

Curriculum Vitae
Samantha Marrienne Howe, Ph.D.
Assistant Professor of Microbiology
College of Veterinary Medicine
Arkansas State University
Room 218, Arkansas Biosciences Institute
showe@astate.edu

Employment

Arkansas State University College of Veterinary Medicine *July 2026 - Present*
Assistant Professor of Microbiology

University of Arkansas Division of Agriculture *July 2024 – June 2026*
Postdoctoral Fellow

University of Arkansas *August 2019 – May 2024*
Graduate Research Assistant

Education and Training

University of Arkansas *Graduation Date: May 2024*
Ph.D., Animal Science, Microbiome
Major Advisor: Jiangchao Zhao, Ph.D.

Oklahoma State University *Graduation Date: August 2019*
Bachelor of Science in Animal Science
Emphasis: Animal Biotechnology
Minor: Microbiology
Honors: summa cum laude, Honors College Degree

Research Program

My research program investigates the resilience and stability of livestock microbial communities, focusing on cattle and swine. We use multi-omics approaches (i.e., culturomics, transcriptomics, metagenomics, and metabolomics) to study the mechanisms underlying host-microbe interactions, commensal-pathogen interactions, and microbiome responses to host stress and disease. Our goal is to identify beneficial microbes and microbial functions that enhance host health, reduce pathogen colonization, and enable the development of antimicrobial alternatives for sustainable livestock production.

Intellectual Property:

Filed:

Title: A NEXT-GENERATION PROBIOTIC FOR BOVINE RESPIRATORY DISEASE PREVENTION Inventors: Jiangchao Zhao, **Samantha Howe**
US Provisional application no. 63/591,695 filed on 10/19/2023.

International Patent Application No.: PCT/US2024/052070 filed on 10/18/2024.

Peer-reviewed publications:

ORCID ID: <https://orcid.org/0000-0003-0632-8106>

ResearchGate: <https://www.researchgate.net/profile/Samantha-Howe-4>

* denotes primary author(s)

Published:

1. Liu, Z.*, H. Wu, **S. Howe**, B. Zuo, Y. Tian, Y. Huang, M. Looper, X. Wang, C. Mu, H. Assress, R. Lan, Y. Xiao, T. Tsai, J. Zhao. *Lactiplantibacillus plantarum* promotes intestinal goblet cell differentiation via indole-3-lactic acid–AHR signaling in pigs. 2026. *npj Biofilms and Microbiomes*. doi: 10.1038/s41522-026-01085-6
2. Liu, Z.*, **S. Howe**, A. Watson, J. Farrar, C. Randolph, Y. Tian, J. Isaza, A. Uribe, Y. Huang, M. Looper, J. Zhao, and T. Tsai. Evaluating Phytochemicals as Alternatives to Antibiotic Growth Promoters in Swine Across Production Phases via Microbial and Functional Profiling. 2026. *Animal Research and One Health*. doi: 10.1002/aro2.70054.
3. Tian, Y.*, Z. Liu, Y. Huang, R. Bist, Y. Xiao, **S. Howe**, T. Tsai, T. Howell, J. Subbiah, M. Looper, and D. Wang. Deep-Learning-Enhanced Automated Coherent-Light Diffraction System for High-Speed, Highly Accurate Strain-Specific Foodborne Bacterial Recognition. 2025. *Journal of Agriculture and Food Research*. doi: <https://doi.org/10.1016/j.jafr.2025.102357>.
4. Z. Liu*, T. Tsai, B. Zuo, **S. Howe**, J. Farrar, C. Randolph, C. Maxwell, and J. Zhao. The sow vaginal and gut microbiota associated with longevity and reproductive performance. 2025. *Journal of Animal Science and Biotechnology*. doi: 10.1186/s40104-024-01140-2.
5. **Howe, S.***, X. Wei, J. Kovac, and J. Zhao. Draft genome sequence of *Ruoffia tabacinasalis* isolated from a bovine nasal swab: a novel member of the bovine nasal microbiota. 2024. *Microbiology Resource Announcements*. doi: 10.1128/mra.00087-24.
6. **Howe, S.***, Z. Liyu, B. Zuo, and J. Zhao. Culturomics: a critical approach in studying the roles of human and animal microbiota. 2024. *Animal Nutriomics*. doi: <https://doi.org/10.1017/anr.2024.6>.
7. **Howe, S*.**, B. Kegley, J. Powell, S. Chen, and J. Zhao. Effect of Bovine Respiratory Disease on the respiratory microbiome: a meta-analysis. 2023. *Frontiers in Cellular and Infection Microbiology*, 13:1223090. doi: 10.3389/fcimb.2023.1223090.
8. Peng, Y*., R. Chen*, Z. Zhang*, R. Jin, T. Xie, X. Liu, J. Chai, **S. Howe**, J. Zhao, Y. Li, and F. Deng. Metagenomic and meta-transcriptomic analysis reveal the colonization and expression profile of probiotic strains in humans and animals. 2023. *Fermentation*, 9(5): 417. doi:10.3390/fermentation9050417.

