

Education

Ph.D. Biosystems Engineering (*Minor: Statistics*), GPA: **3.95** August 2023
Auburn University, Auburn, AL
Dissertation title: Effect of animal manure application and soil physicochemical properties on nutrient and metal leaching.

M.S. Biosystems Engineering, GPA: **4.00** July 2018
Auburn University, Auburn, AL
Thesis title: Sediment Fingerprinting to identify sources of in-stream sediments in an urbanized watershed.

B.S. Agricultural Engineering, GPA: **3.80** July 2015
Punjab Agricultural University (PAU), Punjab, India
Thesis title: Osmo-convective dehydration of cherry tomatoes.

Selected Professional Experience

Postdoctoral Scholar - Teaching Fellow August 2023 – Present
Wrigley Institute for Environmental Studies
University of Southern California (USC), Los Angeles, CA

Instructor for courses:

Water and Soil Sustainability (ENST 320a) laboratory sections; Spring and Fall 2024

- Providing students with hands-on learning in water and soil laboratory analyses, fieldwork, and computer-based data analysis techniques (using R and Excel).
- Renovating and updating laboratory exercises.

Environmental Issues in Society (ENST 150) discussion sections; Spring 2024

- Leading discussion sections of general education (GE) course in Environmental Studies.
- Conducting group simulation activities.
- Grading assignments and exams.

Introduction to Environmental Studies (ENST 100); Fall 2023 and 2024

- Taught GE course in Environmental Studies, introducing ~25% new class material.
- Revised and updated lecture material.
- Developed assignments and exams that allowed critical thinking and individual creativity.
- Incorporated team-based learning and group problem-solving in-class activities.
- Led field trip to San Jose Creek Water Reclamation Plant to provide the students with firsthand experience about the wastewater treatment processes.

Graduate Research Assistant
Department of Biosystems Engineering, Auburn, AL

August 2018 – August 2023

- Utilized field data collection, laboratory experiments, and modeling to elucidate the impact of manure application (poultry litter and swine and dairy manure) and soil physicochemical properties on nutrient and metal transport processes and dynamics in agricultural soils and water quality.
 - Conducted column-based rainfall simulation experiments to quantify nutrient and metal losses (especially colloidal-facilitated) in leachate collected from control and treatment (surface applied animal manure) undisturbed soil columns.
 - Performed various physical and chemical analyses on soil and water samples.
 - Utilized HYDRUS-1D model to simulate preferential transport of phosphorus based on the results obtained by laboratory and field experiments.
 - Used X-Ray computed tomography (CT) image analysis to quantify the impact of soil macropore characteristics on water and solute transport.

Summer Intern
University of Georgia-Extension, GA

May 2018 - July 2018

- Assisted Extension agents in providing Extension resources and services to the clientele.
- Worked with Extension agents and program and office staff to coordinate and implement hands-on educational program events and activities in the areas of agricultural and natural resources, family and consumer sciences, and the 4-H and youth development program.
- Shadowed the outreach manager and environmental educator for the Gwinnett County Water Resources Department to learn about the county's watershed improvement programs involving sediment control and stream restoration projects.
- Assisted the USDA-NRCS district conservationist with natural resource conservation program projects.

Graduate Research Assistant
Department of Biosystems Engineering, Auburn, AL

January 2016 - July 2018

- Sediment source tracking based on field and laboratory experiments and watershed-level modeling
 - Collected, processed, and analyzed water/ sediment samples from Moore's Mill Creek watershed (Auburn, AL) using time-integrated trap samplers, sediment cores, and field test kit.
 - Employed statistical analyses, machine learning models, and Bayesian statistics for in-stream sediment source identification.
 - Utilized GIS and Soil and Water Assessment Tool (SWAT) in predicting hydrology and sediment movement.
 - Conducted soil/suspended sediment particle size analysis using Malvern Mastersizer and sieve analysis.

Undergraduate Research Assistant
Punjab Agricultural University, Punjab, India

August 2014 - June 2015

- Assessed the drying kinetics of cherry tomatoes during osmotic and convective drying.
- Investigated the effects of the concentration of salt on the moisture content and weight of tomatoes.
- Evaluated the quality considerations of elongated and round cherry tomatoes using Konica Minolta CR 10 colorimeter.

- Worked on the operation and maintenance of advanced irrigation technologies and sophisticated ecological analysis for water conservation.

