Sierra N. Young, Ph.D.

Biological and Agricultural Engineering
North Carolina State University
151 Weaver Laboratories, Campus Box 7625
Raleigh, North Carolina 27695

Office: (919) 515-6740
Phone: (630) 310-0578
Email: sierrayoung@ncsu.edu
Homepage: thedaisylab.com

Education

2018	Ph.D.	Civil Engineering	University of Illinois at Urbana-Champaign
2015	M.S.	Civil Engineering	University of Illinois at Urbana-Champaign
2014	B.S.	Civil and Environmental Engineering	Cornell University

Academic Appointments

2019	Assistant Professor	Biological and Agricultural Engineering	North Carolina State University
2018	Visiting Scholar	Agricultural and Biosystems Engineering	Iowa State University

Awards and Fellowships

2020 New Faces of ASABE Class of 2020 Top Honoree, ASABE
2018 Global Water Security for Agriculture and Natural Resources Conference Travel Award, ASABE
2018 Graduate College Travel Award, University of Illinois at Urbana-Champaign
2017 Springer Best Oral Presentation Award, Innovative Strategies for Sustainable Water Management
2016 National Defense Science and Engineering Graduate Fellowship, U.S. Department of Defense
2016 FMC Educational Fund Fellowship, FMC Technologies, University of Illinois at Urbana-Champaign

PUBLICATIONS

Peer-Reviewed Journal Publications

† indicates corresponding author(s)
boldface indicates me or a member of my lab

[1] R. Aharoni, V. Klymiuk, B. Sarusi, **S. Young**, T. Fahima, B. Fishbain, and S. Kendler, "Spectral light-reflection data dimensionality reduction for timely detection of yellow rust," *Precision Agriculture*, 2020, ISSN: 1573-1618. DOI: 10.1007/s11119-020-09742-2.

[2] G. Penny, V. Srinivasan, R. Apoorva, K. Jeremiah, J. Peschel, **S. Young**, and S. Thompson, "A process-based approach to attribution of historical streamflow decline in a data-scarce and human-dominated watershed," *Hydrological Processes*, vol. 34, no. 8, pp. 1981–1995, 2020. DOI: 10.1002/hyp.13707.

[3] **S. N. Young** and J. M. Peschel, "Review of human–machine interfaces for small unmanned systems with robotic manipulators," *IEEE Transactions on Human-Machine Systems*, vol. 50, no. 2, pp. 131–143, 2020. DOI: 10.1109/THMS.2020.2969380.

[4] **S. N. Young**†, "A framework for evaluating field-based, high-throughput phenotyping systems: A meta-analysis," *Sensors*, vol. 19, no. 16, p. 3582, 2019. DOI: 10.3390/s19163582.

[5] **S. N. Young**, E. Kayacan, and J. M. Peschel, "Design and field evaluation of a ground robot for high-throughput phenotyping of energy sorghum," *Precision Agriculture*, vol. 20, no. 4, pp. 697–722, 2019. DOI: 10.1007/s11119-018-9601-6.

[6] E. Kayacan, **S. N. Young**, J. M. Peschel, and G. Chowdhary, "High-precision control of tracked field robots in the presence of unknown traction coefficients," *Journal of Field Robotics*, vol. 35, no. 7, pp. 1050–1062, 2018. DOI: 10.1002/rob.21794.

[7] **S. Young**, J. Peschel, G. Penny, S. Thompson, and V. Srinivasan, "Robot-assisted measurement for hydrologic understanding in data sparse regions," *Water*, vol. 9, no. 7, p. 494, 2017. DOI: 10.3390/w9070494.

Non-Peer-Reviewed Publications

boldface indicates me or a member of my lab

[1] **P. Pandey**, **H. N. Dakshinamurthy**, and **S. Young**, "A literature review of non-herbicide, robotic weeding: A decade of progress," White Paper, Prepared for Cotton Incorporated, 2020, [Online]. Available: https://cottoncultivated.cottoninc.com/wp-content/uploads/2020/06/Robotic-Weeding-LitReview-White_Paper_Pandey_Dakshinamurthy_Young_2020.pdf.