9. Peng, Y.*, T. Xie, Z. Wu, W. Zheng, T. Zhang, **S. Howe**, J. Chai, F. Deng, J. Zhao, and Y. Li. Archaea: an under-estimated kingdom in livestock animals. 2022. *Frontiers in Veterinary Science*, 9: 973508. doi:10.3389/fvets.2022.973508.
10. Deng, F.*, Y. Peng, Z. Zhang, **S. Howe**, Z. Wu, J. Dou, Y. Li, X. Wei, X. Wang, Y. Liang, J. Zhao, and Y. Li. Weaning time affects the archaeal community structure and functional potential in pigs. 2022. *Frontiers in Microbiology*, 13:845621. doi:10.3389/fmicb.2022.845621.
11. Wang, X*, **S. Howe***, F. Deng, and J. Zhao. Current applications of absolute bacterial quantification in microbiome studies and decision-making regarding different biological questions. 2021. *Microorganisms*, 9(9):1797. doi:10.3390/microorganisms9091797.
12. Wang, X.*, **S. Howe**, X. Wei, F. Deng, T. Tsai, J. Chai, Y. Xiao, H. Yang, C. Maxwell, Y. Li, and J. Zhao. Comprehensive cultivation of the swine gut microbiome reveals high bacterial diversity and guides bacterial isolation in pigs. 2021. *mSystems*, 6(4):31. doi:10.1128/mSystems.00477-21.
13. Deng, F.*, Y. Li, Y. Peng, X. Wei, X. Wang, **S. Howe**, H. Yang, Y. Xiao, H. Li, J. Zhao, and Y. Li*. The diversity, composition, and metabolic pathways of archaea in pigs. 2021. *Animals*, 11(7):2139. doi:10.3390/ani11072139.
14. Wei, X.*, T. Tsai, **S. Howe**, and J. Zhao. Weaning induced gut dysfunction and nutritional interventions in nursery pigs: a partial review. 2021. *Animals*, 11(5):1279. doi:10.3390/ani11051279.

In Review:

1. Cheek, R.A.*, E. B. Kegley, **S. M. Howe**, A. Goswami, and J. G. Powell. Seasonality of Bovine Respiratory Disease and Mitigation Techniques used in Receiving Beef Cattle in the Last 10 Years: A Meta-Analysis. *Submitted for publication in Translational Animal Science*.
2. Zhang, J.*, J. Li*, J. Chai*, Z. Zheng, Y. Deng, R. Xiao, X. Qu, Q. Lin, K. Chen, **S. Howe**, J. Zhao, M. Liao. Longitudinal Mapping of Retrograde Antibiotic Resistance Transmission in the Yellow- Feathered Broiler Production Chain. *Submitted for publication in npj Biofilms and Microbiomes*.

Grant Funding (2024 – Present):

Obtained (\$390,000 total):

PD/PI:

- USDA-NIFA AFRI Postdoctoral Fellowship. **S. Howe (PD)**, J. Zhao, J. Powell, E. B. Kegley. Determining the interaction between commensal *Corynebacterium* and pathogenic *Mannheimia* in the bovine respiratory disease. 7/1/2024 – 6/30/2027. \$225,000.

- UADA Animal Health Awards. **S. Howe (PI)**, J.G. Powell, E. Kegley. Characterization of antagonistic and synergistic interactions between bovine respiratory sourced-microbes to increase bovine respiratory health. 1/2025 – 12/2025. \$15,000.

Co-PI:

- Arkansas Biosciences Institute. A. Goswami, **S. Howe (Co-PI)**, T. Tsai, and C. Maxwell. Modeling Gut Microbiome–Immune Co-Development Using Multi-Omics and Machine Learning in Swine. 7/1/2025 – 5/31/2027. \$90,000.
- Arkansas Beef Council. C. Catrett, D. Setyabrata, **S. Howe (Co-PI)**. Characterizing the Persistent Environmental Microbiome and Its Role in Surface Contamination: Insights from a Dry-Aging Cabinet Model. 7/1/2025 – 6/30/2026. \$15,000.
- Research Innovation Grant. K. Midkiff, **S. Howe (Co-PI)**, M. Justice, J. Powell, E. Kegley. Influence of the upper respiratory microbiome and weaning strategies on calf stress, health, and performance. 1/2026 – 12/2026. \$30,000.
- UADA Animal Health Awards. C. Maxwell, T. Tsai, **S. Howe (Co-PI)**. Standardize the live *E. coli* challenge model in young pigs. 1/2025 – 12/2025. \$15,000.