Teaching/Mentoring Experience

- Instructor for undergraduate courses (University of Southern California):
 - *Water and Soil Sustainability* (Spring and Fall 2024)
 - *Environmental Issues in Society* (Spring 2024)
 - *Introduction to Environmental Studies* (Fall 2023, 2024)
- Graduate Teaching Assistant for undergraduate/graduate courses (Auburn University):
 - *Natural Resource Systems Conservation* (Spring 2021)
 - *Watershed Modeling* (Spring 2017, 2018, 2019, 2022)
 - *Geospatial Technologies in Biosystems* (Fall 2017, 2018, 2019, 2020)
- Mentored five master's students to train them in laboratory protocols (experimental, laboratory safety and conduct) and one undergraduate in soil-water sampling and analysis (Auburn University).

Grants and Fellowships

- Alabama Water Resource Research Institute (AWRRI) Water Resources Competitive Grants Program. "Understanding Preferential Flow Patterns in No-Till Manured Pastures Using Dye Tracer and X-Ray CT Image Analysis". March 2021 (funded, amount: \$5,000) (As a PI).
- Campbell Scientific *IMAGINE* instrument grant. March 2021 (funded), amount: \$5,744).
- Southern Region SARE Graduate Student Grant. "Influence of soil physicochemical characteristics on nitrate leaching in pastures: an experimental and modeling study". May 2020 (not funded).
- Henry Linn Travel Grant | Soil Science Society of America | 2022 (funded, \$1000).
- 100+ Women Strong Travel Grant | Samuel Ginn College of Engineering, Auburn University | 2022 (funded, \$450).
- Presidential Graduate Research Fellowship | Auburn University | 2018-21 (funded, \$90,000).

Skills

- **Laboratory and Field Equipment:** Soil moisture sensors (TDR, tensiometers), data loggers, disc infiltrometer, field and lab-based rainfall simulator, water and sediment sampler, centrifuge and ultracentrifuge, discrete analyzer for soil and water analysis (nitrate, nitrite, orthophosphorus, total phosphorus), digestion block, pH and EC meter, combustion furnace, autoclave, ICP-OES, turbidimeter, UV-vis spectrophotometer, zetasizer, particle size analyzers (camsizer, mastersizer), filtration and ultrafiltration devices, ion-selective electrode, hydrometer, material fabrication (cutting, drilling).

- **Water Quantity, Quality, and Solute Transport Models:** HYDRUS-1D, STANMOD, Soil and Water Assessment Tool (SWAT), HEC-HMS, RUSLE.
- **Statistical Analysis and Machine Learning:** Statistical Analysis Software (SAS), R, Python, IBM-SPSS.
- **Engineering Design:** AutoCAD Civil-3D.
- **Geospatial Technology:** ArcGIS, ArcGIS Pro, and GPS instruments for spatial data collection.
- **Others:** ImageJ image analysis software, MS Office Suite (including Visual Basic for Applications), ability to conduct stream geomorphic assessment.

Certifications

- Engineer-in-training (EIT) (Licensed, October 2018).
- Water chemistry and bacteriological monitoring (Alabama Water Watch, 2017).

Peer-Reviewed Publications

1. **Malhotra, K.**, J. Lamba, T.R. Way, C. Williams, K.G. Karthikeyan, S. Budhathoki, R. Prasad, P. Srivastava, and J. Zheng (2024). Preferential flow of phosphorus and nitrogen under steady-state saturated conditions. *Vadose Zone Journal*, 23, e20331.
2. **Malhotra, K.**, J. Zheng, J. Lamba, and A. Abebe (2023). Application of sediment fingerprinting to apportion sediment sources: using machine learning models. *Journal of ASABE*, 66(5): 1205-1221.
3. Budhathoki, S., J. Lamba, P. Srivastava, **Malhotra, K.**, T. R. Way, and S. Katuwal (2022). Using X-ray computed tomography to quantify variability in soil macropore characteristics in pastures. *Soil and Tillage Research*, 215, 105194.
4. Budhathoki, S., J. Lamba, P. Srivastava, **Malhotra, K.**, T. R. Way, and S. Katuwal. (2022). Temporal and spatial variability in 3D soil macropore characteristics determined using X-ray computed tomography. *Journal of Soils and Sediments*, 22(4), 1263-1277.
5. **Malhotra, K.**, J. Lamba, and S. Shepherd. (2020). Sources of stream bed sediment in an urbanized watershed. *Catena*, 184, 104228.
6. Lamba, J., P. Srivastava, T. R. Way, and **Malhotra, K.** (2019). Effect of broiler litter application method on metal runoff from pastures. *Journal of Environmental Quality*, 48(6), 1856-1862
7. Lamba, J., A. Thompson, G. Peaslee, J. Panuska, K. G. Karthikeyan, **Malhotra, K.**, and N. Huisman (2019). Using atmospheric fallout radionuclides ¹³⁷Cs and ²¹⁰Pb to identify suspended sediment sources in an agricultural watershed. *Transactions of the ASABE*, 62(2), 529-538
8. **Malhotra, K.**, J. Lamba, P. Srivastava, and S. Shepherd (2018). Fingerprinting suspended sediment sources in an urbanized watershed. *Water*, 10(11), 1573.

