Piyush Pandey

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Education

2022 (Expected) **Ph.D.** North Carolina State University, Raleigh, NC
Biological and Agricultral Engineering
and **Forestry and Environmental Resources**

2017 **M.S.** in Agricultural and Biological Systems Engineering University of Nebraska, Lincoln, NE
Thesis title:
"High Throughput Phenotyping of Sorghum for the Study of Growth Rate, Water Use Efficiency, and Chemical Composition". Link to thesis.

2014 **B.S.** in Mechanical Engineering Tribhuvan University, Kathmandu, Nepal
Final year thesis on design and fabrication of a post-harvest citrus grading machine

Certification

Teaching and Communication Certificate , The Graduate School, North Carolina State University
Expected completion: Spring 2022

Research Appointment

June 2015 - Dec 2015 **Research Assistant** Nepal Academy of Science and Technology, Lalitpur, Nepal
Research on identification of sensor location and installation for an earthquake early warning system

Publications

Journal Publications

1. **Pandey, P.**, Payn, K.G., Lu, Y., Heine, A.J., Walker, T.D., Acosta, J.J., & Young, S. (2021). **Hyperspectral Imaging Combined with Machine Learning for the Detection of Fusiform Rust Disease Incidence in Loblolly Pine Seedlings** *Remote Sensing.; 13(18):3595. https://doi.org/10.3390/rs13183595*

2. **Pandey, P.**, Dakshinamurthy, H.N., & Young, S. (2021). **Frontier: Autonomy in Detection, Actuation, and Planning for Robotic Weeding Systems.** *Transactions of the ASABE, 64(2), 557-563.*

3. Lu, Y., Payn, K. G., **Pandey, P.**, Acosta, J. J., Heine, A. J., Walker, T. D., & Young, S. (2021). **Hyperspectral Imaging with Cost-Sensitive Learning for High-Throughput Screening of Loblolly Pine (Pinus taeda L.) Seedling for Freeze Tolerance.** *Transactions of the ASABE, 0.*

4. Lu, Y., Walker, T. D., Acosta, J. J., Young, S., **Pandey, P.**, Heine, A. J., & Payn, K. G. (2021). **Prediction of Freeze Damage and Minimum Winter Temperature of the Seed Source of Loblolly Pine Seedlings Using Hyperspectral Imaging.** *Forest Science, 67(3), 321-334.*

5. Liang, Z., **Pandey, P.**, Stoerger, V., Xu, Y., Qiu, Y., Ge, Y., & Schnable, J. C. (2018). **Conventional and hyperspectral time-series imaging of maize lines widely used in field trials.** *Gigascience, 7(2), gix117. https://doi.org/10.1093/gigascience/gix117*

6. **Pandey, P.**, Ge, Y., Stoerger, V., & Schnable, J. C. (2017). **High throughput in vivo analysis of plant leaf chemical properties using hyperspectral imaging.** *Frontiers in plant science, 8, 1348. https://www.frontiersin.org/articles/10.3389/fpls.2017.01348/full*

Conference Publications

1. **Pandey, P.**, Payn, K. G., Lu, Y., Heine, A. J., Walker, T. D., & Young, S. (2020). **High Throughput Phenotyping for Fusiform Rust Disease Resistance in Loblolly Pine Using Hyperspectral Imaging.** *In 2020 ASABE Annual International Virtual Meeting (p. 1). American Society of Agricultural and Biological Engineers. https://elibrary.asabe.org/abstract.asp?aid=51616*
2. Lu, Y., Payn, K. G., **Pandey, P.**, Acosta, J. J., Heine, A. J., Walker, T. D., & Young, S. (2020). **Hyperspectral Imaging-Enabled High-Throughput Screening of Loblolly Pine (Pinus taeda) Seedlings for Freeze Tolerance.** *In 2020 ASABE Annual International Virtual Meeting (p. 1). American Society of Agricultural and Biological Engineers. https://elibrary.asabe.org/abstract.asp?aid=51561*
3. Ge, Y., **Pandey, P.**, & Bai, G. (2016). **Estimating fresh biomass of maize plants from their RGB images in greenhouse phenotyping.** *In Autonomous Air and Ground Sensing Systems for Agricultural Optimization and Phenotyping (Vol. 9866, p. 986605).International Society for Optics and Photonics. SPIE Digital Library*

