

Madison Rose Barshick, PhD

EDUCATION

PhD in Animal Science, Virginia Tech, Blacksburg, VA

August 2025

Dissertation: Modulation of the satellite cell niche controls satellite cell-mediated myogenesis

BS in Animal Science, Biochemistry, Berry College, Mount Berry, GA

May 2021

Graduated Summa Cum Laude, Phi Kappa Phi

PROFESSIONAL SOCIETIES

**American Society of Molecular
Biology & Biochemistry**

Member
2025 - *Present*

American Physiological Society

Member
2023 - *Present*

American Society of Cell Biology

Member
2023 - *Present*

American Society of Animal Science

Member
2019 - *Present*

RESEARCH EXPERIENCE

Institute for Critical Technology and Applied Science Doctoral Fellow, Virginia Tech

2021 – present

Worked on multiple projects related to exercise physiology and the cellular repair of skeletal muscle post-exercise utilizing both horse and mouse models. Developed project skills relating to both *in vivo* and *in vitro* experimentation, especially relating to the post-exercise repair period in skeletal muscle and signaling pathways which control this period.

Undergraduate Research Assistant, Berry College

2018 – 2021

Worked on the development of a biological pesticide targeting the AMP-Activated Protein Kinase Gene in *Musca domestica* (common house fly) through the RNA interference mechanism.

PEER REVIEWED PUBLICATIONS

1. M.R. Barshick, K.M. Ely, K.C. Mogge, L.M. Chance, and S.E. Johnson;
"Methylsulfonylmethane (MSM) supplementation to adult horses supports improved skeletal muscle inflammatory gene expression following exercise."; *Animals*, 2025, 15, 215.

2. J.W. Riley, L.M. Chance, M.R. Barshick, and S.E. Johnson; "Administration of sodium hyaluronate to adult horses prior to and immediately after exercise does not alter range of motion in either the tarsus or metacarpophalangeal joints."; *Transl Anim Sci.*, 2024, 8:txae153.
3. S.R. Gregg, M.R. Barshick, and S.E. Johnson; "Intravenous Injection of Sodium Hyaluronate Diminishes Basal Inflammatory Gene Expression in Equine Skeletal Muscle."; *Animals* 2023, 13, 3030.
4. S.E. Johnson, M.R. Barshick, M.L. Gonzalez, J.W. Riley, M.E. Pelletier, B.C. Castanho and E.N. Ealy; "A carnitine containing product improves aspects of post-exercise recovery in adult horses"; *Animals*, 2023, 13(4):657.
5. M.R. Barshick, M.L. Gonzalez, N.I. Busse, P.J. Helsel, and S.E. Johnson; "The initial delay to mitotic activity in primary cultures of equine satellite cells is reduced by combinations of growth factors"; *J Anim Sci.*, 2022, 100, 8.
6. D.V.L. Rhodes and M.R. Barshick; "Adapting a Bacterial Unknowns Project to Online Learning: Using Microsoft PowerPoint to Create an Unknowns Identification Simulation"; *J Microbiol Biol Educ.*, 2021, 22, 2.

ABSTRACTS

****underlined** denotes presenting author

1. "Impacts of Repeated Fatiguing Exercise on Mitochondria in Thoroughbreds."; B.D. Williams, L.T. Wesolowski, A.N. DiSilvestro, M.R. Barshick, K.C. Mogge, E. Jolley, K. Kaniyamattam, A. Logan, S.E. Johnson, S.H. White-Springer; presented at Equine Science Society Symposium 2025, Fort Collins, CO, June 3rd, 2025. (*oral presentation*)
2. "Comparison of Respiratory Capacities of Permeabilized Muscle Fibers and Isolated Mitochondria in Exercising Horses."; B.D. Williams, L.T. Wesolowski, A.N. DiSilvestro, M.R. Barshick, K.C. Mogge, E. Jolley, K. Kaniyamattam, A. Logan, S.E. Johnson, S.H. White-Springer; presented at American Physiological Society Conference 2025, Baltimore, MD, April 25th, 2025. (*poster presentation*)
3. "Comparison of respiratory capacities of permeabilized muscle fibers and isolated mitochondria in exercising horses"; B.D. Williams, L.T. Wesolowski, A.N. DiSilvestro, M.R. Barshick, K.C. Mogge, E. Jolley, K. Kaniyamattam, A. Logan, S.E. Johnson, S.H. White-Springer; presented at 2025 UF Muscle Biology Conference, Gainesville, FL, March 19th, 2025. (*poster presentation*)
4. "Ablation of SMAD2 in Skeletal Muscle Satellite Cells Alters their Fusogenic Capacity in Response to Hypertrophic Stimuli Without Increasing Fiber Size."; M.R. Barshick, J.W. Riley, J.N. Kidrick, S.E. Johnson; presented at VT Animal Science Symposium 2024, Blacksburg, VA, May 13th, 2024. (*oral presentation*)
5. "Ablation of SMAD2 in Skeletal Muscle Satellite Cells Alters their Fusogenic Capacity in Response to Hypertrophic Stimuli Without Increasing Fiber Size."; M.R. Barshick, J.W. Riley, J.N. Kidrick, S.E. Johnson; presented at VT Muscle Symposium 2024, Blacksburg, VA, April 30th, 2024. (*oral presentation*)