Under review and in-preparation publications:

1. **Malhotra, K.,** J. Lamba, T.R. Way, C. Williams, K.G. Karthikeyan, R. Prasad, P. Srivastava, and J. Zheng. Investigating the effect of animal manure type on colloid-facilitated phosphorus transport (Under review, Geoderma).
2. **Malhotra, K.,** J. Lamba, T.R. Way, R. Prasad, and P. Srivastava. Effect of poultry litter application and preferential flow on metal loss in pastures (Under review, Journal of Environmental Management).
3. V. S. Sandhu, **Malhotra, K.,** J. Lamba, J. Simunek, and T. R. Way. Modeling copper and zinc loss via preferential flows in pastures using HYDRUS-1D (Under review, Vadose Zone Journal).
4. **Malhotra, K.,** J. Lamba, T.R. Way, K.G. Karthikeyan, C. Williams, and P. Srivastava. Influence of manure application and soil physicochemical properties on leaching of colloidal metals in pastures (In-preparation).
5. **Malhotra, K.,** J. Lamba, V. S. Sandhu, J. Simunek, T. R. Way, and P. Srivastava. Estimating phosphorus leaching through undisturbed soil columns using HYDRUS-1D model (In-preparation).

Conference Proceedings Publications

- **Malhotra, K.,** Lamba, J., Shepherd, S., (2019). Sources Of Stream Bed and Suspended Sediment in an Urbanized Watershed, ASABE Paper No. 1901637. Presented at the 2019 ASABE Annual International Meeting, ASABE, St. Joseph, MI, p. 1.
<https://doi.org/10.13031/aim.201901637>
- **Malhotra, K.,** Lamba, J., Shepherd, S., (2018). Sediment Fingerprinting to Identify Sources of Stream Bed Sediment in an Urbanized Watershed, ASABE Paper No. 1801826. Presented at the 2018 ASABE Annual International Meeting, ASABE, p. 1.
<https://doi.org/10.13031/aim.201801826>

Professional Presentations

- **Malhotra, K.,** J. Lamba, T.R. Way, S. Budhathoki, and P. Srivastava. Preferential flow of phosphorus and nitrogen under steady-state saturated conditions. American Society of Agricultural and Biological Engineers Annual International Meeting, Anaheim, California, July 28-31, 2024.
- **Malhotra, K.,** J. Lamba, T.R. Way, S. Budhathoki, and P. Srivastava. Impact of land use and tillage practice on preferential transport of phosphorus. American Society of Agricultural and Biological Engineers Annual International Meeting, Houston, Texas, July 17-20, 2022.
- **Malhotra, K.,** J. Lamba, T.R. Way, S. Budhathoki, and P. Srivastava. Subsurface transport of phosphorus in pasture soils: Influence of preferential flow paths. American Society of Agricultural and Biological Engineers Annual International Meeting, Houston, Texas, July 17-20, 2022.

