

Surya L Shrestha

School of Agriculture

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Education

- **Ph. D.**, Crop Science, 2014, Washington State University, Pullman, WA, USA
 - Dissertation: **Improving drought tolerance in wheat with physiological and molecular tools**
 - Supervisor: Dr. Scot H. Hulbert
- **M. S.**, Agriculture/Plant Pathology, 2008, North Dakota State University, Fargo, ND, USA
 - Thesis: **Blemish diseases of potato tubers: cause, inoculum source and management**
 - Supervisor: Dr. Gary Secor
- **B. S.**, Agriculture/Soil Science, 2003, Tribhuvan University, Institute of Agriculture and Animal Science, Chitwan, Nepal

Honors and awards

- Monsanto's Beachell-Borlaug International Scholarship, 2010-2012
- Travel award, ASA-CSSA-SSSA International Annual Meeting, Cincinnati, OH, 2012
- Travel award, short course on "Plant breeding for drought tolerance" at Colorado State University, Fort Collins, CO, 2010
- Harry E. Goldsworthy Wheat Research Fund Award, 2009 and 2011
- Honor Society of Phi Kappa Phi, 2008
- 'Aishwarya Vidhya Padak' scholastic medal for academic excellence by Her Majesty the Queen of Nepal, 2000
- Winrock Merit Women's International Scholarship, 1998-1999, 2000-2003

Professional experience

Assistant Professor (August 2025 – present)

Tennessee Tech University, School of Agriculture, Cookeville, TN

-Teach plant science courses for undergraduate students (AGRN 1100, AGRN 1110)

-Interested in evaluating agronomy and horticultural germplasms for yield, quality, and disease resistance in the field and controlled environmental conditions, and collaborating with internal and external researchers.

Agricultural Scientist (January 2025 – July 2025)

Animal Microbiology, Tennessee Department of Agriculture, Nashville, TN

-Performed quantitative and qualitative scientific analysis on a variety of agricultural samples using scientific methodologies and analytical instrumentation, and participated in method development and validation processes.

Research Scholar (August 2023 – April 2024)

Department of Horticultural Science, North Carolina State University, Kannapolis, NC

-Designed and performed genetic/genomic research with an emphasis on quality and health-protective traits, coordinated and conducted a multi-faceted project with ongoing research projects, helped in ordering of laboratory supplies, maintained laboratory inventory, notebook, and training logs, and followed laboratory compliance with safety regulations.

Postdoctoral Research Associate (November 2019 – July 2023)

Department of Plant Science, University of Tennessee, Knoxville, TN

- Developed switchgrass genotypes with high biomass yield potential with the suitability to grow as bioenergy and forage crops in marginal environments. Tested switchgrass germplasms in multiple locations and years for biomass yield, ethanol yield, and nutritional compositions, and identified genomic regions associated with these traits.

- Co-taught a plant breeding course (PLSC 453-553) for graduate and undergraduate students on conventional and molecular methods of breeding plants.

Adjunct Faculty (August 2019 – December 2019)

Pellissippi State Community College, Hardin Valley, TN

- Taught an undergraduate course (BIOL 2310) to develop the critical skill set for biological research, including handling and using biological specimens and instruments, keeping records, conducting biological experiments, and writing scientific reports.

Soybean Breeder (December 2014 – May 2017)

Bayer CropScience, Marion, AR

- Managed soybean breeding program and seed laboratory and supervised employees.

Responsible for implementing soybean product portfolio and varieties on pipeline and interacting with global leaders for germplasm advancement and variety release. Developed advanced breeding materials, delivered the materials to technology breeding and trait introgression, and coordinated with molecular breeders to develop markers.

Research Associate (February 2014 – August 2014)

Department of Crop and Soil Science, Washington State University, Pullman, WA

- Mapped genomic regions associated with the drought tolerant traits in two wheat inbred populations and identified markers closely associated with water use trait.

Graduate Research Assistant (January 2009 – January 2014)

Department of Crop and Soil Science, Washington State University, Pullman, WA

- Conducted research on wheat drought tolerance under field and greenhouse conditions. Evaluated germplasms for growth, water use, and water use efficiency under drought stress using physiological screening techniques. Genotyped wheat inbred populations using molecular markers. Developed genotypes with improved potential in a low moisture environment of the Pacific Northwest regions.