Abstracts and Presentations:

* denotes presenting author

Accepted:

1. Cheek, R.A.*, E. B. Kegley, J. L. Reynolds, A. J. Harness, C. M. Looney, J. L. Riddle, **S. M. Howe**, and J. G. Powell. Exploring the relationship between nasal passage thermal imaging and the nasal microbiome for early detection of bovine respiratory disease. Accepted for poster presentation at ASAS National Meeting. Madison, Wisconsin. July 2026.

Completed:

1. Catrett, C. C.*, P. S. Arnold, A. P. Rivera, **S. M. Howe**, and D. Setyabrata. Characterizing the Persistent Environmental Microbiome and Its Role in Surface Contamination: Insights from a Dry-Aging Cabinet Model. 3rd Place Graduate Student Presentation at the American Meat Science Association (AMSA) Reciprocal Meat Conference (RMC). Amarillo, Texas. June 2026.
2. Cheek, R. A. *, E. B. Kegley, **S. M. Howe**, A. Goswami, and J. G. Powell. A 10-year recap of nutrition and metaphylactic techniques evaluated for effects on feedlot respiratory morbidity: A meta-analysis. Poster presentation at the Plains Nutrition Council Meeting. San Antonio, TX. April 2026.

3. Cheek, R. A.*, E. B. Kegley, **S. M. Howe**, and J. G. Powell. Seasonality of bovine respiratory disease (BRD) and mitigation techniques used in receiving beef cattle in the last 10 years: A meta-analysis. Poster presentation at the ASAS Midwest Meeting.
4. **Howe, S.M.***, J. G. Powell, E. B. Kegley, and J. Zhao. The effect of commensal *Corynebacterium* on BRD-associated *Mannheimia haemolytica* growth *in vitro*. Research presentation at Conference of Research Workers in Animal Diseases. Chicago, Illinois. January 2026.
5. **Howe, S.*** and J. Zhao. Comparative genomic analysis of *Corynebacterium xerosis* yields clues about their role in the bovine respiratory tract. Poster presentation at ASM Microbe 2025 in Los Angeles, CA. June 2025.
6. Shrier, E.*, A. Watson, **S. Howe**, R. Story, C. Maxwell, S. Becker, P. Wilcock, A. Gerhart, J. Zhao, and T. Tsai. Effect of fiber and stimbiotic on growth performance and the gut microbiome in pigs challenged with F18 enterotoxigenic *Escherichia coli* (ETEC). Poster presentation at ASAS Midwest Section Meeting. Omaha, Nebraska. March 2025.
7. **Howe, S.M.***, J.G. Powell, E.B. Kegley, and J. Zhao. Determining the interaction between commensal *Corynebacterium* and pathogenic *Mannheimia* in bovine respiratory disease. Poster presentation at Conference of Research Workers in Animal Diseases. Chicago, Illinois. January 2025.
8. **Howe, S.***, J. Chai, B. Kegley, J. Powell, and J. Zhao. Development of novel probiotics to combat bovine respiratory disease. Poster presentation at the Arkansas Biosciences Institute Research Symposium. Jonesboro, Arkansas, September 2024.
9. **Howe, S.***, J. Chai, B. Kegley, J. Powell, and J. Zhao. Development of novel probiotics to combat bovine respiratory disease. Poster presentation at the 2024 Bovine Respiratory Disease Symposium. 1st place EPSCOR poster. Denver, Colorado. August 2024.
10. **Howe, S.***, J. Chai, B. Kegley, J. Powell, and J. Zhao. Identification of a bovine-derived next-generation probiotic for Bovine Respiratory Disease. Poster presentation at ASM Microbe 2024. Atlanta, Georgia. June 2024.
11. **Howe, S.***, J. Zhao. Comparative Genomic Analysis of Nine *Corynebacterium xerosis* Genomes. Arkansas Bioinformatics Consortium (AR-BIC) Conference. 1st Place Graduate Student Poster. Little Rock, Arkansas. February 2024.
12. Zuo, B.*, T. Tsai, J. Chai, **S. Howe**, and J. Zhao. The effects of *Bacillus* strains supplementation on nursery piglet gut microbiome with multi-omics. ARBIC Conference. Little Rock, Arkansas. February 2024.
13. Research presentation on Arkansas Senator's agriculture tour. Presented research to Ranking Member (Senator John Boozman) of the Senate Agriculture Committee and Commodity Futures Trading Commissioners. August 2022.