- **Malhotra, K.,** J. Lamba, T.R. Way, and P. Srivastava. Influence of manure application and soil physicochemical properties on leaching of metals in pastures. American Society of Agricultural and Biological Engineers Annual International Meeting, Houston, Texas, July 17-20, 2022.
- **Malhotra, K.,** J. Lamba, T.R. Way, S. Budhathoki, and P. Srivastava. Influence of manure application and soil physicochemical properties on phosphorus leaching in pastures. Alabama Water Resources Conference and Symposium, Orange Beach, AL. September 8-10, 2021.
- **Malhotra, K.,** J. Lamba, T.R. Way, J. Simunek, and S. Budhathoki. Influence of macropores on phosphorus leaching in pastures: an experimental and modeling study. American Society of Agricultural and Biological Engineers Annual International Meeting (Virtual), 2021.
- **Malhotra, K.,** J. Lamba, T.R. Way, S. Budhathoki, P. Srivastava, and R. Prasad. Phosphorus Leaching through Undisturbed Soil Cores: Influence of Preferential Flow Paths. ASA, CSSA and SSSA International Annual Meeting (Virtual), 2020.
- **Malhotra, K.,** A. Abebe, and J. Lamba. Sediment Fingerprinting to Determine the Source of Suspended Sediment in an Urbanized Watershed. American Society of Agricultural and Biological Engineers Annual International Meeting, Boston, Massachusetts, July 8, 2019.
- **Malhotra, K.,** A. Abebe, and J. Lamba. Fingerprinting the Sources of Stream Bed Sediment in an Urbanized Watershed Using a Bayesian Uncertainty Estimation Framework. American Society of Agricultural and Biological Engineers Annual International Meeting, Boston, Massachusetts, July 9, 2019.
- **Malhotra, K.,** J. Lamba, and S. Shepherd. Sources of Stream Bed and Suspended Sediment in an Urbanized Watershed. American Society of Agricultural and Biological Engineers Annual International Meeting, Boston, Massachusetts, July 9, 2019.
- **Malhotra, K.,** J. Lamba, P. Srivastava, and S. Shepherd. Sediment fingerprinting to identify sources of in-stream sediment in an urbanized watershed. Alabama Water Resources Conference and Symposium, Orange Beach, Alabama, September 6-8, 2018.
- **Malhotra, K.,** J. Lamba, P. Srivastava, and S. Shepherd. Fingerprinting and Modeling In-Stream Sediment Sources in an Urbanized Watershed. American Society of Agricultural and Biological Engineers Annual International Meeting, Detroit, Michigan, July 30, 2018.
- **Malhotra, K.,** J. Lamba, P. Srivastava, and S. Shepherd. The identification of in-stream sediment sources in an urban watershed: an application of sediment fingerprinting. Graduate Engineering Research Showcase, Auburn, Alabama, November 9, 2017.
- **Malhotra, K.,** J. Lamba, P. Srivastava, and S. Shepherd. Sediment Source Analysis in Moore's Mill Creek Watershed, AL, using Sediment Fingerprinting Approach. College of Agriculture Graduate Student Poster Showcase, Auburn, Alabama, October 26, 2017.
- **Malhotra, K.,** J. Lamba, P. Srivastava, and S. Shepherd. Fingerprinting and Modeling the Sources of In-Stream Sediments in a Southern Piedmont Watershed. Alabama Water Resources Conference and Symposium, Orange Beach, Alabama, September 6-8, 2017.

- **Malhotra, K.,** J. Lamba, P. Srivastava, and S. Shepherd. Combining Sediment Fingerprinting and SWAT Modeling to Apportion the Stream Bed Sediment Sources in an Urban Watershed. American Society of Agricultural and Biological Engineers Conference, Spokane, Washington, July 16-19, 2017.
- **Malhotra, K.,** J. Lamba, P. Srivastava, and S. Shepherd. Identifying Sources of In-Stream Sediment Using Inorganic Tracers. Alabama Stormwater Forum, Auburn, Alabama, May 11-12, 2017.
- **Malhotra, K.,** J. Lamba, P. Srivastava, and S. Shepherd. Tracing In-Stream Sediment Sources in an Urban Watershed using Sediment Fingerprinting Technique. American Society of Agricultural and Biological Engineers Conference, Alabama Section, Auburn, Alabama, March 31, 2017.
- **Malhotra, K.,** J. Lamba, P. Srivastava, and S. Shepherd. Sediment fingerprinting to Identify Sources of In-Stream Sediments in an Urban Watershed, Alabama Water Resources Conference and Symposium, Orange Beach, Alabama, September 7-9, 2016.
- **Malhotra, K.,** J. Lamba, P. Srivastava, and S. Shepherd. Sediment fingerprinting to Identify Sources of In-Stream Sediments in an Urban Watershed. Graduate Engineering Research Showcase, Auburn, Alabama, October 20, 2016.
- **Malhotra, K.,** J. Lamba, P. Srivastava, and S. Shepherd. Sediment fingerprinting to Identify Sources of In-Stream Sediments in an Urban Watershed. College of Agriculture Graduate Student Poster Showcase, Auburn, Alabama, October 27, 2016.

Invited Talks

- **Malhotra, K.,** J. Lamba, T.R. Way, S. Budhathoki, and P. Srivastava. Subsurface transport of phosphorus in pasture soils: Influence of preferential flow paths. Oral Presentation, Department of Earth Sciences, University of Southern California, April 2024.
- **Malhotra, K.,** J. Lamba, T. R. Way, C. Williams, K.G. Karthikeyan, S. Budhathoki, R. Prasad, P. Srivastava, and J. Zheng. Effect of animal manure application on transport of nutrients and contaminants in no-till and conventional tilled soils. Oral Presentation (*Virtual*), University of Wolverhampton, UK, June 2023.

