

Madison L. Miller

(269) 598-0313

mlm00066@mix.wvu.edu

Morgantown, WV, USA

SUMMARY

Quantitative ecologist with broad expertise in population genetics, disease ecology, and spatial analysis, with a focus on mammalian wildlife. Experienced in hierarchical Bayesian modeling, genomic data analysis, and field research, with a track record of integrating molecular techniques and landscape-level data to address conservation and management questions.

EDUCATION

West Virginia University, Morgantown, WV August 2026
Doctor of Philosophy in Natural Resource Sciences

Western Michigan University, Kalamazoo, MI March 2022
Master of Science in Biological Sciences

Grand Valley State University, Allendale, MI April 2016
Bachelor of Science in Biology

Lake Michigan College, South Haven, MI December 2013
Associate of Applied Science

RESEARCH EXPERIENCE

Postdoctoral Researcher August 2026 – Current
New Mexico State University, Las Cruces, NM

- Estimating occupancy for three quail species in the state of New Mexico using acoustic recording units and Bayesian modeling
- Instructor of record for “Introduction to Natural Resource Management”

Graduate Research Assistant January 2023 - August 2026
West Virginia University, Morgantown, WV

- Designed and led a research project investigating the population genetics, disease threats, and spatial ecology of Appalachian cottontails (*Sylvilagus obscurus*) and snowshoe hares (*Lepus americanus*) in West Virginia
- Conducted genomic analyses with microsatellites, SNPs, and sequencing data to investigate genetic variation and population structure
- Developed a custom Bayesian spatially explicit mark-recapture model in NIMBLE to estimate population density and abundance

- Utilized a public disease database and a Bayesian conditional autoregressive model to investigate environmental factors that influence rabbit hemorrhagic disease virus type 2 in lagomorph species across North America
- Completed courses on structured decision making, bioinformatics, conservation genetics, and quantitative ecology
- Completed “The Practice of RADseq: Population Genomics Analysis with Stacks” course led by Julien Catchen and learned to analyze SNP data using STACKS

Research Professional

January 2022 - November 2022

Savannah River Ecology Lab, Aiken, SC

- Contributed to collaborative research on disease ecology and population genetics
- Extracted DNA, conducted PCR, and generated microsatellite genotyping data
- Co-authored several manuscripts including a first author publication on pathogen infection dynamics in wildlife populations

Graduate Student

August 2019 - March 2022

Western Michigan University, Kalamazoo, MI

- Designed and executed an independent research project integrating disease ecology, environmental data, and quantitative analysis
- Took applicable graduate level courses including: Introduction to GIS, Experimental Design & Analysis, and Evolution

Laboratory Manager

May 2017 - July 2019

Kellogg Biological Station, Michigan State University, Hickory Corners, MI

- Assisted with the design and execution of experimental research integrating genetics, ecology, and evolutionary biology in a model system
- Conducted molecular laboratory work including DNA extraction and RADseq library preparation for genomic analyses
- Co-authored a publication examining eco-evolutionary dynamics associated with genetic rescue
- Managed laboratory operations and trained personnel in molecular and experimental techniques

Research Assistant

May 2016 - August 2016

Delaware National Estuarine Research Reserve, Dover, DE

- Independently designed a project assessing nest box preferences of Tree swallows (*Tachycineta bicolor*) and Eastern bluebirds (*Sialia sialis*)
- Organized and led volunteer horseshoe crab surveys and entered data

Undergraduate Researcher

November 2015 - April 2016

Grand Valley State University, Allendale, MI

- Assisted with wildlife field research and data collection

TEACHING EXPERIENCE

Instructor of Record

January 2025 - May 2025

West Virginia University, Morgantown, WV

- Independently taught Vertebrate Natural History, developing lectures on evolution and ecology and mentoring undergraduate students

Graduate Teaching Assistant

August 2019 - December 2021

Western Michigan University, Kalamazoo, MI

- Assisted with undergraduate biology and genetics instruction

Biology Tutor

September 2014 - April 2016

Grand Valley State University, Allendale, MI

- Led small-group and one-on-one tutoring sessions for undergraduate students in general biology, ecology, and genetics

MANUSCRIPTS

Miller, M. L., Welsh, A. B., Frantz, M. W., Owen, S. F., & Rota, C. T. (2026). Domestic lagomorph cases and developed land cover are associated with higher RHDV2 case counts in wild lagomorphs in the western United States. *Journal of Wildlife Diseases*. <https://doi.org/10.7589/JWD-D-24-00202>

Hall, E., Murry, B., **Miller, M.**, Cook, A., Welsh, A. (2025) New to the party: non-native cnidarians discovered throughout the Ohio River Basin, USA. *BioInvasions Records* 14(3): 661–672. <https://doi.org/10.3391/bir.2025.14.3.15>

