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## **Xiao Yang**

Ph.D student, Department of Poultry Science, College of Agricultural and Environmental Sciences

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## **EDUCATION**

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- **Sep 2021-Present University of Georgia, Athens, GA, USA**  
GPA: 3.90/4.0, **PhD Student of Poultry Science**
- **Sep 2018-Jun2020 China Agricultural University Beijing, China**  
GPA: 3.22/4.0, **Master of Science in Animal Science** Granted in June 2020
- **Sep 2014-Jun 2018 South China Agricultural University Guangzhou China**  
GPA: 3.62/5.0, **Bachelor of Science in Animal Science** Granted in June 2018

## **RESEARCH INTERESTS / SUMMARY**

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- Focused on precision farming, interested in developing models helping manage chicken farm and improve poultry welfare based on computer vision;
- Additional interest includes optimizing feed formula for feed mills and dealing with practical problems such as feed waste and waste disposal in farms;
- Conducted several field trips and internships in farms and feed mills, has been practicing solving front-line difficulties with professional knowledge.

## **RESEARCH TECHNIQUES AND SKILLS**

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- Computer Vision: Python, deep learning, object recognition, classification, and segmentation by neural network
- Real-time PCR: Detection of microorganisms in rumen fluid and feces
- Gas Chromatograph: Determination of rumen fluid volatile fatty acids
- Proximate Analysis: Including moisture, ash, crude protein, ether extract, neutral detergent fiber, acid detergent fiber and so on
- Other skills: Using thermal camera and SLR camera, collecting rumen fluid by a flexible esophageal tube; Design feed formula

## **RESEARCH AND INTERNSHIP EXPERIENCES**

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**Sep 2021-Present, *Research Assistant***

**University of Georgia**

**Athens**

- Rear 800 cage-free chickens at Poultry Research Center and installed video systems, light control systems to collect image data

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- Measuring chicken body weight based on thermal camera and deep learning for less labor of weighting birds
  - Detecting cage-free chicken and calculating total number of recognized chickens to improve real-time detection of chicken using deep learning
  - Classifying behaviors of chicken automatically via convolutional neural network and utilizing these behavioral indicators to improve chicken welfare
  - Monitoring wild birds by computer vision to prevent high pathogenic avian influenza (HPAI)
  - Breeding Athens Canadian Random Bred (ACRB)
  - Helping extension at department of poultry science

**Sep 2020-May 2021, *Lab assistant***

**Sinovac Life Science Co., Ltd.**

**Beijing**

- Worked as a lab assistant to evaluate the effectiveness of the vaccines

**Mar 2019-Jun 2019, *Assistant Experimenter Intern***

**Hong' An High-Quality Beef Cattle Technology Breeding Co., Ltd.**

**Yangxin**

- Part of the graduation experiment for my master's degree, researched with doctoral students
- Targeted to solve the problem of high tannin content in sorghum as the feed for cattle
- Conducted Latin Square Experiment on Simmental bull, utilized the theoretical basis that polyethylene glycol can eliminate the toxic and side effects of tannin, increased the use of tannin-rich feed for beef cattle, which allowed sorghum to become a roughage resource that could feed grass-eating livestock like cattle, sheep, and camels in large quantities
- Reduced nitrogen emissions in animal feces with a certain proportion of polyethylene glycol and tannin in their feed

**Jun2018-Aug 2018, *Member, Elite Cattlemen Summer Program***

**DeLaval Beijing and College of Animal Science and Technology, China Agricultural University**

**Beijing**

- Joined as a member of the Elite Cattlemen Summer Program, merit-based, highly selective
- Acquired theoretical lessons and production training at DeLaval, Beijing, in English; studied comprehensive and systemic solutions including traditional and fully automatic milking systems, milk quality and animal health maintaining, milk refrigeration, cow comfort, ranch supplies, feeding, manure treatment, barn facilities, and ranch management support systems, covering all aspects of ranch operations
- Applied the knowledge to help dairy farmers to take care of cows and produce dairy products

**Sep 2017-Mar 2018, *Academic Research***

**Undergraduate Thesis, *The Distribution of Glucose Transporters at the Placenta of Sow*, South China Agricultural University, Guided by Associate Professor Fang Chen Guangzhou**