Awards & Recognitions

- Superior Paper Award | **American Society of Agricultural and Biological Engineers** | “Application of Sediment Fingerprinting to Apportion Sediment Sources: Using Machine Learning Models” | 2024
- Outstanding Doctoral Student Award | **Auburn University** | 2024
- 100+ Women Strong Outstanding Graduate Student Award | **Samuel Ginn College of Engineering, Auburn University** | 2023 (\$1000)
- ‘Love of Learning’ Award | **Phi Kappa Phi** | 2021 (\$500)
- 2nd prize in the 2020 ASA, CSSA, and SSSA Photo Contest | **American Society of Agronomy** | **Crop Science Society of America** | **Soil Science Society of America** | 2020 (\$100)

- 1st place in AABFEIO Graduate Student Research Paper Award | **American Society of Agricultural and Biological Engineers** Annual International Meeting, Boston, Massachusetts | 2019 (\$100)
- Master's Thesis Award | **Auburn University** | 2019
- 1st prize in Graduate Student Research Poster Showcase | **College of Agriculture, Auburn University** | 2019 (\$300)
- Outstanding Master's Student Award | **Auburn University** | 2018
- Outstanding International Student Award | **Auburn University** | 2018
- 2nd place winner for Boyd-Scott Graduate Research Award | **American Society of Agricultural and Biological Engineers** Annual International Meeting, Detroit, Michigan, USA | 2018 (\$300)
- 2nd prize in Graduate Student Research Poster Showcase | **College of Agriculture, Auburn University** | 2018 (\$200)
- 1st prize in Graduate Student Research Poster Showcase | **College of Agriculture, Auburn University** | 2017 (\$300)
- Certificate of Research Achievement | **Biosystems Engineering, Auburn University** | 2017
- 3rd prize in Poster Presentation | **Alabama Water Resources Conference**, Orange Beach, AL | 2016 (\$200)
- University Merit Scholarship for eight consecutive semesters | **Punjab Agricultural University, India** | 2011-15
- Honorary membership in **Alpha Epsilon** (Members in this society are chosen from the students registered in the upper portion of their engineering class, and who exhibit outstanding qualities of character, leadership, and personality).
- Honorary membership in **Phi Kappa Phi** (Members of this society are chosen for exceptional scholastic achievements at Auburn University).

Professional Memberships

- American Society of Agricultural & Biological Engineers
- American Society of Agronomy | Crop Science Society of America | Soil Science Society of America
- Alpha Epsilon

Professional Development Workshops

- Leadership Workshop, Auburn University | August 2023
- Peer Review Training Workshop, ASA-CSSA-SSSA International Annual Meeting | November 2022
- Advanced Data Analytics for Water Resources Management using R, ASABE AIM | November 2022
- Computer Vision and Machine Learning, ASABE AIM | July 2022
- HYDRUS short course, Virtual | March 2021
- Campbell Scientific's CRBasic Datalogger/LoggerNet Training, Virtual | March 2021
- Modeling Water Flow and Contaminant Transport in Soils and Groundwater using HYDRUS Software Packages, Colorado | June 2019

University and Community Service

- Reviewer, Groundwater for Sustainable Development | 2024
- Reviewer, Journal of Environmental Quality | 2024
- Reviewer, Agrosystems, Geosciences & Environment | 2023

- Reviewer, Soil Science Society of America Journal | 2023
- Judge, Alabama Science and Engineering Fair | 2023
- Vice-chair, NRES-224 (Sub-committee at ASABE) | 2022-2023.
- Moderator, ASABE AIM | 2022
- Reviewer, Journal of Hydrology | 2022.
- Vice President, Alabama Delta Beta Chapter of Alpha Epsilon | 2018-2020.
- Campus Kitchens: Participating as a shifts leader for collecting, packaging, and delivering unserved food from restaurants, cafeterias to food insecure people (Auburn, AL).
- Graduate Senator in the Graduate Student Council, Auburn University, AL | 2018.
- Member of 'Traffic Appeals Board', University Committee, Auburn University, AL | 2018.
- Graduate Student Ambassador: Selected among one of the Graduate Student Ambassadors to serve as a point of contact for sharing information and answering questions from prospective students, and participating in off-and on-campus recruiting events (Auburn, AL).
- Waste Reduction & Recycling: Participating in on-campus events to provide recycling services (Auburn, AL).
- Alabama Water Watch: Collecting water quality data using a field test kit, entering data into the portal, and performing trend analysis (Auburn, AL).
- Rotaract Club: Volunteered for tree plantation camps and blood donation drives (Punjab, India).
- Others: Volunteered for Ag- Discovery Day, E-day, and Moores Creek Earth Day Clean Up Drive.