[2] **Y. Lu**, K. G. Payn, **P. Pandey**, J. J. Acosta, A. J. Heine, T. D. Walker, and **S. Young**, "Hyperspectral imaging-enabled high-throughput screening of loblolly pine (pinus taeda) seedlings for freeze tolerance," in *2020 ASABE Annual International Virtual Meeting*, American Society of Agricultural and Biological Engineers, 2020, p. 1. DOI: doi:10.13031/aim.202001072.

PRESENTATIONS

Invited Talks and Seminars

[1] "Analyzing sensor data at the source," Invited Session Titled: "Instructional Case Studies with Data Sets for YOUR Instruction", ASABE Annual International Meeting (Virtual), Jul. 15, 2020.

[2] "Towards enabling remote telemanipulation by uncrewed aerial systems (uas) in unknown environments," RSS Robots in the Wild Workshop: Challenges in Deploying Robust Autonomy for Robotic Exploration (Virtual), Jul. 12, 2020.

[3] "Using robotics, sensing, and automation to improve the throughput of phenotyping," NCSU INTRINsyC Seminar Series (Virtual), Jun. 26, 2020.

[4] "From farm to takeoff: Small unmanned robots for agricultural and biological systems," Cornell Initiative for Digital Agriculture (CIDA) Seminar Series, Ithaca, NY, Dec. 9, 2019.

[5] "Using robotics and automation to improve the throughput of field-based phenotyping," Syngenta RTP Plant Expression Community Seminar Series, Raleigh, NC, Nov. 12, 2019.

[6] "From farm to takeoff: Ground and aerial robots for biological systems analysis," Carnegie Mellon University Field Robotics Center Seminar Series, Pittsburgh, PA, May 21, 2019.

[7] "Advancements and challenges in technology and data management practices of field-based, high-throughput phenotyping," Phenome 2019 Invited Speaker, American Society of Plant Biologists, Tucson, AZ, Feb. 8, 2019.

[8] "Unmanned systems for sensing and sense-making in agricultural and natural environments," Invited Seminar Speaker, Department of Food, Agricultural and Biological Engineering, The Ohio State University, Columbus, OH, Apr. 10, 2018.

[9] "Human-machine interaction in robotics and automation for sensing and sense-making," Invited Seminar Speaker, Department of Agricultural and Biosystems Engineering, Purdue University, West Lafayette, IN, Feb. 26, 2018.

[10] "Design and evaluation of a ground vehicle for field-based phenotyping of energy sorghum," Phenome 2018 Invited Speaker, American Society of Plant Biologists, Tucson, AZ, Feb. 15, 2018.

[11] "Robot-assisted measurements in a data-sparse region of india," Ven Te Chow Hydrosystems Seminar, University of Illinois, Urbana, IL, Apr. 15, 2016.

[12] "Bathymetric data collection using multiple robotics platforms: Uavs, usvs, and kite aerial photography," Linking Robotics, Citizen Science and Remote Sensing to Advance Water Science in Data-Scarce Regions Seminar Series, Ashoka Trust for Research in Ecology and the Environment (ATREE), Bangalore, India, Jun. 12, 2015.

Conference Presentations and Posters

[1] **A. Nguyen**, V. Abner, M. Knauer, J. Holt, and **S. Young**, "Accurate and rapid assessment of pig body weights using stereo vision and advanced image processing," in *ASABE Annual International Meeting*, (Virtual), Jul. 2020.

[2] **A. Hillman**, **S. Young**, and C. Sayde, "High resolution assessment of miscanthus production environmental impacts," in *ASABE Annual International Meeting*, (Virtual), Jul. 2020.

[3] **P. Pandey**, K. Payn, and **S. Young**, "A UAV platform for mass production of control crosses in Loblolly Pine," in *ASABE Annual International Meeting*, (Virtual), Jul. 2020.

