.S. Johnston, S. Chien, T. Esfandani, H. Blackmon. A Reference Quality Genome Assembly for the Jewel Scarab *Chrysina gloriosa*. G3 – *Accepted with Minor Revisions.*

13. M.M. Jonika, A. Arekere, K. Wilhoit, H. Blackmon. Drift Drives the Evolution of Chromosome Number II: The Impact of Range Size on Genome Evolution in Carnivora. Journal of Heredity. – *Accepted with Minor Revisions.*

12. H. Blackmon, **M.M. Jonika**, J.M. Alfieri, L. Fardoun, J.P. Demuth. Drift Drives the Evolution of Chromosome Number I: The Impact of Trait Transitions on Genome Evolution in *Coleoptera*. – *In Print*

11. J.M. Alfieri, **M.M. Jonika**, J.N. Dulin, H. Blackmon. 2023. Tempo and Mode of Genome Structure Evolution in Insects. Genes. – 14(2): 336.

10. 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 13(1): 1-12.

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

8. J.M. Alfieri, G. Wang, **M.M. Jonika**, C.A. Gill, G.N. Athrey, H. Blackmon. 2022. A Primer for Single-Cell Sequencing in Non-Model Organisms. Genes 13(2): 380.

7. 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.

6. 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.

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

4. 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. Journal of Forensic Science 65(5): 1579-1587.

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

2. 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.

1. 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. Journal of Veterinary Internal Medicine. 33: 1295-1305.

OTHER PUBLICATIONS

13. **Michelle Jonika**. 2022. Software Carpentry - Computing Resources for Researchers. Career Development Toolkit: a blog from the Genetics Society of America. – *In Print*

12. **Michelle Jonika.** 2022. 15 Informational Interview Questions for PhDs Nervous About Networking. Career Development Toolkit: a blog from the Genetics Society of America. – *In Print*

11. Michelle Jonika. 2022. Career Development Through the Lens of Design Thinking. Career Development Toolkit: a blog from the Genetics Society of America.

10. Michelle Jonika. 2021. Terry McGlynn: Navigating a Career and Family. Genes to Genomes: a blog from the Genetics Society of America.

9. Michelle Jonika. 2021. Early Career Scientist Leadership Spotlight: Michelle Jonika. Genes to Genomes: a blog from the Genetics Society of America.

8. Jacob L. Steenwyk, **Michelle Jonika**. 2020. How to Get Started in Science Communication. ecrLife.

7. M.M. Jonika, A.M. Faris, C.E. Hjelmen, A.M. Tarone. 2019. Transcriptional Markers of Sex Determination for Forensic Entomology. Proceedings of the American Academy of Forensic Sciences. 25:813.

6. M.M. Jonika, A.M. Faris, C.E. Hjelmen, A.M. Tarone. 2018. Transcript-Based Sex Determination for Forensic Entomology. Entomological Society of America. MUVE, 0273.

5. Amanda B. Blake, B.C. Guard, J.B. Honneffer, **M.M. Jonika**, J.A. Chaitman, J.A. Lidbury, J.M. Steiner and J.S. Suchodolski. 2018. Altered Fecal Fatty Acid, Sterol and Bile Acid Metabolism in Dogs with Acute Diarrhea. J Vet Intern Med. 32:2248.

4. Michelle M. Jonika, A.M. Tarone. 2018. Genes as Markers of Sex for Forensic Entomology. Undergraduate Thesis, Texas A&M University, College Station, Texas.

3. Blake C. Guard, **M.M. Jonika**, J.B. Honneffer, J.A. Lidbury, J.M. Steiner, A.E. Jergens, and J.S. Suchodolski. 2017. Longitudinal Characterization of the Fecal Metabolome in Dogs with Inflammatory Bowel Disease. J Vet Intern Med. 31:1289.

2. Blake C. Guard, **M.M. Jonika**, J.B. Honneffer, J.A. Lidbury, J.M. Steiner, and J.S. Suchodolski. 2017. Development and Analytical Validation of an Assay for the Quantification of Fecal Bile Acids. J Vet Intern Med. 31:1289.