Presentations

Poster Presentations

1. **Pandey, P.**, Payn, K. G., Heine, A. J., Young, S. **Design of an Automated Controlled Pollination System for Loblolly Pine.** *Presented at the European Conference on Mobile Robots. Workshop on Agricultural Robotics and Automation, August 31, 2021*
2. **Pandey, P.**, Payn, K. G., Lu, Y., A. Juan, Heine, A. J., Walker, T. D., & Young, S.**High-throughput phenotyping of loblolly pine: Analysis of hyperspectral images at the plant organ level for disease resistance** *Presented at the North American Plant Phenotyping Network Annual Conference, February, 2021*
3. **Pandey, P.**, & Li, C. (2019, February) **Evaluation of 3D reconstruction methods with application to plant phenotyping under field conditions.** *Presented at the College of Engineering Research Showcase at the University of Georgia, Feb 22, 2019.*
4. **Pandey, P.**, Ge, Y., Stoerger, V., & Schnable, J. C. (2017, April). **High Throughput In vivo Analysis of Plant Leaf Chemical Properties Using Hyperspectral Imaging.** *Presented at the University of Nebraska-Lincoln Research Fair, April 4-5, 2017. Link to poster*

Workshops

1. **Hyperspectral image analysis for plant phenotyping**. *2021 Midwest Big Data Summer School, Iowa State University, June 2021*

invited presentations

1. **High Throughput Phenotyping of Loblolly Pine Seedlings for Disease Resistance Using Hyperspectral Imaging**. *NCSU Cooperative Tree Improvement Program Contact Meeting December 2-3, 2020*
2. **Computer vision and pollinating robots in the breeding of loblolly pine**. *Camcore Annual Meeting 2021, December 1.*

Teaching Appointment

Spring 2022 **Co-instructor** North Carolina State University, Raleigh, NC

BAE 401/501 Sensors and Control

Introduction to sensors and control with lab sections using Matlab and Arduino microcontroller.

Spring 2021 **Instructor of Record** North Carolina State University, Raleigh, NC

2021 BAE Engineering Teaching Fellows Program

BAE 200 Computer Methods in Biological Engineering

Introduction to engineering problem-solving using spreadsheets and computer programming in R.

Fall 2020 **Teaching Assistant** North Carolina State University, Raleigh, NC

BAE 200 Computer Methods in Biological Engineering
Graded and provided feedback on student work.

Fall 2017 **Teaching Assistant** University of Nebraska-Lincoln, Lincoln, NE

BSEN 460/860 Instrumentation and Controls
Conducted laboratories, delivered lecture, supervised student projects.

Peer review

Reviewer
Frontiers in Plant Science (2*)
Computers and Electronics in Agriculture (2)
Applied Engineering in Agriculture (2)
AAAI 2022: Workshop on AI for Agriculture and Food Systems (5)

Co-reviewer
The Plant Journal (2)
IEEE Robotics and Automation Letters (2)

* *Number in parenthesis is number of papers reviewed*

Service

Committee member: ASABE MS-60 Unmanned Aerial Systems
Judge: ASABE Robotics Student Design Competition 2020
Application reviewer: UNL Graduate Travel Awards Program (GTAP) 2017

Mentorship

Undergraduate researchers
Kate Yang, Ema Muslic, University of Nebraska-Lincoln (2022)
Project: Greenhouse phenotyping of plants
Spencer Corkins, North Carolina State University (2022)
Project: Quadrotor design and control

Senior design teams
Arianna Braiman, Erica Lisowe, Devon Hoyle, Garrett Forro, North Carolina State University (2020)
Project: Automating the Controlled Pollination Process of Loblolly Pine in North Carolina with Drones
Callie Stanek, North Carolina State University (2020)
Project: Monitoring of turkey aggression using a Raspberry Pi Computer

Student robotics group
UNL Huskerbots Robotics Team, University of Nebraska-Lincoln (2017)

Memberships

American Society of Agricultural and Biological Engineers Member

North American Plant Phenotyping Network Member

Certifications

Certified Remote UAS Drone Pilot under FAA Part 107.