[4] **E. Smith**, S. Hall, and **S. N. Young**, "Water quality monitoring using collaborative aerial and surface systems in nearshore aquaculture production environments," in *ASABE Annual International Meeting*, (Virtual), Jul. 2020.

[5] **H. N. Dakshinamurthy** and **S. N. Young**, "In situ precision measurements of soil moisture content using an unmanned aerial vehicle," in *ASABE Annual International Meeting*, (Virtual), Jul. 2020.

[6] **Y. Lu**, **P. Pandey**, K. Payn, A. Heine, T. Walker, and **S. N. Young**, "Hyperspectral imaging-enabled high-throughput screening of loblolly pine (pinus taeda) seedlings for freeze tolerance," in *ASABE Annual International Meeting*, (Virtual), Jul. 2020.

[7] **P. Pandey**, K. Payne, T. Walker, A. Heine, and **S. N. Young**, "High throughput phenotyping for fusiform rust disease resistance in loblolly pine using hyperspectral imaging," in *ASABE Annual International Meeting*, (Virtual), Jul. 2020.

[8] **E. Smith**, S. Hall, and **S. N. Young**, "Water quality testing using collaborative unmanned surface vehicle-unmanned aerial vehicle systems in coastal environments," in *ASCE World Environmental and Water Resources Congress*, (Accepted Abstract; Conference Cancelled due to COVID19), May 2020.

[9] **S. N. Young** and J. Peschel, "Advancing remote manipulation with unmanned aerial vehicles for agricultural applications," in *ASABE Annual International Meeting*, (Boston, MA), Jul. 9, 2019.

[10] **S. N. Young**, R. Lanciloti, and J. Peschel, "Unmanned systems for agricultural water measurement and management," in *Global Water Security for Agricultural and Natural Resources (ASABE Global Initiative Conference)*, (Hyderabad, India), Oct. 5, 2018.

[11] **S. N. Young**, K. Koppula, R. Lanciloti, J. Riesen, and J. Peschel, "Telemanipulation by unmanned aerial vehicles for agricultural data applications," in *ASABE International Meeting*, (Detroit, MI), Jul. 30, 2018.

[12] **S. N. Young**, J. Riesen, and J. Peschel, "In situ measurement of soil-water parameters using a micro unmanned aerial vehicle," in *ASCE World Environmental and Water Resources Congress*, (Minneapolis, MN), Jun. 4, 2018.

[13] **S. N. Young**, "Field application of small, low-cost robots for remote surface data collection," in *Innovative Strategies for Sustainable Water Management*, (Phagwara, Punjab, India), ***Best Oral Presentation and Springer Abstract Award**, Nov. 18, 2017.

[14] J. Peschel and **S. N. Young**, "Human-robot teaming for hydrologic data gathering at multiple scales," in *AGU Fall Meeting Abstracts*, (New Orleans, LA), 2017.

[15] **S. N. Young** and J. Peschel, "Bathymetric mapping with a small unmanned surface system," in *ASCE World Environmental and Water Resources Congress*, (West Palm Beach, FL), 2016.

[16] J. Peschel and **S. N. Young**, "Robot-assisted socio-hydrologic and water quality understanding in data sparse regions," in *AGU Fall Meeting Abstracts*, (San Francisco, CA), 2016.

[17] **S. N. Young** and J. Peschel, "Waterway-view imaging with a small unmanned surface system," in *AGU Fall Meeting Abstracts*, (San Francisco, CA), 2015.

[18] G. Penny, S. E. Thompson, V. Srinivasan, J. Peschel, **S. N. Young**, K. Jeremiah, *et al.*, "Streamflow generation in a drying catchment outside bangalore, india," in *AGU Fall Meeting Abstracts*, (San Francisco, CA), 2015.

