Sudip Kunwar, Ph.D.

Assistant Professor, Precision Agriculture,
School of Agriculture and Applied Sciences (SL/SAAS), Langston University
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EDUCATION AND TRAINING

Ph.D.	Major: Plant Breeding Specialization: Phenomics and Quantitative Genetics	University of Florida – Gainesville, Fl	08/2025
M.S.	Major: Horticultural Sciences Specialization: Phenotyping and Plant Physiology	University of Florida – Gainesville, Fl	05/2021
B.Sc.	Agriculture	Agriculture and Forestry University – Chitwan, Nepal	12/2017

RESEARCH INTERESTS

Quantitative Genetics| Predictive Breeding| Precision Agriculture| High-throughput Phenotyping| Remote Sensing| Artificial Intelligence

PROFESSIONAL EXPERIENCE

1. Assistant Professor, Biosystem Engineering and Precision Agriculture 08/2025- present

School of Agriculture and Applied Sciences (SL/SAAS), Langston University

- Apply UAV-based and proximal sensors, machine vision, and artificial intelligence to advance phenotyping of major horticultural and agronomic crops
- Develop and implement precision agriculture tools to improve efficiency of agricultural inputs for crop and livestock systems
- Lead research and teaching initiatives focused on integrating cutting-edge technology with sustainable agricultural practices

2. Graduate Research Assistant 08/2021- 08/2025

World food crop breeding and genetics lab, University of Florida
PI: Dr. Ali Babar

- Enhanced predictive ability of genomic prediction models for genetically complex traits by integrating environmental covariates and associated secondary traits
- Operated UAV flights and developed different prediction models using artificial intelligence algorithms integrating UAV-based-sensors-fusion and genomic markers data
- Designed and executed wheat and oat breeding trials and selections

- Improved harvest index, biomass partitioning traits and yield in wheat to cope with heat stressed conditions.

3. Graduate Research Assistant 01/2019- 08/2021

Plant Physiology lab, University of Florida
PI: Dr. Ute Albrecht

- Evaluated a large-scale citrus rootstock breeding trial for their horticultural, physiological, and histological attributes in Huanglongbing endemic conditions
- Contributed to the lab's greenhouse researches and in other molecular physiology tasks including DNA extraction and PCR assays
- Collaborated with precision agriculture lab, at SWFREC, UF to accomplish a project on developing a novel methodology for citrus leaf nutrient concentration determination using UAV and machine learning

4. Agri-market Analyst 03/2018 – 07/2018

Prime Minister Agriculture Modernization Project, Sweet orange Super-zone, Sindhuli, Nepal

- Analyzed agricultural market data and conducted agriculture market information center for the farmers
- Published a booklet "Superzone profile" with all the sweet orange related information of the area

TEACHING EXPERIENCE

1. Instructor

Department of Agriculture and Natural Resources, Langston University Spring semester 2026
PSRS4343 – Plant Breeding

- Develop and implement a comprehensive curriculum for plant breeding, integrating quantitative genetics, inheritance, and applied breeding practices
- Deliver engaging lectures and facilitated discussions to deepen student understanding of complex concepts
- Provide individualized support through regular and special office hours, strengthening students' practical and analytical skills
- Critically assess quizzes, assignments, and projects, offering detailed feedback to improve student learning outcomes

2. Teaching Assistant Total: 3 different courses and 3 semesters

Agronomy Department, University of Florida Spring semester 2025
AGR4320/5321 – Plant Breeding/ Genetic Improvement of plants (Instructors: Drs. Ali Babar/ Fredy Altpeter)

- Enhanced student comprehension of complex plant breeding and quantitative genetics and inheritance concepts through regular and special office hours
- Provided detailed feedback on quizzes and assignments, significantly improving students' understanding and application of the course materials

Agronomy Department, University of Florida Spring semester 2024

AGR5307 – Molecular Genetics for Crop Improvement (Instructor: Dr. Fredy Altpeter)