1. Blake C. Guard, J.B. Honneffer, **M.M. Jonika**, J.A. Lidbury, J.M. Steiner, A.E. Jergens, and J.S. Suchodolski. 2017. Longitudinal Characterization of Dysbiosis and Unconjugated Bile Acid Profiles in the Feces of Dogs with Inflammatory Bowel Disease. Gastroenterology 152.5: S992.

WORK EXPERIENCE

Postdoctoral Research Fellow, Department of Biology, Texas A&M   June 2023-Current
Designing an automated genomic pipeline to categorize genomic characteristics for mammalian species totaling 1000s of TB of genomic data. Assembling and annotating highly contiguous genomes for four giant beetles of North America and other beetles of importance in conservation.

Bioinformatics Intern, PetDx, San Diego, California   June-August 2022
Leveraged high-complexity data set to predict canine cancer types, used machine learning (Random Forest) approaches to train and evaluate different models, and performed extensive data evaluation to curate sample metrics, obtain balanced training and testing sets and identify meaningful model parameters.

Genomics Discovery & Application Intern, Bayer, St. Louis, Missouri   May-August 2021
Worked in the Crop Science Division of Bayer to identify historic data that can be used to test for epistasis, developed a statistical testing framework to identify interactions between introgressed loci, designed follow-up experimentation to test for epistasis, and established connections with teams with expertise in data science, genomics, and precision breeding.

Research Assistant, Department of Biology, Texas A&M   May 2019-Present
Lead researcher on three projects focused on comparative genomic analyses of mammalian and invertebrate genomes. Responsibilities include maintaining public code base, molecular wet lab work and mentoring of undergraduate and graduate students.

Research Technician, Department of Entomology, Texas A&M   May–August 2018
Completed research from undergraduate thesis and follow-up studies for sex determination in forensic entomology.

Supplemental Instructor-Organic Chemistry II, Texas A&M   January–May 2018
Helped facilitate understanding and teach concepts for organic chemistry II.

Research Intern, U.S. Department of Homeland Security, Newark, New Jersey   June–August 2017
Created a direct analysis in real-time mass spectral database of drug standards for use in a forensic chemistry laboratory at U.S. Customs and Border Protection.

Student Researcher, Gastrointestinal Laboratory, Texas A&M   January 2016–August 2018
Investigated the effects of antibiotics on the gut health and microbiota of companion animals.

AWARDS
2023 Montgomery Award, Texas A&M University Graduate and Professional School
2023 Association of Former Students Distinguished Graduate Student Award - Excellence in Research
Outstanding PhD Student Poster Presentation, Life on a Dynamic Planet Symposium
Outstanding PhD Student Oral Presentation, Student and PostDoc Research Conference
2022 Genetics Graduate Student Association Travel Award, Texas A&M University
1st Place Genetics Graduate Student Science Art Competition, Texas A&M University
Texas A&M University Data Science Ambassador, Texas A&M University Data Science Institute
Research Excellence – Genetics and Genomics Interdisciplinary Program, Texas A&M University
Outstanding PhD Student Poster Presentation, Texas Genetics Society
Outstanding PhD Student Oral Presentation, North American Forensic Entomology Association
Genetics Graduate Student Association Oral Presentation Award, Texas A&M University
1st Place Genetics Graduate Student Science Art Competition, Texas A&M University
2019 Genetics Graduate Student Association Travel Award, Texas A&M University
Undergraduate Research Scholar, Texas A&M University
Texas A&M Senior Merit Award, Texas A&M University
1st Place Poster Presentation Student Research Week, Texas A&M University
Sigma Xi STEM Award Student Research Week, Texas A&M University
1st Place Department of Entomology Mentorship Symposium, Texas A&M University
George Bush Presidential Library Foundation Undergraduate Travel Grant, Texas A&M University