Graduate Research Assistant (August 2006 – December 2008)

Department of Plant Pathology, North Dakota State University, Fargo, ND

- Studied potato blemish diseases under greenhouse and field environments. The study identified seed and soil treatment fungicides effective in controlling the disease and quantified the pathogen infestations in tubers and soil using real-time PCR.

Research Assistant (January 2004 - July 2006)

Regional Office of the International Maize and Wheat Improvement Center (CIMMYT), and National Agricultural and Environmental Forum, Kathmandu, Nepal

- Responsible for market development for scale-appropriate machinery for agricultural resource conservation in Nepal's smallholder farming context. Conducted surveys, organized field visits, and provided on-farm training to farmers on adopting agricultural mechanization.

Workshops and trainings attended

- Catalyst group grant writing workshop, North Carolina State University, Kannapolis, NC, 2023
- RNA sequencing workshop, University of Tennessee, Knoxville, TN, 2022
- Hanover research grantmanship Workshop, virtual training, 2021
- Genotyping-by-sequencing (GBS) data analysis training, USDA, Western Regional Research Center, Albany, CA, 2020
- ALMACO 4-row planter and combine (hands on), Marion, AR, 2015 and 2016
- Quality management system, seed stewardship and job safety training, Marion, AR, 2014 to 2017
- Leadership development training by Tero International Inc., Monsanto Headquarter, St. Louis, MO, 2012
- Wheat breeding and physiology training and international wheat yield consortium workshop, CIMMYT, Cd. Obregon, Mexico, 2011 and 2012
- The world food prize symposium, Des Moines, IA, 2012
- Short course on plant breeding for drought tolerance, Colorado State University, Fort Collins, CO, 2010
- Gender sensitization training and participatory rural appraisal workshop, Institute of Agriculture and Animal Science, Rampur, Chitwan, Nepal, 2004

Research Proposals

Shrestha, S.L. and Hulbert, S.H. 2010-2012. Improving drought stress tolerance in wheat with integrated breeding, physiology, and molecular genetics. Submitted to: *Monsanto's Beachell-Borlaug International Scholarship* (~\$85,000).

- Shrestha, S.L., Hulbert, S.H., Garland-Campbell, K.A., and Steber, C.M. 2013. Wheat physiological trait screening for drought tolerance in the field. Submitted to: *Harry E. Goldsworthy Wheat Research Fund* (~\$3,000).
- Shrestha, S.L., Allen, F., Sams, C., and Senseman, S. 2020. Evaluation of switchgrass genotypes for salt tolerance by using physiological and molecular markers. Submitted to: *One UT Collaboration and innovation Grant Application* (not funded).
- Shrestha, S.L. and Iorizzo, M. 2023. Evaluating carrot's *Alternaria* tolerance and anthocyanin. Submitted to: *Bioenergy Research Initiative New and Emerging Crops Program* (not funded).