- Assessed and offered constructive feedback on assignments, reinforcing key concepts of molecular genetics and biotechnology and their practical applications
- Supported student learning and understanding of the key topics and concepts during regular office hours

Agronomy Department, University of Florida Spring semester 2022

PLS3004C – Principle of Plant Science (Instructor: Dr. James Estrada)

- Assisted to deliver course materials and graded assignments and exams of advanced plant science concepts
- Delivered constructive comments to students regarding their tasks and help them to reinforce the applicability of their theoretical concepts

3. Program Manager & Instructor 12/2017 – 12/2018

High School Crop Science program, Shree Rajeshwari Higher Secondary School, Sindhupalchowk, Nepal

- Prepared and delivered lectures for high school level's field agronomic crops course
- Trained students to the basic agronomic field studies

REFEREED PUBLICATIONS

Google Scholar: https://scholar.google.com/citations?user=iSaqvUEAAAAJ&hl=en (Citations >320, h-index-5 & I-10 index-4)

Research article under review

- **Kunwar S.**, Babar MA., Ampatzidis Y., Khan N., Acharya JP., McBreen J., Adewale S., Sahi D., Brown-Guedira G. Deciphering the genetic basis of yield components in wheat by integrating hyperspectral-based phenomes. *Under Review*. *Plant Phenomics.*
- Adewale S., Babar MA., Khan N., Acharya JP., McBreen J., Raza I., **Kunwar S.**, Nandety RS., Fiedler J. Uncovering the genetic architecture of biomass yield and related traits in Southern US oat germplasm using a genome-wide association study. *Under Review*. *Theoretical and Applied Genetics*.
- Signorini V., McBreen J., **Kunwar S.**, Acharya JP., Khan N., Silva CM., Ampatzidis Y., Chilenje ME., Babar MA., Nardino M. High-throughput phenotyping for membrane thermostability: strategies to enhance heat stress tolerance in wheat. *Under Review*. *The Plant Phenome Journal.*
- Noor M., Rahman M., Bulle M., Rasel M., Hossain S., Sarker J., Afridi N., Kondi RKR, Perves M; **Kunwar S.**, Azam G., Alasmari A., Gaber A., Hossa A. Identification and evaluation of high-yielding rice (*Oryza sativa* L.) mutants for enhancing productivity and stability under deepwater environmental conditions. *Under Review*. *Planta.*

Research article accepted & published

- **Kunwar S.**, Babar MA., Jarquin D., Ampatzidis Y., Khan N., Acharya JP., McBreen J., Adewale S., Brown-Guedira G. Optimizing biomass partitioning in wheat using UAV-based hyperspectral phenomic and genomic prediction: kernel-based and machine learning approaches. *Accepted*. *Frontiers in Plant Science*.