[19] J. Peschel, **S. N. Young**, G. Penny, S. Thompson, and V. Srinivasan, "Robot-assisted measurements in data sparse regions," in *AGU Fall Meeting Abstracts*, (San Francisco, CA), 2015.

EXTENSION

Extension Presentations

[1] **S. N. Young**, "Advances in machine learning and robotics for autonomous weeding," in *NC Soybean Producers Association Virtual Field Day*, Aug. 2020.

[2] ——, "Current and future uses for ground and aerial robots in precision agriculture," in *Southeast Regional Fruit & Vegetable Conference, Strawberry Educational Session*, (Savannah, GA), Jan. 10, 2020.

[3] ——, "Robotics and automation: Opportunities for peach production," in *Southeast Regional Fruit & Vegetable Conference, Peach Educational Session*, (Savannah, GA), Jan. 10, 2020.

[4] ——, "Robotic crop monitoring and spraying technologies: Current uses and future trends," in *Southeast Regional Fruit & Vegetable Conference, Caneberry Educational Session II*, (Savannah, GA), Jan. 10, 2020.

[5] **S. N. Young**, C. Reberg-Horton, J. Ward, and G. Roberson, "Digital ag tools for on-farm research," in *NC Extension Conference*, (Raleigh, NC), Oct. 28, 2019.

[6] **S. N. Young** and J. Ward, "Tools for phenotyping, precision agriculture, and machine systems," in *International Union of Forest Research Organizations Tree Biotechnology Conference, Suggs Lab Tour*, (Raleigh, NC), Jun. 26, 2019.

Workshops

[1] "Hardware and sensors," (Tucson, AZ), Instructor and Organizer, Phenome Digital Phenotyping Workshop, Phenome Conference, Feb. 6, 2019.

[2] "Future directions: Robotic applications for ag sensing," (Raleigh, NC), Instructor, Data Science for Ag Extension Agents Workshop, Booth Field Learning Lab, Jan. 16, 2019.

[3] "Hardware and sensors," (Tucson, AZ), Instructor, Phenome Digital Phenotyping Workshop, Phenome Conference, Feb. 13, 2018.

[4] "Unmanned aerial vehicles in intensively managed landscapes," (West Lafayette, IN), Instructor, Consortium of Universities for the Advancement of Hydrologic Science (CUAHSI), Role of Runoff and Erosion on Soil Carbon Stocks Workshop, Purdue University, Oct. 20, 2015.

MENTORSHIP

Current Ph.D. Students

Hemanth Dakshinamurthy	Anticipated graduation: May 2022
Piyush Pandey (co-advised)	Anticipated graduation: May 2022

Current M.S. Students

Anh Nguyen	Anticipated graduation: May 2021
Russell Smith (co-advised)	Anticipated graduation: May 2021
Andrew Hillman (co-advised)	Anticipated graduation: May 2021

Undergraduate Students Supervised

Ian Dershem	Computer Science (UNC Chapel Hill)	Spring 2020 - Present
Evan Smith	Biological & Agricultural Engineering (NCSU)	Summer 2019 - Present
John Corriher	Biological & Agricultural Engineering (NCSU)	Summer 2019
William Daniels	Computer Engineering (UNC Charlotte)	Summer 2019
Knicole Knox	Computer Engineering (NCSU)	Spring - Fall 2019

Graduate Student Committee Membership

Kaelin Saul	Ph.D.	Biological & Agricultural Engineering
Ryan Phillips	M.S.	Biological & Agricultural Engineering
Victoria Abner	M.S.	Animal Science

Other Mentorship Activities

Fall 2020-Spring 2021, Faculty Advisor, NC State BAE ASABE Student Club
Spring 2020, Senior Design Faculty Sponsor, Project Title: Water Sampling Payload for an Autonomous Surface Vehicle

TEACHING

Since 2019, Instructor, North Carolina State University, *BAE 401/501 Sensors and Controls*
Lecture and lab-based course for undergraduate and graduate students serving as an introduction for two- and three-dimensional visual sensing for automated sensemaking in agricultural, natural, and urban systems. Focuses on understanding both the theory and hands-on aspects of computer vision.