TEACHING AND MENTORSHIP
Teaching Assistant, Department of Biology| Department of Biochemistry
- Python for Biologists | Spring 2023 (Texas A&M)
- Anatomy and Physiology | Spring 2022 (Texas A&M)
- Introduction to Genetics Laboratory | Spring 2019, Spring 2023 (Texas A&M)
- Critical Writing in Biology | Fall 2020, Spring 2021 (Texas A&M)
- Guest Lecture - Bioinformatics | Topic: Genetic Privacy | Fall 2019 (Texas A&M University)
- Guest Lecture - Bioinformatics | Topic: Genetic Privacy | Fall 2021 (Utah Valley University)
- Guest Lecture - Forensic Genetics | Topic: Genetic Testing |Fall 2022, Fall 2023 (Texas A&M University)
- Guest Lecture - Forensic Entomology | Topic: Genetics in Forensic Entomology |Spring 2023 (Texas A&M University)

Graduate Student Mentor, Department of Biology
- Mentee: Johnathan Lo | Topic: Microsatellite Characterization and Evolution
- Mentee: Abhi Arekere, Kayla Wilhoit | Topic: Carnivore Chromosome Number Evolution
- Mentee: Ragan Miller, Joseph Ward, Leen Fardoun, Elyssabeth Pratt| Topic: Chrysina Morphometrics
- Mentee: Grace Fischer | Topic: Tribolium Dispersal Patterns
- Mentee: Elexys Peoples | Topic: Genome Assembly
- Mentee: Samrudh Rao | Topic: Sex Chromosome Evolution

LEADERSHIP AND SERVICE
Coding Workshop Facilitator & Instructor| F: Facilitator, T: Taught, *: Co-Taught   April 2019 - Present

- 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)
- Open Source for Open Science (OSOS) Workshop Instructor – T (85 attendees)

Texas Genetics Society | Board Member, Student Representative, Industry Liaison   March 2020-Present
- Board Member, Student Representative: Organized annual Texas Genetics Society (TGS) meeting and facilitated social media account posting and advertised on social media for annual TGS Meeting
- Industry Liaison: Organize industry sponsors for annual TGS meeting

Genetics Graduate Student Association | President, Vice President, Graduate Student Representative, Seminar Committee, Communications Liaison   May 2019-May 2023
- President: Facilitated monthly graduate student association meetings
- President | Vice President: Oversaw communication between current graduate students, genetics faculty, and the program executive committee
- Vice President: Planned and facilitated annual recruitment symposium
- Graduate Student Representative: Represented the genetics interdisciplinary program in the graduate and professional student government
- Seminar Committee Member: Invite, plan, and host seminar speaker schedules for the G2 Genetics seminar series
- Communications Liaison: Facilitate social media posts and various science communication initiatives to boost program presence online

Texas A&M College of Science | WISE, Outreach Committee   January 2019- May 2023
- Participate in various outreach activities important to the mission of the College of Science and Women in Science and Engineering
  - Texas Junior Academy of Science Judge (2018, 2021)
  - Expanding Your Horizons Workshop (Helper: 2019, Leader: 2021, 2022)
  - Student Research Week Judge (2019)
  - Jr. Regional Science Bowl Moderator (2019)
  - Regional Science Bowl Moderator (2019)
  - Texas Junior Science and Humanities Symposium (January 23, 2020)
  - AP Research Mentor (2019, 2021)
- Serve on the Women in Science and Engineering outreach committee and organize local school STEM nights
  - Greens Prairie Elementary STEM Night (October 19, 2019)
  - Franklin ISD STEAM Night (November 8, 2021; November 14, 2022)
  - Zoom-a-WISE-Woman
    - Participant (April 29, 2022)
    - Moderator (April 27, 2022; April 29, 2022)

Genetics Society of America | Early Career Leadership Program   January 2020-December 2022
- Contribute career development blog pieces for various Genetics Society of America blogs and initiatives
- Curate resources contributing to a career development toolkit and early career researcher newsletters
- Organize career development workshops for bi-monthly workshop series and tri-annual TAGC conference