- Adewale S., Babar MA., Jarquin D., Khan N., Acharya JP., **Kunwar S.**, McBreen J., Rios E., Harrison S., Noah D., Amir I., Paul M., Boyles R., Fledler J., Nandety RS. (2026). Effectiveness of low-density high-throughput marker platform and easy-to-measure traits for genomic prediction of biomass yield in oat (*Avena sativa* L.). *The Plant Genome.*
- **Kunwar S.**, Babar MA., Jarquin D., Ampatzidis Y., Khan N., Acharya JP., McBreen J., Adewale S., & Brown-Guedira G. (2025). Enhancing prediction accuracy of key biomass partitioning traits in wheat using multi-kernel genomic prediction models integrating secondary traits and environmental covariates. *The Plant Genome*.
- McBreen J., Babar MA., Jarquin D., Ampatzidis Y., Khan N., **Kunwar S.**, Acharya JP., Adewale S., & Brown-Guedira G. (2025). Leveraging Multi-Omics Data with Machine Learning to Predict Grain Yield in Small vs. Big Plot Wheat Trials. *Agronomy 15(6), 1315.*
- McBreen J., Babar MA., Jarquin D., Ampatzidis Y., Khan N., **Kunwar S.**, Acharya, JP., Adewale S., Brown-Guedira G. (2025). Enhancing genomic-based forward prediction accuracy in wheat by integrating UAV-derived hyperspectral and environmental data with machine learning under heat-stressed environments. *The Plant Genome* 18, *e20554*.
- **Kunwar S.**, Meyering B., Grosser J., Gmitter F.G., Castle W.S., & Albrecht U. (2023). Field performance of 'Valencia' orange trees on diploid and tetraploid rootstocks in different huanglongbing-endemic growing environments. *Scientia Horticulurae 309, 111635*.
- Costa L., **Kunwar S.**, Ampatzidis Y., & Albrecht U. (2022). Determining leaf nutrient concentrations in citrus trees using UAV imagery and machine learning. *Precision Agric 23, 854–875*.
- **Kunwar S.**, Grosser J., Gmitter F., Castle W.S., & Albrecht U. (2021). Field performance of 'Hamlin' orange trees grown on various rootstocks in HLB-endemic conditions. *HortScience, 56 (2), 244-253*.
- Sharma G., Shrestha S., **Kunwar S.**, & Tseng T. M. (2021). Crop diversification for improved weed management: A review. *Agriculture*, *11*(5), 461.

Proceeding & Extension article published

- Albrecht U., **Kunwar S.**, Grosser J., Gmitter F.G. & Castle W.S. (2023). Enhancing yield efficiency and fruit quality in citrus through use of tetraploid rootstocks. *Acta Hortic*. 1366, 75-82.
- Albrecht U., **Kunwar S.**, & Grosser J. 2020. Rootstock effects on 'Valencia' and 'Hamlin' trees in large-scale commercial plantings. *EDIS*.

SCHOLARSHIPS AND AWARDS

- **Dr. Elaine Turner Plant Breeding Scholarship (1,100$**), Plant Breeding Graduate Program at the University of Florida, Spring 2024
- **William C. and Bertha M. Cornett Fellowship (total 4000$**), College of Agricultural and Life Sciences (CALS), University of Florida/Institute of Food and Agricultural Sciences (UF/IFAS), 2023 to 2025
- **First-place Award in Oral Presentations (600$***)* in the 8th Annual Plant Breeding Retreat at UF, 2024
- **Gerald O. Mott Award** by Crop Science Society of America, 2024
- Selected for the **2024 Bayer University Mentorship Program (B4U) program**
- **First-place Award in Poster Competition (250$)** in the 8th Annual Plant Science Symposium at UF, 2024

- Plant Breeding Graduate Program at the University of Florida **Top-up Award (*1800$)*** Spring 2024
- National Association of Plant Breeders **(NAPB) Borlaug Scholarship**, 2023-24
- **Travel grant, CSSA (800$)** to present in annual meeting of Western Society of Crop Science in Hawaii, 2023
- **Travel scholarship** to present in annual symposium of Society of Organic Seed Professionals in West Virginia, 2022
- **Student speaker award (250$)** for oral presentation in Plant science council symposium at UF, 2022
- **Second place in the best student scientific paper publication (400$)** by Florida Horticultural Science Society (FSHS), 2021.
- **Plant Breeding Graduate Initiative (PBGI) fellowship** to pursue Ph.D. in plant breeding at UF

PROFESSIONAL AFFILIATIONS AND SERVICES

- *Manuscript Reviews (no. of manuscript reviews is in parentheses)*, **The Plant Genome (2), Frontiers in Plant Science (1), Plant Phenomics (1) The Plant Phenome (1), HortScience (1)**
- *Student Oral Presentation Competition Judge,* **CANVAS 2025, Crop Science Society of America**
- *Member*, **Tri-society for Agronomy, Crop Science and Soil Science America**, Since 2021
- *Member*, **National Association of Plant Breeding**, Since 2021
- *Member*, **American Society for Horticultural Science**, Since 2019
- *Member*, **Florida State Horticultural Society**, 2019-21

