LIYIKE JI

Ph.D. Candidate | Applied Scientist · ML & Computer Vision | Gainesville, FL

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PROFILE

Applied-ML researcher and Ph.D. candidate at the University of Florida with 4+ years building computer-vision and multimodal machine-learning systems for large-scale, real-world imagery. Author of 8 peer-reviewed and conference works. I work across the full research stack: foundation models (SAM, Depth Anything), distributed PyTorch training on NVIDIA A100 GPUs, rigorous benchmarking, and reproducible tools adopted by other researchers. Seeking Applied Scientist and ML research roles.

EDUCATION

Ph.D. Candidate, Agricultural & Biological Engineering — *University of Florida, Gainesville, FL* · 2023 – Dec. 2026 (expected)
Research focus: machine learning, computer vision, remote sensing, multimodal learning, and AI systems.

M.S., Industrial & Systems Management — *University of Southern California, Los Angeles, CA* 2021 – 2022
Coursework: machine learning, optimization, statistics, data analytics, decision making, engineering economics, and technology management.

B.S., Controlled Environment Agriculture — *Northwest A&F University, Yangling, China* 2016 – 2020
Coursework: environmental control, greenhouse engineering, automation, sensing, process optimization, and data monitoring.

RESEARCH EXPERIENCE

Graduate Research Assistant — *UF Phenomics Lab, IFAS GCREC* 2023 – Present

- **Built a reproducible multimodal benchmarking framework** for crop nutrient prediction by integrating UAV imagery, elevation data, field measurements, management records, and daily environmental time series. Implemented and compared ML/DL architectures, including PLSR, Random Forest, CNN, LSTM, TCN, and Transformer variants, under identical grouped cross-validation, fold-specific preprocessing, and out-of-fold evaluation. Deep visual representations consistently outperformed handcrafted spectral and structural features across both growing seasons, and the leakage-free protocol produced honest generalization estimates. The modular pipeline extends to additional sensors, imaging modalities, and spatial resolutions.
- **Trained high-resolution temporal models on NVIDIA A100 GPUs** using PyTorch, CUDA mixed precision, and multi-GPU DistributedDataParallel on UF HiPerGator. Implemented distributed sampling, fold-level checkpoints and outputs, and SLURM / sbatch launch files; when full-resolution sequences became host-memory bound, re-architected the data-loading and process strategy while preserving a reproducible path for long runs.
- **Developed and maintained an automated UAV phenotyping pipeline that transforms raw drone imagery into analysis-ready datasets** across repeated field collections. The modular workflow integrates photogrammetry, orthomosaic and DEM generation, vegetation segmentation, plot- or plant-level extraction, spatial ID alignment, trait computation, and export of standardized outputs for downstream breeding and phenotyping analyses.
- **Designed and validated a multi-sensor UAV platform** that captures aligned RGB, multispectral, and thermal data. Published the platform design and processing workflow, validated canopy measurements against field observations, and used the approach with multiple labs, crops, and breeding programs.
- **Contributed to a CVPR Workshops 2026 vision paper and a deployed web application.** Co-authored a CVPR Workshops 2026 paper on PlantSegFlow, a zero-shot video segmentation and tracking pipeline integrating Depth Anything, SAM, and motion-based identity assignment, reaching over 98.8% counting accuracy without task-specific training. Contributed to PhenomeInsight, a deployed UF web-GIS platform that transfers UAV data to HiPerGator and returns interactive orthomosaic, elevation, vegetation-index, hotspot, and processing-status outputs.

TECHNICAL SKILLS

Programming: Python, R, SQL, Bash; C++

Machine Learning: PyTorch, CUDA, DistributedDataParallel, mixed precision, TensorFlow, scikit-learn, XGBoost; CNNs, YOLO, SAM, Depth Anything, multimodal fusion, LSTM / TCN / Transformers, regression, time series, SHAP, Integrated Gradients, Grad-CAM

Computer Vision: OpenCV, object detection, instance / semantic segmentation, photogrammetry, point clouds, feature extraction; RGB, multispectral, thermal, and hyperspectral imaging

Geospatial & Data: Metashape, QGIS / PyQGIS, rasterio, GDAL, GeoPandas, pandas, NumPy; GeoTIFF, shapefile, CRS / reprojection, orthomosaic, DEM / DSM, and temporal sensor-data processing

Systems: NVIDIA A100, UF HiPerGator, SLURM / sbatch, Linux, Git, Docker, checkpoints, logging, automated batch workflows, and reproducible command-line documentation

UAV Systems: FAA-certificated Remote Pilot (Part 107); multirotor systems, payload integration, mission planning, flight operations, and multi-sensor data processing

PUBLICATIONS

In preparation

1. **Ji, L.**, et al. (in prep.). A Transferable Framework Integrating UAV Phenomics, Management Records, and Environmental Time Series for Strawberry Nutrient Status Prediction.

Published & presented

2. Shen, K., Zhou, X., Daggubati, S., Wang, X., **Ji, L.**, Choi, D., & Ilodibe, U. D. (2026). A Field-based Plant Video Segmentation Pipeline (FPVSP) for Off-line Plant Tracking through Zero-shot Segmentation and Motion Features. *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops*, 9824–9833.
3. **Ji, L.**, Wang, X., Hassan, H., & Deng, Z. (2026). A Multi-Sensor UAV Platform: Design, Testing, and Application for High-Throughput Plant Phenotyping. *Drones*, 10(5), 372.
4. Sleper, J. A., Zheng, C., **Ji, L.**, … Whitaker, V. M. (2025). Exploring the efficacy of phenomic and genomic selection for yield and fruit quality traits in strawberry. *The Plant Genome*.
5. **Ji, L.**, Wang, X., Dissanayake, K., … Choi, D. (2025). AI-Driven Multimodal Framework for Predicting Strawberry Performance and Insights. *ASABE Annual International Meeting* (Conference Paper).
6. Zhou, X., Wang, X., **Ji, L.**, … Whitaker, V. M. (2025). Deep Learning for Strawberry Runner Detection Integrating Ground and Aerial Imaging. *Smart Agricultural Technology*.
7. **Ji, L.**, Wang, X., & Elwakil, W. (2025). Selected UAV Options for Agricultural Imaging and Mapping Applications under Florida's UAS Regulations (AE613). *UF/IFAS EDIS*.
8. Wang, X., Zhou, X., **Ji, L.**, & Shen, K. (2024). Artificial Intelligence / Machine Learning-Assisted Near-Infrared / Optical Biosensing for Plant Phenotyping (Book Chapter).
9. **Ji, L.**, Wang, X., Cordova, G., & Deng, Z. (2024). Predicting Caladium Tuber Weight from Canopy Traits Through High-Throughput Aerial Imagery. *ASABE* (Conference Paper).

LEADERSHIP & HONORS

- Vice Chair, Student Activity Committee (SAC) — AOC-ABFE (Association of Overseas Chinese Agricultural, Biological & Food Engineers), 2026; Secretary, 2025.
- Session Moderator — Machinery Systems Poster Session, ASABE Annual International Meeting, 2026.
- ASABE Student Poster Presentation Competition — winner selected through the ITSC Community for "Predicting Caladium Tuber Weight from Canopy Traits Through High-Throughput Aerial Imagery", 2024.
- Master's Scholar Award — University of Southern California, 2021.

RESEARCH INTERESTS & LANGUAGES

Interests: machine learning, computer vision, multimodal systems, geospatial data, and applied AI.

Languages: Mandarin Chinese, English, Spanish (intermediate).