Spring 2018, Co-Instructor, Iowa State University, *ABE 690 Visual Sensing and Sensemaking*
Lecture and lab-based course for graduate students serving as an introduction for two- and three-dimensional visual sensing for automated sensemaking in agricultural, natural, and urban systems. Focuses on understanding both the theory and hands-on aspects of computer vision.

Spring 2018, Co-Instructor, Iowa State University, *HON 290H Honors Program*
Independent study research-based course on topics of an interdisciplinary nature. Provides an introduction

to research methodology and hands-on experience in a robotics and sensing lab. Intended for freshmen and sophomores with membership in the University Honors Program.

SERVICE

Service to the Profession

Appointed or Elected Leadership

since 2019	Vice Chair, Emerging Information Systems (ITSC-254) Committee, ASABE
since 2019	Secretary, Emerging and Innovative Technologies Committee, ASCE EWRI
2019	Program Committee, Phenome 2019 Conference, American Society of Plant Biologists, Tucson, AZ
2016-2018	Director and Liaison, Graduate Women in the Society of Women Engineers, University of Illinois

Committee Membership Involvement

since 2020	Unmanned Aerial Systems (MS-60), ASABE
since 2018	Technical Committee on Agricultural Robotics and Automation, IEEE RAS
since 2018	Emerging and Innovative Technologies Committee, ASCE EWRI
since 2018	Emerging Information Systems Committee (ITSC-254), ASABE
2018-2019	Unmanned Systems for Environmental and Water Resources Task Committee, ASCE EWRI

Membership in Professional and Honorary Societies

since 2017	American Society of Agricultural and Biological Engineers
since 2017	Institute of Electrical and Electronics Engineers
since 2015	American Geophysical Union
since 2014	National Honor Society Tau Beta Pi
since 2013	National Honor Society Chi Epsilon
since 2013	Society of Women Engineers
since 2012	American Society of Civil Engineers

Editorships and Reviewing Activities

2020	Guest Editor, Plant Phenomics and Precision Agriculture Call for Papers, *PLOS One*.
Ongoing	Reviewer: *Transactions of the ASABE, Applied Engineering in Agriculture, Plant Methods, HardwareX, Hydrological Sciences, Frontiers in Earth Science.*

University and Community Service

NC State Campus Service

2020-Present	Member, GLBT Advocate Program
2020	Volunteer, Virtual State 4-H Presentation Judging for Electric and Wheels and Engines
2020	Volunteer and Panel Member, Virtual State 4-H Electric Congress
2020	Volunteer and Presenter, 4th NC Public School Science Classes (via Zoom during COVID)
2019	Volunteer, VEX Robotics Triangle League Competitions
2019	Volunteer, BAE Ecological Engineering Summer Camp
2019	Volunteer, ASABE Rally in Raleigh Panel Moderator

University of Illinois Campus Service

2015-2018	Committee Member, Graduate Women in the Society of Women Engineers
2015-2017	Organizer and Volunteer, Women Exploring Graduate Opportunities in CEE
2017	Committee Member, Women Empowered in STEM Conference (weSTEM) Organizing Committee
2016	Organizer and Volunteer, Girls' Adventures in Mathematics, Engineering, and Science Camp
2016	Organizer and Volunteer, Booker T. Washington Elementary School STEM Academy
2015-2016	Volunteer, Nanoscale Science and Technology Resources for Community Teaching
2014-2016	Volunteer, University of Illinois Engineering Open House

Community Lectures

"Blow-Up and Robot Stories." PechaKucha Night Champaign-Urbana, Volume 23, February 11, 2017, Urbana, IL, USA.
"Robots in the Wild." Girl Scouts of Central Illinois Camp Kiwanis Instructional Facility at Lake of the Woods, October 1, 2016, Mahomet, IL, USA.