

EDUCATION

Oklahoma State University (OSU)

Ph.D. in Animal Genetics. GPA: 3.7/4.0

Anticipated Aug. 2024

Nanjing Agriculture University (NJAU)

M.S. in Animal Nutrition. GPA: 3.8/4.0

Stillwater, OK, USA

Yangzhou University (YZU)

B.S. in Animal Science. GPA: 3.6/4.0

Jun. 2017

Nanjing, Jiangsu, China

Jun. 2014

Yangzhou, Jiangsu, China

SKILL

Programming: Python, R, Bash, Slurm, SAS**Software:** Git, AWS, High Performance Computing (HPC)**Quantitative Bioinformatics Skills:** 16S rRNA, Metagenomics, Whole Genome, RNA-seq, Meta-analysis, Statistical Computing, Data Visualization, Biomarker Selection, Database Creation and Maintenance.

RESEARCH EXPERIENCE

NGS data analysis: pipeline development and refining**1. Development of 16S rRNA Gene Sequencing Data Analysis Pipelines, Research Assistant, OSU**

May. 2019 – Present

- Utilize QIIME2 pipeline to process raw 16S rRNA gene sequencing data.
- Developed analysis workflows using Python and R for bacterial taxonomy classification, diversity analysis (alpha and beta), statistical computing, and results visualization.

2. Development of RNA Sequencing Data Analysis Pipelines, Research Assistant, OSU

Aug. 2020 – Present

- Developed analysis workflows using Python and R for gene profiling and differential gene expression analysis.
- Crafted R script for The Gene Kyoto Encyclopedia of Genes and Genomes (KEGG) pathway analysis, gene set enrichment (GSE) analysis and results visualization.

3. Development of Metagenomic Sequencing Data Analysis Pipelines, Research Assistant, OSU

Jan. 2023 – Present

- Developed assembly and binning pipelines for bacterial metagenomic sequencing data.
- Written Python and R script for gene annotation and predictive functional analysis.

4. Creation of Bacterial 16S rRNA Gene Taxonomy Database, Research Assistant, OSU

Oct. 2021 – Jan. 2023

- Conducted a comprehensive meta-analysis of 1,500 16S rRNA V3-V4 sequencing samples from chicken ileal and cecal gut regions using QIIME2. Integrated data from established databases (RDP, Greengenes2, NCBI, and EzBioCloud) to update the top 1,000 Amplicon Sequence Variants (ASVs), applying a 97% identity threshold to ensure relevance to poultry research.
- Developed Python and R scripts to automate taxonomy classification, facilitating efficient and accurate microbial identification for future research endeavors.

Bioinformatics Analysis in Research Projects**1. Identification of the Gut Microbes that are Involved in Production Efficiency of Poultry**

Aug. 2019 – Dec. 2022

OSU, Advisor: Prof. Glenn Zhang

- Conducted multiple animal trials and 16S rRNA gene sequencing data analysis to investigate gut microbes that are associated with residual feed intake and growth rate in broiler chickens.
- Performed meta-analysis of publicly available 16S rRNA gene sequencing data to investigate the biogeography and succession of chicken gut microbiome.

2. Microbiome-based Approaches to Mitigate Necrotic Enteritis

Feb. 2020 – Present

OSU, Advisor: Prof. Glenn Zhang

- Conducted 16S rRNA gene and ITS sequencing data analysis to identify the gut bacteria and fungi that are associated with the severity of necrotic enteritis.
- Conducted animal trials and 16S rRNA and metagenomic sequencing data analysis to study the kinetic shift of the gut microbiota in response to coccidiosis and necrotic enteritis in broiler chickens.
- Screened multiple chicken gut commensal bacteria for their ability to against *Clostridium Perfringens* using co-culture assay *in vitro*.
- Conducted multiple bacterial transplantation animal trials and data analysis to investigate the *in vivo* effect of bacterial that are found to be associated with resistance in against of necrotic enteritis.

3. Impacts of Fermented Red Ginseng (FRG) and Curcumin on Alzheimer's Disease

Aug. 2022 – Present

OSU, Collaboration with Prof. Yoo Kim, Department of Human Nutritional Science

- Conducted comprehensive analysis of microbiota and RNA sequencing data of multiple studies to explore the anti-aging effects of FRG and curcumin.
- Performed correlation analysis between differentially enriched bacteria and differentially expressed genes (DEGs), contributing to understanding the interaction between host and gut microbiota underlying anti-aging.

