

Piyush Pandey

🏠 piyushpandey.info

✉ ppandey4@ncsu.edu

🔍 [google scholar](#)

🌐 [linked-in](#)

EDUCATION

2022	Ph.D. Biological and Agricultural Engineering and Forestry and Environmental Resources	NORTH CAROLINA STATE UNIVERSITY, RALEIGH, NC
2017	M.S. in Agricultural and Biological Systems Engineering Thesis title: "High Throughput Phenotyping of Sorghum for the Study of Growth Rate, Water Use Efficiency, and Chemical Composition". Link to thesis.	UNIVERSITY OF NEBRASKA, LINCOLN, NE
2015	B.S. in Mechanical Engineering Final year thesis on design and fabrication of a post-harvest citrus grading machine	TRIBHUVAN UNIVERSITY, KATHMANDU, NEPAL

CERTIFICATION

Teaching and Communication Certificate, The Graduate School, North Carolina State University (2022)
Communication Strategies for Teaching and Beyond, The Graduate School, North Carolina State University (2022)

AWARDS AND HONORS

2022	Outstanding Teaching Assistant	NC STATE BIOLOGICAL AND AGRICULTURAL ENGINEERING
2022	Alpha Epsilon Honor Society	
2019	University Graduate Fellowship	NC STATE UNIVERSITY
2017	Awarded second position	ASABE STUDENT ROBOTICS COMPETITION

RESEARCH APPOINTMENT

June 2015 - Dec 2015	Research Assistant Research on identification of sensor location and installation for an earthquake early warning system	NEPAL ACADEMY OF SCIENCE AND TECHNOLOGY, LALITPUR, NEPAL
November 2022 - Present	ORISE Postdoctoral Fellow - Development of computer vision models for the phenotyping of individual plants -	UNITED STATES DEPARTMENT OF AGRICULTURE - AGRICULTURAL RESEARCH SERVICE

PUBLICATIONS

JOURNAL PUBLICATIONS

1. Veazie, P., **Pandey, P.**, Young, S., Ballance, M. S., Hicks, K., & Whipker, B. (2022). **Impact of Macronutrient Fertility on Mineral Uptake and Growth of Lactuca sativa 'Salanova Green' in a Hydroponic System.** *Horticulturae*, 8(11), 1075.
2. **Pandey, P.**, Whipker, B., Veazie, P., & Young, S. (2022). **Non-destructive Characterization of Macronutrients in Hydroponic Lettuce Using Hyperspectral Imaging** *Biosystems Engineering (In Review)*.
3. **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>

4. 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. doi.org/10.13031/trans.14085
5. 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*, 64(6): 2045-2059. doi.org/10.13031/trans.14708.
6. 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. doi.org/10.1093/forsci/fxab003.
7. 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
8. 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. doi.org/10.3389/fpls.2017.01348.

CONFERENCE PUBLICATIONS

1. Pandey, P., Acosta, J. J., Payn, K. G., & Young, S. (2022). **Towards aerial robotic pollination for controlled crosses in *Pinus taeda*.** In 2022 ASABE Annual International Meeting. American Society of Agricultural and Biological Engineers.
2. 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
3. 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
4. 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

BOOK CHAPTERS

1. Pandey, P. & Young, S., **Design Considerations for In-Field Measurement of Plant Architecture Traits Using Ground-Based Platforms**, in *High-Throughput Plant Phenotyping: Methods and Protocols*, ser. Methods in Molecular Biology, A. Lorence and K. Medina Jimenez, Eds., 1st ed., vol. 2539, New York, NY: Springer, 2022. [Online]. Available: https://link.springer.com/book/9781071625361. (In press)

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 BAE 401/501 Sensors and Control Introduction to sensors and control with lab sections using Matlab and Arduino microcontroller.	NORTH CAROLINA STATE UNIVERSITY, RALEIGH, NC
Spring 2021	Instructor of Record 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.	NORTH CAROLINA STATE UNIVERSITY, RALEIGH, NC
Fall 2020	Teaching Assistant BAE 200 Computer Methods in Biological Engineering Graded and provided feedback on student work.	NORTH CAROLINA STATE UNIVERSITY, RALEIGH, NC
Fall 2017	Teaching Assistant BSEN 460/860 Instrumentation and Controls Conducted laboratories, delivered lecture, supervised student projects.	UNIVERSITY OF NEBRASKA-LINCOLN, LINCOLN, NE

PEER REVIEW

Reviewer

Frontiers in Plant Science (2*)
 Computers and Electronics in Agriculture (2)
 Applied Engineering in Agriculture (3)
 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

Secretary: ASABE ITSC-318 Mechatronics & Robotics (2022)
Committee member: ASABE MS-60 Unmanned Aerial Systems; ITSC-318 Mechatronics & Robotics
Judge: ASABE Robotics Student Design Competition (2020)
Application reviewer: UNL Graduate Travel Awards Program (2017)

MENTORSHIP

Supervision of undergraduate researchers

Kate Yang, Ema Muslic, University of Nebraska-Lincoln (2022)

Project: Greenhouse phenotyping of plants

Spencer Corkins, North Carolina State University (2021-2022)

Project: Quadrotor design and control

Chun Ngai North Carolina State University (2022)

Project: Manipulator design for sweet potato slip singulation

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 (2021-2022)

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](#).