Other Outreach Activities   August 2018-Current
- LAUNCH

o Moderator for Undergraduate Research Scholars Symposium (February 27, 2019; February 26, 2020)
o LAUNCH Undergraduate Research Expo – Experiences in Mentoring Undergraduate Researchers Workshop Panelist (2019)
o Mentoring Undergraduate Researchers – A Workshop or Graduate Students (May 17, 2019; September 2, 2022)
• Member of the organizing committee for the 4th Annual Southeast Texas Evolutionary Genetics and Genomics conference at Texas A&M University

ADDITIONAL TRAINING

HPRC Short Courses

Introduction to Linux

Introduction to Python

Introduction to Scientific Python

Introduction to Next Generation Sequencing

Introduction to Julia

Introduction to Deep Learning with TF

Introduction to CUDA

TAMU Institute of Data Science

Introduction to Data Science

Exploratory Data Analysis with pandas

Machine Learning with Scikit-learn

Deep Learning with Keras

NVIDIA Deep Learning Computer Vision

Computational and Artificial Intelligence

HACKING COMPETITIONS

2019 TAMU Datathon

1. On the Origins of Tacos- https://devpost.com/software/on-the-origins-of-tacos
2. Random Forest Models for Predicting Oil Drill Failures-
   https://devpost.com/software/random-forest-models-for-predicting-oil-drill-failures

PRESENTATIONS (T: talk, P: poster, † coauthored with a student/postdoc)

2024

Genome Assembly of an Expanding Forest Pest: Dendroctonus frontalis (Southern Pine Beetle); Department of Biology Student Postdoc Research Conference; College Station, Texas – P†

Drift Drives the Evolution of Chromosome Number; Department of Biology Student Postdoc Research Conference; College Station, Texas – P

2023

Genome Assembly of the North American Giant Stag Beetle (Lucanus elaphus); Summer Undergraduate Research in Genetics and Genomics (SURGe), College Station, Texas – T†

Genome Assembly of the North American Giant Stag Beetle (Lucanus elaphus); Texas A&M Undergraduate Summer Research Expo, College Station, Texas – P†

Genome Assembly of an Expanding Forest Pest: Dendroctonus frontalis (Southern Pine Beetle); Society for the Study of Evolution and American Society of Naturalists, Albuquerque, New Mexico – P†

Morphometrics of Jewel Scarabs of the Southwest; Society for the Study of Evolution and American Society of Naturalists, Albuquerque, New Mexico – P†

Small Effective Population Size Drives Chromosome Number Evolution in Carnivores; Texas Genetics Society; Austin, Texas – P

Small Effective Population Size Drives Chromosome Number Evolution in Carnivores; Life on a Dynamic Planet Symposium; College Station, Texas – P

Small Effective Population Size Drives Chromosome Number Evolution in Carnivores; Department of Biology Student Postdoc Research Conference; College Station, Texas – T

Small Effective Population Size Drives Chromosome Number Evolution in Carnivores; TAMU Life Sciences Recruiting Symposium; College Station, Texas – P

2022

Cancer Signal Origin; PetDx End of Internship Company Presentation; San Diego, California; Virtual – T

Why Not Y Naught; Southeast Texas Evolutionary Genetics and Genomics Conference; Houston, TX–T

The Role of Centromeres in Chromosome Number Evolution, Texas Genetics Society Annual Meeting; College Station, TX-T

The Role of Centromeres in Chromosome Number Evolution, TAMU Life Sciences Recruiting Symposium; College Station, TX-P

2021

Effects of Host/Graft Sex Mismatch on Neural Progenitor Grafts for Spinal Cor Injury; Department of Biology Student and Postdoc Research Conference; College Station, TX–P† (co-author Michael Pitonak)

Chromosome Number Evolves at Equal Rates in Holocentric and Monocentric Clades, Department of Biology Student and Postdoc Research Conference; College Station, TX-T&P