- Extracted RNA from different parts of the pig placenta, conducted real-time PCR, and explored the distribution of the glucose transporter
- Provided a theoretical basis for the use of glucose in pregnant sows, discussed the distribution of glucose carriers in the pig placenta preliminarily, prepared basic data for future research on the function of glucose transporters

**Jul2017-Aug 2017, Assistant Experimenter Intern**

**Changjiang Food Group Co., Ltd.**

**Foshan**

- Performed piglet fattening experiments and learned to design experiments on production issues
- Fed 300 piglets for one month, grouped them based on their initial weight, compared four feed produced by different companies by analyzing feed intake

**Aug 2016, Field Study, Farm Breeding Intern**

**Guangdong Wen's Foodstuffs Group Co., Ltd.**

**Zhaoqing**

- Learned breeding techniques, and experienced the whole process from breeding the pigs to selling the pigs
- Studied Wen's unique family cooperation model, provided farmers the unified piglets, vaccines, feed, and other technical instructions, helped them sow more piglets, reduce feed costs, and improve maturity rate

**Jun2015-Jun 2017, Pet Breeding Intern, Team Leader**

**College of Animal Science, South China Agricultural University**

**Guangzhou**

- Undergraduate Innovation and Entrepreneurship Program for the breeding of mammals and ornamental birds
- Visited the pet laboratory three times a week, successfully bred two litters of Chinchillas, a litter of Russian blue cats, and a litter of Garfield cats, witnessed the yellow Opaline, pink Bourke's Parrot, and other Ploceidae breeding offspring in the lab
- Exhibited on pet culture festival, presented achievements to primary schools students nearby

**Aug2014, Feeding Intern**

**Zhongshan Jianbang Feed Technology Co., Ltd**

**Zhongshan**

- Understood the process of feed production, assisted workers to produce the feed, involved in the production and packaging of premixed feed, an average of 300 bags, each 20kg, were produced each day

## PROJECTS

- [ 1 ] 2023-2024: Performance model development. Zoetis. \$100,000 (Leader)
- [ 2 ] 2023-2026: Precision farming practices for sustainable egg production. USDA-NIFA. \$300,000 (participant).
- [ 3 ] 2023-2024: A Precision Tracking System in Food Supply Chain. UGA. \$37,500 (participant).
- [ 4 ] 2022-2024: An automatic imaging system for poultry welfare evaluation. Georgia Research Alliance. \$50,000 (participant).

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- [ 5 ] 2022-2024: Cloud computing for cage-free egg production. Oracle America. \$100,000 (gifts - computers/cloud credits). (Participant).
  - [ 6 ] 2020-2023: An integrated method for air quality management in cage-free houses. Egg Industry Center. \$100,000 (participant).

## PUBLICATIONS

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### Peer Reviewed Journal Articles:

- [ 1 ] **Yang, X.**, Bist, R., Subedi, S., & Chai, L. (2023). A deep learning method for monitoring spatial distribution of cage-free hens. *Artificial Intelligence in Agriculture*, 8, 20-29.
- [ 2 ] **Yang, X.**; Chai, L.; Bist, R.B.; Subedi, S.; Wu, Z. A Deep Learning Model for Detecting Cage-Free Hens on the Litter Floor. *Animals* **2022**, 12, 1983, doi:10.3390/ani12151983.
- [ 3 ] **Yang, X.**, Bist, R., Subedi, S., Wu, Z., Liu, T., & Chai, L. (2023). An automatic classifier for monitoring applied behaviors of cage-free laying hens with deep learning. *Engineering Applications of Artificial Intelligence*, 123, 106377
- [ 4 ] **Yang, X.**; Bist, R.B.; Subedi, S.; Chai, L. A Computer Vision-Based Automatic System for Egg Grading and Defect Detection. *Animals* **2023**, 13, 2354. <https://doi.org/10.3390/ani13142354>
- [ 5 ] **Yang, X.**, Haixing Dai, Zihao Wu, Ramesh Bahadur Bist, Sachin Subedi, Jin Sun, Guoyu Lu, Changying Li, Tianming Liu, Lilong Chai. An Innovative Segment Anything Model for Precision Poultry Monitoring. (Submitted to Computers and Electronics in Agriculture)
- [ 6 ] **Yang, X.**, Ramesh Bahadur Bist, Bidur Paneru, Tianming Liu, Todd Applegate, Casey Ritz, Woo Kim, Prafulla Regmi, Lilong Chai. Revolutionizing Poultry Management with Advancements in Computer Vision. (Submitted to Poultry Science)
- [ 7 ] **Yang, X.**, Ramesh Bist, Bidur Paneru, Lilong Chai, Deep learning methods for tracking individual chickens for locomotion analysis.(Submitted to Animals)
- [ 8 ] **Yang, X.**, Ramesh Bist, Sachin Subedi, Zihao Wu, Tianming Liu, Bidur Paneru, Lilong Chai. A deep learning framework for monitoring wild birds on poultry farms to prevent avian influenza. (Submitted)
- [ 9 ] Subedi, S.; Bist, R.; **Yang, X.**; Chai, L. Tracking Pecking Behaviors and Damages of Cage-Free Laying Hens with Machine Vision Technologies. *Computers and Electronics in Agriculture* **2023**, 204, 107545, doi:10.1016/j.compag.2022.107545.
- [ 10 ] Bist, R. B., **Yang, X.**, Subedi, S., & Chai, L. (2023). Mislaying behavior detection in cage-free hens with deep learning technologies. *Poultry Science*, 102(7), 102729.
- [ 11 ] Bist, R. B., Subedi, S., Chai, L., Regmi, P., Ritz, C. W., Kim, W. K., & **Yang, X.** (2023). Effects of perching on poultry welfare and production: a review. *Poultry*, 2(2), 134-157.
- [ 12 ] Subedi, S., Bist, R., **Yang, X.**, & Chai, L. (2023). Tracking floor eggs with machine vision in cage-free hen houses. *Poultry Science*, 102(6), 102637.
- [ 13 ] Bist, R.B.; Subedi, S.; Chai, L.; **Yang, X.** Ammonia Emissions, Impacts, and Mitigation Strategies for Poultry Production: A Critical Review. *Journal of Environmental Management* **2023**, 328, 116919, doi:10.1016/j.jenvman.2022.116919.
- [ 14 ] Guo, Y., Aggrey, S. E., **Yang, X.**, Oladeinde, A., Qiao, Y., & Chai, L. (2023). Detecting broiler chickens on litter floor with the YOLOv5-CBAM deep learning model. *Artificial Intelligence in Agriculture*, 9, 36-45.
- [ 15 ] Bist, R. B., **Yang, X.**, Subedi, S., Sharma, M. K., Singh, A. K., Ritz, C. W., ... & Chai, L. (2023). Temporal Variations of Air Quality in Cage-Free Experimental Pullet Houses. *Poultry*, 2(2), 320-333.
- [ 16 ] Bist, R. B., Subedi, S., **Yang, X.**, & Chai, L. (2023). Effective Strategies for Mitigating Feather Pecking and Cannibalism in Cage-Free W-36 Pullets. *Poultry*, 2(2), 281-291.
- [ 17 ] Bist, R. B., Subedi, S., **Yang, X.**, & Chai, L. (2023). A novel YOLOv6 object detector for monitoring piling behavior of cage-free laying hens. *AgriEngineering*, 5(2), 905-923.
- [ 18 ] Bist, R. B., Subedi, S., **Yang, X.**, & Chai, L. (2023). Automatic Detection of Cage-Free Dead Hens with Deep Learning Methods. *AgriEngineering*, 5(2), 1020-1038.
- [ 19 ] Bist, R. B., **Yang, X.**, Subedi, S., Ritz, C. W., Kim, W. K., & Chai, L. (2024). Electrostatic particle ionization for suppressing air pollutants in cage-free layer facilities: Dust suppressing

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- for cage-free hens. *Poultry Science*, 103494.
- [ 20 ] Bist, R. B., **Yang, X.**, Subedi, S., & Chai, L. (2023). Illuminating Solutions for Reducing Mislaid Eggs of Cage-Free Layers. *AgriEngineering*, 5(4), 2170-2183.
  - [ 21 ] Xie, B.; **Yang, X.**; Yang, L.; Wen, X.; Zhao, G. Adding Polyethylene Glycol to Steer Ration Containing Sorghum Tannins Increases Crude Protein Digestibility and Shifts Nitrogen Excretion from Feces to Urine. *Animal Nutrition* **2021**, 7, 779–786, doi:10.1016/j.aninu.2021.03.002.

