Harman Singh Sangha, Ph.D.

Assistant Professor, Machine Learning | Computer Vision | System Automation

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EXPERIENCE

Auburn University   August 2025 - Present

➤ **Assistant Professor**

Iowa State University   January 2023 – July 2025

➤ **Engineer III**

- Developed **computer vision** solutions for agricultural machinery
- Managed various **computer vision-based engineering projects**
- Developed **image data acquisition systems**
- **Developed crop phenotyping system** for agronomy application
- Agriculture Deep **learning model development and deployment**
- **Tested engineering systems** in-field
- **Advised and mentored graduate students** in numerous research projects

Iowa State University   August 2019 – December 2022

➤ **Graduate Research Assistant**

- Developed **object detection model** to identify corn ears
- Evaluated **performance** of several **object detection model** for agricultural imagery
- Supported multiple **computer vision** and **machine learning** projects for agricultural and off-highway machinery
- Evaluated **depth perception algorithms** for tree canopy identification

➤ **Teaching Involvement**

- **Instructor-of-record** for **ABE 316** (Applied Numerical Methods for Ag. and Biosystems Engineering) in **Fall 2021**
- **Guest Lectures** for **ABE 170** (Engineering Graphics and Introductory Design) in **Spring 2021**
- **Guest Lectures** for **ABE 316** (Applied Numerical Methods for Ag. and Biosystems Engineering in **Fall 2020**

Kansas State University   August 2017 – August 2019

➤ **Graduate Research Assistant**

- Collected **UAS imagery** for drought and disease detection and analysis in soybean and corn crops
- Evaluated **multispectral & thermal sensors** for crop monitoring
- Developed and designed onboard RTK corrected **GPS module** for UAS
- Developed knowledge base of **automation, controller design, telemetry & sensing technology** for digital agricultural data platforms

➤ **Teaching Involvement**

- **Guest Lecture** for **ATM 550** (Precision Agriculture Technologies) in **Fall 2018**

EDUCATION

Ph.D.
Agricultural Engineering
Iowa State University
2019 – 2023
Ames, Iowa

Masters of Science
Agricultural Engineering
Kansas State University
2017 – 2019
Manhattan, Kansas

Bachelor of Technology
Agricultural Engineering
Punjab Agricultural University
2011 – 2015
Ludhiana, Punjab, India

RESEARCH INTERESTS

- Agricultural System automation
- Visual sensing and sensemaking
- Smart decision-making with machine learning

PUBLICATIONS

1. **Sangha, H. S.**, & Darr, M. J. (2025). Influence of Model Size and Image Augmentations on Object Detection in Low-Contrast Complex Background Scenes. AI, 6(3), 52. https://doi.org/10.3390/ai6030052
2. Tangellapalli, S. A., **Sangha, H.S.**, Peschel, J., Duncan, D. (2024) Assessing Monocular Depth Estimation Networks for UAS Deployment in Rainforest Environments. 2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 1365.
3. Gadhwal, M., **Sangha, H. S.**, Sharda, A., Merwe, D. (2023) Spatial corn canopy temperature extraction: How focal length and UAV flying altitude influence thermal infrared sensing accuracy. Computers and Electronics in Agriculture, 209, 107812. https://doi.org/10.1016/j.compag.2023.107812
4. **Sangha, H. S.**, Sharda, A. Thermal infrared Imaging System Usage for Crop Health Assessments. MF3561. Kansas State Research and Extension. https://bookstore.ksre.ksu.edu/Item.aspx?catId=1061&pubId=24600
5. **Sangha, H. S.**, Sharda, A., Schapaugh, W., Walta D. Evaluation of Multispectral Sensors for Assessing Pigment Index in Soybean. Acta Scientific Agriculture 6.4 (2022): 13-23.
6. **Sangha, H. S.**, Sharda, A., Koch, L., Wang, G., Prabhakar, P. (2020). Impact of camera focal length and sUAS flying altitude on spatial crop canopy temperature evaluation. Computers and Electronics in Agriculture, 172 , 4. https://doi.org/10.1117/12.2519378

STUDENTS MENTORED

Yiming Bian   Summer 2023 – Summer 2024

Computer Science (Ph.D.)

- Weekly advising on project planning and technical problem solving
- Report generation for updating industrial partners

Xiaoquan Zhao   Spring 2024 – Fall 2024

Computer Science (Masters)

- Weekly advising on project planning and technical problem solving
- Report generation for updating industrial partners

Lisa Tordai   Summer 2024 – Summer 2025

Agricultural and Biosystems Engineering (Masters)

- Weekly advising on project planning and technical problem solving
- Report generation for updating industrial partners

Sadegh Jafari   Fall 2024 – Spring 2025

Computer Science (Ph.D.)

- Weekly advising on project planning and technical problem solving
- Report generation for updating industrial partners

SERVICE

Continued Professional Development (CPD) Instructor for ASABE
July 2022 - present

Responsibilities: Conduct professional development workshop on computer vision and machine learning during yearly international meeting

ABE liaison for Committee on Lectures at Iowa State University
August 2023 - present

Responsibilities: Review and approve guest lectures to be conducted at Iowa State University

Vice-President of ABE Graduate Organization (ABEGO) at Iowa State University
August 2020 - July 2021

Responsibilities: Organize various professional development and social events. Helping the president of ABEGO with tasks.

Student-Body Representative and Member-at-Large for Association of Agricultural, Biological and Food Engineers of Indian Origin (AABFEIO) committee (ASABE)
July 2020 - July2021

Responsibilities: Delegating tasks from the committee to student volunteers. Addressing student issues with the committee.

President of BAE Graduate Student Organization (BAE-GSO) at Kansas State University
August 2018 - May 2019

Responsibilities: Organize various professional development and social events. Coordinate with other officers regarding their responsibilities

Vice-President of BAE Graduate Student Organization (BAE-GSO) at Kansas State University
January 2018 - May 2018

Responsibilities: Liaison to the Graduate Senate. Organize various professional development and social events. Helping the president of ABEGO with tasks.

AWARDS

AABFEIO Graduate Student Research Award in M.S. Category at ASABE Annual International Meeting at Boston, MA. Received $100.
Summer 2019

LANGUAGES

- English
- Hindi
- Punjabi

TECHNICAL SKILLS

Programming Languages
- Python
- R
- MATLAB
- C++
- Visual Basic
- SQL
- Simulink

Software
- SolidWorks
- AutoCAD
- ArcGIS
- Blender

CVML Libraries
- TensorFlow
- Keras
- Scikit-Learn
- OpenCV