Hill, J. E., **Miller, M. L.**, Chipman, R. B., Gilbert, A. T., Beasley, J. C., Dharmarajan, G., & Rhodes, O. E. (2025). Habitat-specific seasonal densities of sympatric raccoons and opossums in the southeastern United States. *Journal of Mammalogy*. <https://doi.org/10.1093/jmammal/gyaf001>

Clipp, H. L., Pesi, S. M., **Miller, M. L.**, Gigliotti, L. C., Skelly, B. P., & Rota, C. T. (2024). White-tailed deer detection rates increase when coyotes are present. *Ecology and Evolution*, 14, e11149. <https://doi.org/10.1002/ece3.11149>

Hill, J. E., **Miller, M. L.**, Chipman, R. B., Gilbert, A. T., Beasley, J. C., Dharmarajan, G., & Rhodes, O. E. (2024). Influence of habitat and baiting strategy on oral rabies vaccine bait uptake by raccoons in the southeastern United States. *Applied Animal Behaviour Science*, 277, 106320. <https://doi.org/10.1016/j.applanim.2024.106320>

Miller, M. L., Rota, C., & Welsh, A. (2024). Transforming gastrointestinal helminth parasite identification in vertebrate hosts with metabarcoding: A review. *Parasites & Vectors*, 17, 1–15. <https://doi.org/10.1186/s13071-024-06388-1>

Fitzpatrick, S. W., Mittan-Moreau, C., **Miller, M.,** & Judson, J. M. (2023). Genetic rescue remains underused for aiding recovery of federally listed vertebrates in the United States. *Journal of Heredity*. <https://doi.org/10.1093/jhered/esad002>

*Bernasconi, D. A., ***Miller, M. L.,** Hill, J. E., Gupta, P., Chipman, R., Gilbert, A. T., Rhodes, O. E., Jr., & Dharmarajan, G. (2023). Raccoons (*Procyon lotor*) show higher *Trypanosoma cruzi* detection rates than Virginia opossums (*Didelphis virginiana*) in South Carolina, USA. *Journal of Wildlife Diseases*. <https://doi.org/10.7589/JWD-D-22-00174>

Hill, J. E., **Miller, M. L.,** Helton, J. L., Chipman, R. B., Gilbert, A. T., Beasley, J. C., Dharmarajan, G., & Rhodes, O. E., Jr. (2023). Raccoon spatial ecology in the rural southeastern United States. *PLOS ONE*, 18(11), e0293133. <https://doi.org/10.1371/journal.pone.0293133>

Miller, M. L., Kronenberger, J. A., & Fitzpatrick, S. W. (2019). Recent evolutionary history predicts population but not ecosystem-level patterns. *Ecology and Evolution*, 9(24), 14442–14452. <https://doi.org/10.1002/ece3.5879>

* = authors contributed equally to study

PRESENTATIONS

Miller, M. L., Rota, C. T., Frantz, M. W., Owen, S. F., & Welsh, A. B. “Assessing snowshoe hare (*Lepus americanus*) population genetics in west Virginia, USA” Oral presentation at 29th Annual Davis Student Research and Creative Scholars Day. 2026. West Virginia University, Morgantown, WV, USA. *Awarded 1st place.*

Miller, M. L., Welsh, A. B., Frantz, M. W., Owen, S. F., & Rota, C. T. “Domestic lagomorph cases and developed land cover are associated with higher RHDV2 case counts in wild lagomorphs in western US.” Oral presentation at The Wildlife Society Meeting. 2025. Edmonton, AB, Canada.

Miller, M. L., Welsh, A. B., Frantz, M. W., Owen, S. F., & Rota, C. T. “Predicting the spread of RHDV2 in the United States.” Oral presentation at 28th Annual Davis Student Research and Creative Scholars Day. 2025. West Virginia University, Morgantown, WV, USA. *Awarded 2nd place.*

Miller, M. L., Welsh, A. B., Frantz, M. W., Owen, S. F., & Rota, C. T. “Predicting the spread of RHDV2 in the United States.” Oral presentation at Women in Natural Resources Symposium. 2025. West Virginia University, Morgantown, WV, USA.

Miller, M. L., Rota, C. T., Frantz, M. W., Owen, S. F., & Welsh, A. B. “Parasites in Poop: Using metabarcoding to assess gastrointestinal parasite communities of Appalachian cottontails,

snowshoe hares, and Eastern cottontails in West Virginia, USA.” Poster presentation at The Wildlife Society Meeting. 2024. Baltimore, MD, USA.

Miller, M. L., Rota, C. T., Frantz, M. W., Owen, S. F., & Welsh, A. B. “Assessing population genetics of Appalachian cottontails (*Sylvilagus obscurus*) in West Virginia, USA.” Oral presentation at American Society of Mammalogists Meeting. 2024. Boulder, CO, USA.