SCIENTIFIC PRESENTATIONS

- Deciphering the genomic regions influencing the hyperspectral-based phenome correlated with yield associated traits in wheat, **University of Florida Plant Breeding Retreat 2025, Daytona, FL**
- Enhancing wheat yield potential: integrating genomic and phenomic approaches for biomass partitioning optimization, **3rd International Wheat Congress**, **2024, Perth, Australia**
- Integrating remote sensing with genomics to enhance agronomic trait prediction in wheat, **University of Florida Plant Breeding Retreat 2024, Daytona, FL**
- Integrating remote sensing data for phenomic and genomic prediction of agronomic traits in wheat, **University of Florida Plant Science Symposium 2024, Gainesville, FL**
- Optimizing genomic prediction models to predict HI, yield, and biomass partitioning traits in wheat. **Louisiana State University Plant Science Symposium 2023, Baton Rouge, LA**
- Determining yield, harvest index, and associated complex biomass partitioning traits in wheat using UAV-based hyperspectral sensor and machine learning. **Western Crop Science Society (WCSSA) annual meeting 2023, Honolulu, Hawaii**
- Potential use of UAV-based remote sensing tools for indirect assessment of harvest index and associated complex biomass partitioning traits in wheat. **AI Conference 2023, Orlando, FL**
- Potential use of UAV-based remote sensing tools for indirect assessment of harvest index, biomass partitioning dynamics and associated complex traits in wheat, **Tri-society ASA, CSSA, SSSA annual conference 2022**

- Estimation of harvest index and biomass partitioning traits in wheat using UAV-based remote sensing tools and genomics, **Student Organic Seed Symposium 2022, Morgantown, WV**
- Evaluating citrus rootstocks for their potential for use in high-density plantings in HLB-endemic conditions, **American Society for Horticultural Science (ASHS) annual conference 2021, Denver, CO**
- Field performances of 'Hamlin' orange trees grown on various diploid and tetraploid rootstocks in HLB-endemic conditions, **Florida State Horticultural Society (FSHS) annual general meeting 2020**
- Assessing rootstock effects on the horticultural performance of 'Valencia' orange trees grown commercially in HLB endemic conditions, **American Society for Horticultural Science (ASHS) annual conference 2020**
- Evaluation of citrus rootstock cultivars response to HLB in large-scale commercial field trials, **7th Annual South Florida Research Graduate Symposium 2019, Homestead, FL**

LEADERSHIPS

- *President*, **Nepalese Student Association**, University of Florida, 2023-24
- *Vice-president*, **Gator Cricket Club**, University of Florida, 2023-24
- *Vice-president (2022-24) & Treasurer (2021-22)*, **Gator Citrus Club**, University of Florida, 2021- 24
- *Captain (2023-24) & Vice-captain (2021-23)*, **University of Florida Cricket (Sports) Team**, 2021-24
- *Vice-President*, **Nepalese Student Association**, University of Florida, 2022-23
- *Vice-president*, **Plant Science Council**, University of Florida, 2021-23

PROFESSIONAL REFERENCES

Dr. Md Ali Babar
Associate Professor, Agronomy Department,
University of Florida
Cell: 217-552-2346
Email: mababar@ufl.edu
Relationship: Ph.D. supervisor (2021-2025)

Dr. Ute Albrecht
Associate Professor, Department of Horticultural Science, University of Florida
Cell: 772-532-2918
Email: ualbrecht@ufl.edu
Relationship: MS advisor (2019-2021)

Dr. Yiannis Ampatzidis
Associate Professor, Department of Agricultural and Biological Engineering, University of Florida
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Email: i.ampatzidis@ufl.edu
Relationship: Ph.D. co-supervisor (2021-current)