### Conference papers/abstract:

- [ 1 ] **Yang, X.**, L. Chai, R. Bist, S. Subedi, and Z. Wu. Monitoring cage-free laying hens with deep learning models. 2023 US Livestock Farming Conference. Knoxville, TN, May 21-24 Full Paper accepted.
- [ 2 ] Bist, R. B., **X. Yang**, and S. Subedi, L. Chai. Monitoring floor egg laying behaviors of cage-free hens with machine vision. 2023 US Livestock Farming Conference. Knoxville, TN, May 21-24. Full Paper accepted.
- [ 3 ] Subedi, S., L. Chai, R. Bist, **X. Yang**. Floor Egg Detection with Machine Vision in Cage-free Hen Houses. 2023 US Livestock Farming Conference. Knoxville, TN, May 21-24. Full Paper accepted.
- [ 4 ] **Yang, X.**, Bist, R., Subedi, S., L. Chai. Tracking cage-free laying hens on litter floor with machine vision. 2023 International Poultry Scientific Forum (IPSF), Jan. 22-23, Atlanta, GA.
- [ 5 ] Bist, R., Yang, X., Subedi, S., L. Chai\*. Monitoring mislaying behaviors of cage-free hens with deep learning. 2023 International Poultry Scientific Forum (IPSF), Jan. 22-23, Atlanta, GA.
- [ 6 ] Subedi, S., **Yang, X.**, Bist, R., L. Chai. Detecting Floor Eggs with Machine Vision Technologies. 2023 International Poultry Scientific Forum (IPSF), Jan. 22-23, Atlanta, GA.
- [ 7 ] **Yang, X.**, L. Chai, R. Bist, and S. Subedi. 2022. Litter quality in cage-free houses. 2022 ASABE Annual International Meeting. Paper# 2200925 (doi:10.13031/aim.202200925).
- [ 8 ] Bist, R. L. Chai, **Yang, X.**, S. Subedi. 2022. Air quality in cage-free hen houses during pullets production. 2022 ASABE Annual International Meeting. Paper# 2200329 (doi:10.13031/aim.202200329).

### Presentations:

- [ 1 ] **Yang, X.**, L. Chai, R. Bist, S. Subedi. Monitoring litter quality in cage-free facilities with W-36 pullets. 2022 International Poultry Scientific Forum (IPSF), Jan. 22-23, Atlanta, GA. (Post Presentation).
- [ 2 ] **Yang, X.**, Bist, R., Subedi, S., L. Chai. Tracking cage-free laying hens on litter floor with machine vision. 2023 International Poultry Scientific Forum (IPSF), Jan. 22-23, Atlanta, GA. (Oral Presentation).
- [ 3 ] **Yang, X.**, L. Chai, R. Bist, and S. Subedi. Detecting cage-free laying hens on litter floor with machine vision. 2022 Poultry Science Association (PSA) Annual Meeting. July. 11-14, San Antonio, TX. (Oral Presentation).
- [ 4 ] **Yang, X.**, Bist, R., Subedi, S., L. Chai. A deep learning method for detecting cage-free hens on the litter floor. 2022 Poultry Science Graduate Research Forum Department of Poultry Science UGA. May 4. Athens GA. (Oral Presentation).
- [ 5 ] **Yang, X.**, Bist, R., Subedi, S., L. Chai. Automatic system for grading and weighting cage-free eggs based on computer vision. 2023 Poultry Science Association (PSA) Annual Meeting. July. 10-13, Philadelphia, PA. (Oral Presentation).
- [ 6 ] **Yang, X.**, Bist, R., Subedi, S., L. Chai. Monitoring cage-free laying hens on floor with machine vision. 2<sup>ND</sup> Precision Livestock Farming Conference (USPLF2023). May. 21-24, Knoxville, Tennessee. (Oral Presentation).

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## AWARDS

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- Poultry science forum third prize, 2022
  - UGA Graduate Summer Research Funding 2023
  - Gainesville Spring Chicken Scholarship 2023

## **MEMBERSHIPS**

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- Poultry Science Association (PSA)
- World's Poultry Science Association (WPSA)