Publications

- Shrestha, S.L., Tobias, C.M., Allen, F.L., Bragg, J., Goddard, K., and Bhandari, H.S. 2025. Mapping quantitative trait loci for bioenergy traits in multiple hybrid populations of lowland switchgrass in simulated-sward planting. *GCB Bioenergy*, <https://doi.org/10.1111/gcbb.70060>
- Shrestha, S.L., Allen, F.L., Goddard, K., Bhandari, H.S., and Bates, G.E. 2023. Genetic variation for bioenergy traits within and among lowland switchgrass (*Panicum virgatum*, L.) crosses. *Biomass and Bioenergy*, 175, 106878. <https://doi.org/10.1016/j.biombioe.2023.106878>
- Shrestha, S.L., Tobias, C.M., Bhandari, H.S., Bragg, J., Nayak, S., Goddard, K., and Allen, F. 2023. Mapping quantitative trait loci for biomass yield and yield-related traits in lowland switchgrass (*Panicum virgatum* L.) multiple populations. *G3 Genes/Genomes/Genetics*, 13(5), jkad061. <https://doi.org/10.1093/g3journal/jkad061>
- Shrestha, S.L., Garland-Campbell, K.A., Steber, C.S., Pan, W. L., and Hulbert, S. H. 2023. Association of canopy temperature with agronomic traits in spring wheat inbred populations. *Euphytica*, 219(1), 7. <https://doi.org/10.1007/s10681-022-03135-4>
- Shrestha, S.L., Sams, C., and Allen, F. 2022. Genotypic variation for salt tolerance within and between 'Alamo' and 'Kanlow' switchgrass (*Panicum virgatum* L.) cultivars. *Agronomy*, 12(4), 973. <https://doi.org/10.3390/agronomy12040973>
- Shrestha, S.L., Bhandari, H.S., Allen, F., Tobias, C.M., Nayak, S., Goddard, K., and Senseman, S.A. 2021. Heterosis for biomass yield and other traits in Alamo × Kanlow switchgrass populations. *Crop Science*, 61(6), 4066-4080. <https://doi.org/10.1002/csc2.20618>
- Shrestha, S.L., Garland-Campbell, K.A., Steber, C.S., and Hulbert, S. H. 2020. Carbon isotope discrimination association with yield and test weight in Pacific Northwest-adapted spring and winter wheat. *Agrosystems, Geosciences and Environment*, 3(1), e20052. <https://doi.org/10.1002/agg2.20052>
- Shrestha, S.L. 2014. Improving drought tolerance in wheat with physiological and molecular tools. PhD thesis. Washington State University, Pullman, WA. <https://hdl.handle.net/2376/116676>
- Shrestha, S.L. 2009. Blemish diseases of potato tubers: cause, inoculum source and management. MS thesis. North Dakota State University, Fargo, ND.

Datasets

Shrestha SL, Tobias CM, Bhandari HS, Bragg J, Nayak S, Goddard K, Allen F. 2023. Alamo × Kanlow genotypic and phenotypic data for biomass yield and yield-related traits in lowland switchgrass (*Panicum virgatum* L.) crosses. *Dryad dataset*. <https://doi.org/10.5061/dryad.hmgqnk9mm>

Abstracts/Presentations/Posters

- Shrestha, S.L., Allen, F., Goddard, K., Bhandari, H.S., and Bates, G.E. 2022. Genetic variation for bioenergy traits within and among lowland switchgrass (*Panicum virgatum* L.) crosses. ASA-CSSA-SSSA International annual meeting, November 06-09, Baltimore, MD (Poster)
- Shrestha, S.L., Allen, F., Tobias, C.M., Bhandari, H.S., and Bates, G.E. 2021. Heterosis and QTL mapping for biomass yield and other traits in switchgrass (*Panicum virgatum* L.). ASA-CSSA-SSSA International annual meeting, November 07-10, Salt Lake City, UT (Oral)
- Shrestha, S.L., Sams, C.E., and Allen, F. 2020. Salt tolerance differences within and between lowland switchgrass (*Panicum virgatum* L.) cultivars. ASA-CSSA-SSSA International annual meeting, November 07-10, Salt Lake City, UT (Poster)
- Shrestha, S.L., Allen, F. and Senseman, S.A. 2020. Heterosis for biomass yield in ‘Alamo’ × ‘Kanlow’ switchgrass populations. ASA-CSSA-SSSA International annual meeting (Virtual), November 09-13 (Poster)
- Shrestha, S.L. 2014. Soybean breeding targets in the Mid-South region, Bayer Crop Science Soybean Breeding Workshop, March 14, Marion, AR (Presented to growers and stakeholders)
- Shrestha, S.L., Martinez, S., Garland-Campbell, K., Hulbert, S.H. and Steber, C.M. 2013. Discovering drought resistance mechanisms in wheat. Dryland Agriculture Technical Report 13-1 (Abstract)
- Shrestha, S.L. 2012. Physiological techniques of screening drought tolerance in wheat, Washington State University Dryland Station Field Day, June 14, Lind, WA (Presented to growers)
- Shrestha, S.L. and Hulbert, S. H. 2012. Screening of spring and winter wheat for water use efficiency by carbon isotope discrimination analysis, Western Society of Agronomy meeting, Pullman, WA (Poster) and ASA-CSSA-SSSA International annual meeting, Cincinnati, OH (Oral)
- Shrestha, S.L. and Hulbert, S. H. 2011. Carbon isotope discrimination to determine water use efficiency of wheat in Pacific Northwest (PNW). Oct. 11, Monsanto, Ankeny, IA (Poster and oral)
- Shrestha, S.L., Hulbert, S. H., Garland-Campbell, K.A. and Carter, A.H. 2011. Use of Molecular Mapping Techniques for Adaptation to Rainfall Levels in Pacific Northwest Wheat. Regional Approaches to Climate Change for Pacific Northwest Agriculture (REACCH PNA) Meetings, May 9-11, University of Idaho, Moscow, ID (Poster)
- Shrestha, S.L. 2010. Physiological screening of Drought Stress Tolerance in inland Pacific Northwest (PNW) Wheat. Plant Drought Adaptation Symposium, June 24-25, Fort Collins, CO (Oral)