6. "Reduction of SMAD2 in Skeletal Muscle Fibers Does Not Affect Functional Muscle Outputs"; J.W. Riley, M.R. Barshick, S.E. Johnson; presented at VT Muscle Symposium 2024, Blacksburg, VA, April 30th, 2024. (*poster presentation*)
7. "Ablation of SMAD2 in Skeletal Muscle Satellite Cells Alters their Fusogenic Capacity in Response to Exercise."; M.R. Barshick, J.N. Kidrick, S.E. Johnson; presented at 2024 ICTAS Doctoral Scholar Research Symposium, Blacksburg, VA, March 29th, 2024. (*poster presentation*)
8. "Ablation of SMAD2 in Skeletal Muscle Satellite Cells Alters their Fusogenic Capacity in Response to Exercise."; M.R. Barshick, J.N. Kidrick, S.E. Johnson; presented at Cell Bio 2023, Boston, MA, December 5th, 2023. (*poster presentation*)
9. "Ablation of the transcription factor SMAD2 in satellite cells changes rate of fiber repair after exercise-induced damage to muscle"; M.R. Barshick, S.E. Johnson; presented at the 2023 ICTAS Doctoral Scholar Research Symposium, Blacksburg, VA, March 31, 2023. (*poster presentation*)
10. "Successive Bouts of Exercise Influences the Inflammatory Cytokine Response in Thoroughbred Horses Regardless of Recovery Aid Supplementation"; M.R. Barshick, J.W. Riley, M.E. Pelletier, M.L. Gonzalez, and S.E. Johnson; presented at the 2023 Southern Section American Society of Animal Science Meeting, Raleigh, NC, January 24, 2023. (*oral presentation*)
11. "Understanding the role of cell lineage in equine muscle satellite cell mediated muscle repair"; M.R. Barshick, M.L. Gonzalez, S.E. Johnson; presented at the 2022 ICTAS Doctoral Scholar Research Symposium, Blacksburg, VA, April 22, 2022. (*poster presentation*)
12. "Induction and Detection of dsRNA in Transformed *Saccharomyces cerevisiae*"; M.R. Barshick; presented at the 2021 Symposium on Student Scholarship, Rome, GA, April 12, 2021. (*oral presentation*)
13. "Adapting a Bacterial Unknowns Project to Online Learning: Using Microsoft PowerPoint to Create an Unknowns Identification Simulation"; D.V.L. Rhodes and M.R. Barshick; presented at the 2021 ASM Conference for Undergraduate Educators, Virtual, March 2021. (*oral presentation*)
14. "Cloning of AMP-Activated Protein Kinase Gene into *Saccharomyces cerevisiae*"; M.R. Barshick; presented at the 2019 Symposium on Student Scholarship, Rome, GA, April 9th, 2019. (*oral presentation*)
15. "Cloning of AMP-Activated Protein Kinase Gene into *Saccharomyces cerevisiae*"; M.R. Barshick; presented at the 2019 Southeastern Society for Parasitologists Annual Meeting, Athens, GA, April 2019. (*oral presentation*)

TEACHING EXPERIENCE

Instructor of Record, School of Animal Sciences, Virginia Tech, Spring 2025

- Contemporary Issues in Animal Science (12 students)

Graduate Teaching Assistant, School of Animal Sciences, Virginia Tech, 2021 - 2025

- Equine Exercise Physiology, *Fall 2024*
- Dairy Science and Industry, *Spring 2024*
- Horse Production and Management, *Fall 2023*
- Animal Nutrition and Feeding, *Spring 2023*
- Equine Exercise Physiology, *Fall 2021*

Undergraduate Teaching Assistant, Biology Department, Berry College, 2020

- Microbiology, *Spring 2020*

ACCOMPLISHMENTS & AWARDS

Outstanding Graduate Student, School of Animal Sciences, Virginia Tech

February 2025

2nd Place Award Physiology Essay Contest, American Society of Physiology

December 2024

2nd Place Oral Presentation VT Muscle Symposium, Virginia Tech

May 2024

ICTAS Doctoral Scholar, Institute for Critical Technology & Applied Sciences, Virginia Tech

2021 – 2025

American Chemical Society Honor Recipient, Berry College ACS Chapter

May 2020

Undergraduate Scholastic Achievement Award, Journal of Animal Science

May 2020

2019 Richards Scholar Funding, Berry College

August 2019

Emerging Leaders Program, Berry College

August 2019

Ciordia-Steward-Porter Award (1st Place Oral Presentation), Southeastern Society of Parasitologist Annual Meeting

April 2019

W & N Pirkle Scholarship, Chemistry Department, Berry College

Received 2020, 2019

2018 Synovus Scholar Funding, Berry College

August 2018

Science Scholars Program, Berry College

August 2018

Kathryn & Julius Elrod Scholarship, Animal Science Department, Berry College

Received 2020, 2019, 2018

University of Florida Biotechnician Assistant Credential Certification

May 2016