Miller, M. L., Rota, C. T., Frantz, M. W., Owen, S. F., & Welsh, A. B. “Assessing population structure, genetic diversity, and hybridization of the Appalachian cottontail (*Sylvilagus obscurus*) in West Virginia, USA.” Poster presentation at 27th Annual Davis Student Research and Creative Scholars Day. 2024. West Virginia University, Morgantown, WV, USA.

Miller, M. L., Rota, C. T., Welsh, A. B., & Frantz, M. W. “Assessing the reliability of skull measurements in identifying Appalachian cottontails (*Sylvilagus obscurus*) and Eastern cottontails (*Sylvilagus floridanus*) using genomic data.” Poster presentation at The Wildlife Society Meeting. 2023. Louisville, KY, USA.

Miller, M. L., Rota, C. T., Welsh, A. B., Frantz, M. W., & Owen, S. F. “Disease threats, population genetics, spatial ecology and parasitism of Appalachian cottontails (*Sylvilagus obscurus*) and snowshoe hares (*Lepus americanus*) in West Virginia.” Oral presentation at WRS Wildlife Diversity and Natural Heritage Meeting. 2023. Elkins, WV, USA.

Miller, M. L., Vonhof, M. J. “Influence of land cover and soil characteristics on chronic wasting disease prevalence in North American deer.” Poster presentation at Women in Natural Resources Symposium. 2023. West Virginia University, Morgantown, WV, USA.

Miller, M. L. “Raccoons experience higher *Trypanosoma cruzi* infection rates than opossums in the Southeast US.” Oral presentation at Savannah River Ecology Laboratory Graduate Research Symposium. 2022. Aiken, SC, USA.

Miller, M. L. “Influence of land cover and soil on chronic wasting disease.” Oral presentation. Western Michigan University Master’s thesis defense. 2022. Virtual.

Miller, M. L. “Influence of land cover and soil characteristics on chronic wasting disease prevalence in deer.” Poster presentation at Midwest Ecology and Evolution Conference. 2022. Virtual.

Miller, M. L. “Effect of land use on big brown bat intestinal parasites.” Oral presentation at Student Seminar Series. 2020. Western Michigan University, Kalamazoo, MI, USA.

Miller, M. L. “How does genetic rescue affect populations in novel environments?” Oral presentation at Brown Bag seminar. 2018. Kellogg Biological Station, Hickory Corners, MI, USA.

RELEVANT SKILLS

Molecular & Genomic Techniques

- DNA extraction/quantification (fecal, tissue, blood)
- PCR amplification and optimization
- RADseq library preparation
- Metabarcoding library preparation
- Gel electrophoresis
- Microsatellite genotyping

Bioinformatic and Quantitative Analysis

- Bioinformatic pipelines: STACKS, dada2, QIIME
- R programming - data wrangling, visualization, quantitative analysis, reproducible workflows
- Bayesian modeling and inference including development of custom NIMBLE code
- Spatial data mapping and analysis in ArcGIS and QGIS
- Remotely access high-performance computing systems

GRANTS/AWARDS

Davis College Research and Creative Scholars Day Spring 2026

- 1st Place Oral Presentation
- Awarded \$150

Davis College Research and Creative Scholars Day Spring 2025

- 2nd Place Oral Presentation
- Awarded \$100

West Virginia University/West Virginia Division of Natural Resources 2023 - 2026

- Graduate Research Assistantship
- Received \$105,000 stipend across four years plus tuition

Western Michigan University Graduate Student Research Grant Winter 2020

- Awarded \$1,000 toward research

MENTORING

Kellogg Biological Station, Hickory Corners, MI May 2018 - August 2018

- Helped two undergraduate students design, carry out, and present research projects
- Projects included a study investigating the effect of predation history on bluegill diet preferences and a study investigating morphological and genetic differences of different ecotypes of rainbow darters

West Virginia University, Morgantown, WV

September 2023 - May 2025

- Taught four undergraduate students in molecular and genetic techniques
- DNA extraction using an automated robot
- Sample labeling and organization
- PCR analysis
- DNA quantification

West Virginia University, Morgantown, WV

May 2025 - February 2026

- Trained two undergraduate students to use AI software, TrapTagger, to identify snowshoe hares from game camera photos

VOLUNTEER AND SERVICE

Peer Reviewer

December 2025

- Scientific Reports, Environmental DNA

Graduate Student Representative

July 2025 - Current

- Served as the graduate student representative for the West Virginia University Division Advisory Committee
- Contributed to meaningful dialogue with Division administration, provided input on emerging issues, and identified opportunities to strengthen the Division

President

June 2023 - May 2025

- Served as president of the Division of Natural Resources and Forestry Graduate Student Association
- Coordinated meetings with the graduate student body
- Managed a yearly budget with fundraising and expenditures
- Planned events including a plant fundraising sale and a graduate student picnic

PROFESSIONAL ORGANIZATIONS

- The Wildlife Society, Member, 2023 - Current
- Association for Women in Science, Member, 2025 - Current
- American Association of Mammalogists, Member, 2019 - Current