The Evolution of Chromosome Type in Insects, Evolution; Virtual-T

Not All Centromeres Are Equal, or Are They?, Texas Genetics Society Annual Meeting; Virtual-P

2020

An Evaluation of Differentially Spliced Genes as Markers of Sex for Forensic Entomology, North American Forensic Entomology Association; Virtual-T

Rise of the Machines: Using a Convolutional Neural Networks to Elucidate Genomic Architecture, TAMU Life Sciences Recruiting Symposium; College Station, Texas-T

2019

Rise of the Machines: Using a Convolutional Neural Networks to Elucidate Genomic Architecture; Genetics Department G2 Seminar Series; College Station, Texas-T

Opportunities for Genetics Research and How to Apply to Graduate Schools; Genetics and Biochemistry Club; Clemson, South Carolina-T

Effects of Host/Graft Sex Mismatch on Survival and Integration of Neural Progenitor Call Transplants for Spinal Cord Injury; Department of Biology Student and Postdoc Research Conference; College Station, TX–P† (co-author Michael Pitonak)

The Evolution of Genomic Compartments in Insects; Department of Biology Student and Postdoc Research Conference; College Station, Texas–P

Microsatellite Evolution in Hexapods; Southeast Texas Evolutionary Genetics and Genomics; College Station, Texas–P

Sixty percent of the time, it works every time: sex identification in immature Calliphoridae; Southeast Texas Evolutionary Genetics and Genomics; College Station, Texas– P† (co-author Alexander McGuane)

Mode and Tempo of Microsatellite Evolution Across 300 Million Years of Insect Divergence, Evolution; Providence, Rhode Island–T

micRocounter: Identification of Microsatellite Inference; Biology Undergraduate Research Symposium; College Station, Texas– P† (co-author Johnathan Lo)

Characterization of Microsatellite Evolution in Insects; Houston Regional Ecology and Evolution Student Symposium; Houston, Texas–T

Rapid Identification and Inference of Genomic Compartments; Texas Genetics Society; College Station, Texas– P† (co-author Johnathan Lo)

Microsatellite Characterization in Genome Assemblies; Texas Genetics Society; College Station, Texas–T

Rapid Identification of Microsatellite Content; Student Research Week; College Station, Texas– P† (co-author Johnathan Lo)

The Evolution of Repetitive Elements in Hexapods; Student Research Week; College Station, Texas–P

Characterization of Microsatellite Evolution in Insects; Genetics Recruiting Symposium; College Station, Texas–P

Transcriptional Markers of Sex Determination for Forensic Entomology; American Academy of Forensic Science; Baltimore, Maryland–T

2018

Transcript-based Sex Determination for Forensic Entomology; Entomological Society of America; Vancouver, Canada–T

Markers of Sex Determination in Blow Flies; LAUNCH Research Conference; College Station, Texas–P

Immature Sex Identification for Blow Flies of Forensic Importance; International Association for Identification; San Antonio, Texas–P

Genetic Sex Determination for Forensic Entomology; Southeast Texas Evolutionary Genetics & Genomics Symposium; Houston, Texas–P

Using Sexual Dimorphism as a Method for Sex Determination in Blow Flies; Ecological Integration Symposium; College Station, Texas–T

Genes as Markers of Sex for Forensic Entomology, Undergraduate Student Research Conference; College Station, Texas–T

Development of Mass Spectral Database Using Direct Analysis in Real Time (DART); American Academy of Forensic Science; Seattle, Washington–P

Let's Talk About Sex: Identifying Female and Male Markers in Blow Flies; Entomology Department Seminar; College Station, Texas–T

2017

Development of Mass Spectral Database Using Direct Analysis in Real Time (DART); Student Research Conference; College Station, Texas–T

A Method for Rapid Field Identification of Illicit Compounds; U.S. Customs and Border Protection–T

Development and Analytical Validation of an Assay for the Quantification of Fecal Bile Acids; Student Research Conference; College Station, Texas–P