Shrestha, S.L., Hulbert, S.H., Garland-Campbell, K.A. and Steber, C.S. 2010. Improving drought tolerance through integrated breeding, physiology and molecular genetics in Pacific Northwest Wheat. Dryland agriculture Technical Report 10-2 (Abstract)

Shrestha, S.L., Hulbert, S. H., Garland-Campbell, K.A. and Carter, A.H. 2010. Use of Molecular Mapping Techniques for Adaptation to Rainfall Levels in Pacific Northwest Wheat. ID # 188-7, ASA, CSSA, and SSSA International Annual Meetings, Oct 31-Nov. 4, Long Beach, CA (Poster)

Certifications

- Introduction to Genomic Technologies
- Python for Genomic Data Science

Molecular techniques

- DNA and RNA extraction
- PCR and qRT-PCR
- Gel Electrophoresis
- Gene cloning
- Tissue culture
- Plant Transformation
- Genotyping with SSR and SNP markers

Physiological screening tools and techniques

- Multi-channel fluorescence microscope (EVOS™ M7000) for stomatal traits
- Modular multimode microplate reader (Synergy H1) for leaf spectral measurements
- Infrared thermometer and Infrared camera for canopy temperature
- Portable photosynthesis system (LI-COR) for photosynthesis
- Chlorophyll meter (SPAD) for chlorophyll content
- Photosynthesis yield analyzer (MINI pam) for fluorescence measurements
- Spectrometers (JAZ) for plant growth spectral measurements
- Carbon isotope discrimination technique for water use efficiency

Professional memberships and services

- ASA-CSSA-SSSA, Crop Science Society of America (CSSA), 2010 to present
- Organizing committee member, '41st International Carrot Conference', July 8-10, 2024, Raleigh, NC
- Member, 'NCSU Horticultural Science Safety Committee', 2023-2024
- American Phytopathological Society (APS), 2007-2009
- Secretary, Plant Pathology Graduate Student Association, North Dakota State University, Fargo, ND, 2007
- Phi Kappa Phi Honor Society, 2008-2009

Computer programs

- Plant Breeding: PRISM software for handling all stages of plant breeding processes
- Bioinformatics: Practical Extraction and Report Language (PERL), Basic Local Alignment Search Tool (BLAST), genomic tools for processing GBS data (SAM tools, BCF tools, Trimmomatic and Freebayes)

- Molecular: GeneMarker for simple sequence repeats, GenomeStudio for single nucleotide polymorphisms, Mapmaker, JoinMap, MapDisto, WinQTL Cartographer,
- Statistical: SAS, JMP, R (Shiny database), R/QTL
- Productivity software: Microsoft Word, Excel workbook, Excel macro, Access, BarTender 2016 by Seagull Scientific (labeling and barcode creation), TIBCO Spotfire (data visualization and analytics software), Selection finder (tracking breeding materials through barcodes), Q-Pulse (quality management), Laboratory Information Management System (LIMS)
- Data storage and computational platform: Amazon Elastic Compute Cloud (EC2), University of Tennessee Advanced Computing Facility (ACF)