4. Alternative Solutions for Pathogens in Poultry

Jan. 2023 – Present

University of Arkansas, Collaboration with Prof. GuillermoTellez-Isaias, Department of Poultry Science

- Executed multiple microbiota data analysis, focusing on identifying potential solutions to mitigate pathogenic disease in poultry.
- Drafted reports for summarizing key results for each study.

TEACHING EXPERIENCE

Teaching Assistant for Animal Genetics (ANSI3423)

OSU, Research Assistant

Jan. 2022-Aug. 2023

- Instructed classes ranging from 100-120 students in undergraduate level.
- Facilitated hands-on learning at individual level and in group settings.

Research Mentor for Undergraduate Students

OSU, Research Assistant

Apr. 2022-Aug. 2023

- Taught and advised undergraduate students for bioinformatics data analysis.
- Taught and supervised lab-related experiments and procedures.

SELECTED PEER-REVIEWED PUBLICATIONS (SELECTED 2 OUT OF 10)

- Kim DM*, Liu J*, Whitmore M.A, Tobin I, Zhao ZJ, Zhang G. *Two intestinal microbiota-derived metabolites, deoxycholic acid and butyrate, synergize to enhance host defense peptide synthesis and alleviate necrotic enteritis*. *Journal of Animal Science and Biotechnology*. ((In press; (*Co-1st authors))
- Liu J, Robinson K, Lyu W, Yang Q, Wang J, Christensen KD, Zhang G. *Anaerobutyricum and Subdoligranulum Are Differentially Enriched in Broilers with Disparate Weight Gains*. *Animals*. 2023; 13(11):1834.
- 10 published and accepted in total, 4 first-author papers. A full list of publications can be found [here](#).

ABSTRACTS

- Liu J, Q Yang, Whitmore M.A, Stewart S.N, Robinson K, Ran JS, and Zhang G. 2022. *Discovery of the intestinal microbiota that are associated with residual feed intake in broiler chickens*. PSA Annual Conference, San Antonio, TX.
- Lee DY, Liu J, Chandrasekaran P, Zhang G, O'Connell J, Egan J, and Kim Y. 2023. P23-046-23 *Dietary Curcumin Downregulates the Hepatic Cellular Senescence Pathway and Alters Gut Microbiota Composition in Aged Mice*. *Current Developments in Nutrition*,7.
- Lamichhane G, Liu J, Lee SJ, Lee DY, Zhang G, and Kim Y. 2023. OR26-01-23 *Protective Effect of Dietary Curcumin on Spatial Memory Dysfunction and Metabolic Regulation in an Alzheimer's Disease Mouse Model via the Brain-Liver-Gut Axis*. *Current Developments in Nutrition*, 7: 100108.
- Whitmore M.A, Kim M, Liu J, Tobin I, Zhao ZJ and Zhang G. 2024. *Deoxycholic acid synergizes with butyrate to alleviate necrotic enteritis in broilers*. *Annual Conference of Research Workers in Animal Diseases (CRWAD)*, Chicago, IL.
- Tobin I*, Liu J*, Whitmore M.A, Kim M, Zhao ZJ, Guo JQ, and Zhang G. 2024. *A commensal bacterium protects chickens against necrotic enteritis*. *Annual CRWAD Conference*, Chicago, IL. (*Co-1st authors))
- Liu J, Whitmore M.A, Tobin I, Kim M, Zhao ZJ, Guo JQ, Lamont S, Kulkarni R, Cheng H, Zhang G. 2024. *Intestinal microbiome confers strong colonization resistance against necrotic enteritis in chickens*. *Annual CRWAD Conference*, Chicago, IL.

SELECTED HONORS AND AWARDS

- | | |
|--|-----------|
| • 1 st Place of Oral Presentation, Conference of Research Works in Animal Disease | Jan. 2014 |
| • Williams Distinguished Graduate Fellowship, Oklahoma State University | Aug. 2023 |
| • Women's Faculty Council Student Research Award, Oklahoma State University | Apr. 2023 |
| • Graduate Scholarship, Department of Animal and Food Sciences, Oklahoma State University | Apr. 2021 |
| • 2 nd place, Biological Sciences Symposium Presentation Competition, Oklahoma State University | Nov. 2020 |

COMMUNITY ENGAGEMENT

Judge, Oklahoma State Science and Engineering Fair / Reviewer, Animal Microbiome / Member, Poultry Science Association