14. **Howe, S.***, J. Chai, H. Usdrowski, S. Capik, B. Kegley, J. Richeson, J. Powell, and J. Zhao. Utilization of culture-independent and culture-dependent methods to investigate the bovine respiratory microbiome. Young Scholar Award Talk at the American Society of Animal Science National Meeting. Oklahoma City, Oklahoma. June 2022.
15. **Howe, S.***, and J. Zhao. 2022. The Effect of Bovine Respiratory Disease on Respiratory Microbiome: A Meta-Analysis. Poster presentation at ASM Microbe 2022. Washington D.C. June 2022.
16. Usdrowski, H.*, J. Chai, B. Zuo, **S. Howe**, J. Powell, J. Zhao. The Effects of Storage Temperature on the Bovine Nasal Microbiome. Poster presentation at ASM Microbe 2022. Washington D.C. June 2022.
17. Zuo, B.*, T. Tsai, J. Chai, H. Usdrowski, **S. Howe**, J. Zhao. The Effect of *Bacillus* Strains Supplementation on Sows' Reproductive Performance, Piglets' Growth Performance and Microbiome. Poster presentation at ASM Microbe 2022. Washington D.C. June 2022.

Mentorship:

Mentoring and Committee Service as Faculty:

	Role	Student Affiliation
Kathryn Burton	Research Advisor and Committee Chair	Arkansas State University Molecular Biosciences PhD Student
Cameron Cattrett	Committee Member	University of Arkansas PhD Student
Jayakarhika Jayaraman	Committee Member	Arkansas State University M.S. Student

Research Trainees as Graduate Student/Postdoctoral Fellow:

	Position	Current Position
Ziyu Liu	PhD Student	Postdoctoral Scholar; University of Calgary Medical School
Christina Lim	Undergraduate Honors Student	Mizzou CVM
Erika Shrier	Undergraduate Honors Student	Washington State CVM
Ava Salo	Undergraduate Honors Student	Current Student

Ad hoc journal reviewer:

Animals

Animal Microbiome

BMC Microbiology

BMC Veterinary Research

International Journal of Molecular Sciences

Microorganisms

Teaching Experiences:

Teaching position and responsibilities:

Guest lecturer (South China Agricultural University)

- Spring 2026 | 15 students
 - Section Title: *Bovine Respiratory Disease and the Bovine Respiratory Microbiome*

Seminar (ANSC 5901) (University of Arkansas) – Grant Writing Section

- Fall 2025 | ~10 students
 - Section Title: *Grant Writing: Pre- and Post- Doctoral Fellowships*

Advanced Analytical Methods (ANSC 5743L) (University of Arkansas) – Microbiome Section

- Fall 2025 | ~10 students
 - Section title: *Conducting an Animal Microbiome Study*

Graduate Teaching Assistant, Animal Breeding & Genetics (ANSC 3133) (University of Arkansas)

- Spring 2020, 2021, 2022, 2023, 2024 | ~ 50 students/semester
 - Presenting lectures when the professor is traveling.
 - Collecting, grading, and handing back class material, including weekly quizzes, homework assignments, and exams.
 - Meeting with students outside of class to cover unclear topics.

Guest lecturer, Microbial Ecology (CSES 5264) (University of Arkansas)

- Fall 2021 | ~10 students
 - Lecture title: *Library Preparation for Next Generation Sequencing and Microbiome Data Analysis.*

Awards and Honors:

- 1st place 2024 BRD Symposium Early Career EPSCOR Poster Competition | 2024
- 1st Place Poster AR-BIC 2024 Graduate Student Poster Competition | 2024
- Department of Animal Science Outstanding PhD Student | 2024
- Department of Animal Science Paul Noland Graduate Student Award | 2024
- American Society of Animal Science National Young Scholar Award | 2022
- Department of Animal Science Outstanding PhD Student | 2022
- Doctoral Academy Fellowship Recipient | 2019 - 2023
- Oklahoma State University (OSU) Senior of Significance | 2019
- OSU CASNR Dean's Award of Excellence | 2019
- OSU CASNR Senior of Distinction | 2019
- OSU Department of Animal and Food Sciences Senior Leadership Award | 2019
- OSU Niblack Research Scholar | 2018 - 2019
- OSU Animal Science Undergraduate Research Scholar | 2017 – 2019

Professional Memberships:

- American Society of Microbiology | 2020 – Present
- American Society of Animal Science | 2022 – Present

Professional Development

- BRD Symposium 2024 Meeting
 - Summer 2024
- Academy of Veterinary Consultants Meeting
 - Winter 2023, Summer 2024, Winter 2024, Winter 2025
- Agri-Food Innovation Summit
 - Attendee: 2023
- NSF I-Corps: UA Step Program
 - Completed: 2023
- University of Arkansas Animal Science Graduate Student Association
 - President: 2021 - 2022
 - Vice President: 2020 - 2021
 - Member: August 2019 - May 2024
- Fundamentals of High-Impact Scientific Writing Workshop
 - Completed: 2020
- Mothur Workshop
 - Completed: 2020