

NUSRAT JAHAN

Soil Hydrology | Land-Atmosphere Coupling | Remote Sensing | Agricultural Water Management | Nutrient Dynamics

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ACADEMIC TRAINING

Graduate Research Assistant | [SHaRE \(Soil Hydrology and Remote Sensing\) Lab](#) (2025 – present)
School of Plant, Environmental and Soil Sciences (SPESS) | Louisiana State University (LSU), Baton Rouge, LA, USA

EDUCATION

Ph.D., SPESS, LSU, 2025 – present

Major: Soil Hydrology and Remote Sensing | Cumulative GPA: 4.236/4

M.Sc., International Master of Science in Soils and Global Change (IMSOGLO), 2022 – 2024

Specialization: Physical Land Resources and Global Change | Bioscience Engineering

Joint Degree | Ghent University (UGent), Belgium & Aarhus University (AU), Denmark

Cumulative Score: 745/1000 (Magna Cum Laude, Higher Distinction)

B.Sc., Soil, Water and Environment, Khulna University (KU), Bangladesh, 2018 – 2022

Life Science Faculty | Cumulative GPA: 3.86/4.00 (Distinction, 2nd on merit list)

RESEARCH PROJECTS

PhD Research | SHaRE Lab, SPESS, LSU, 2025 – present

- Developing a parsimonious, scale-invariant soil water balance framework to estimate atmosphere-coupled profile soil moisture from surface water and energy fluxes, with applications in mesoscale irrigation scheduling and drought monitoring specially across Louisiana
 - Contributing to LaCADIAN (Louisiana Climate and Digital Agriculture Network), funded by USDA-NRCS – installing and maintaining 24 automated statewide environmental monitoring stations across Louisiana, supporting precision and digital agriculture innovation
- Advisor: Dr. Vinit Sehgal | Co-advisor: Dr. Stacia Conger, LSU AgCenter

M.Sc. Thesis | Aarhus University (AU), Denmark, 2023 – 2024

Phosphorus Transport in Rewetted Lowland Areas: Critical Processes: laboratory column leaching experiments within the PhosCarb project

Advisor: Dr. Bo Vangsø Iversen | Co-advisor: Dr. Goswin Johann Heckrath, Agroecology Department, AU

B.Sc. Thesis | Khulna University (KU), Bangladesh, 2021 – 2022

Phytoextraction of Soil Salinity by Sorghum Plant Treated with Gypsum and Mulch: field and laboratory investigation of bioremediation in coastal Bangladesh

Advisor: Dr. Jagadish Chandra Joardar, Soil, Water and Environment Discipline, KU

PUBLICATIONS

REFEREED JOURNAL

Jahan, N., Mahmud, U., & Khan, M.Z. (2025). Sustainable plant-soil phosphorus management in agricultural systems: challenges, environmental impacts and innovative solutions. *Discover Soil*, 2(1), 13.

IN PREPARATION

Jahan, N., Sehgal, V., Conger, S., & Mohanty, B.P., (2026) A Landscape Soil Hydrology Model Based on Emergent Nonlinear Water-Energy Coupling Dynamics.

BOOK CHAPTERS (*Abstracts Submitted*)

Jahan, N., et al., (2026) Land Use Changes and Their Impact on Delta Health. In *Sustaining Bangladesh's Deltas: A Comprehensive Approach to Environmental Challenges*.

Ahmed, B., **Jahan, N.**, & Islam, M. S. (2026) *Salinity Intrusion and Coastal Soil Degradation*. In *Sustaining Bangladesh's Deltas: A Comprehensive Approach to Environmental Challenges*.

CONFERENCE PRESENTATIONS AND POSTERS

Jahan, N., Sehgal, V., & Conger, S. (2025, Poster and Oral). Can Land Surface Water-Energy Fluxes Drive Rootzone Soil Moisture Modeling? CANVAS 2025, ASA-CSSA-SSSA Annual Meeting.

Jahan, N., Sehgal, V., & Conger, S. (2025, Poster). Mesoscale Rootzone Soil Moisture Modeling Using Land-Surface Water-Energy Fluxes. AGU Fall Meeting 2025, New Orleans, LA.

Jahan, N., Sehgal, V., & Conger, S. (2025, Poster). Soil Moisture Modeling with Minimal Data for Operational Ag Decision Support. LCAAA Professional Excellence Poster Contest 2025, LSU.

Conger, S.L., Sehgal, V., **Jahan, N.**, & Agyiri, M.N.A. (2026, Oral). LaCADIAN: Utilizing a Weather Network as an Extension Tool. LCAAA Annual Meeting 2026.

Jahan, N., Sehgal, V., & Conger, S. (2026, Poster). Soil Moisture Modeling with Minimal Data for Operational Ag Decision Support. NACAA Annual Meeting 2026, Denver, CO.

OUTREACH

Jahan, N., Agyiri, M.N.A., Adekila, F.A., Momenian, P., Jha, P., Conger, S., & Sehgal, V. Louisiana Climate and Digital Agriculture Network: Building Statewide Ag-focused Environmental Sensing Network. *LSU AgCenter Magazine*, Summer 2026. (*Under Review*)

Web Presence:

Co-moderator, [LaCADIAN](#), LSU AgCenter, statewide agricultural environmental monitoring network public portal

Co-moderator, [SHaRE Lab](#), SPESS, LSU, Soil Hydrology and Remote Sensing Lab website

TEACHING AND MENTORSHIP

Workshops

Data Visualization and Geospatial Analysis with R, in collaboration with Texas A&M Vadoso Zone Research Group (Assistant Instructor, AGU Fall Meeting 2025 | Co-instructor (upcoming), AGU Fall Meeting 2026)

Mentorship

Mentoring a summer lab intern in field instrumentation, sensor deployment, data collection and geospatial analysis, SHaRE Lab, SPESS, LSU, 2026

HONOURS AND AWARDS

- 2nd Place, SSSA Soil Physics and Hydrology Division Student Competition, CANVAS 2025, ASA-CSSA-SSSA Annual Meeting
- 1st Place, Applied Research Category, LCAAA Professional Excellence Poster Contest 2025, LSU; work selected for presentation at NACAA Annual Meeting 2026, Denver, CO
- Graduate Research Assistantship (100% funding), SPESS, LSU, 2025 – present
- Erasmus Mundus Scholarship, European Union, 2022-2024; competitively selected as country representative from Bangladesh
- Bangladeshi Government Scholarship for outstanding academic achievement, undergraduate level, 2017, 2018, 2019 and 2021

- Bangladeshi Government Award and Stipend, Ministry of Education, Bangladesh; for outstanding academic achievement at Secondary School Certificate (SSC, 2014), Junior School Certificate (JSC, 2012) and Primary School (2009) examinations

PROFESSIONAL ACTIVITIES AND LEADERSHIP

Leadership

- Field Operations Coordinator, LaCADIAN, LSU AgCenter, 2025 – present
- Member Coordinator, Rhythm (Dance Organization), Khulna University, 2019-2022
- Associate Publicity Manager, PODIUM (Public Speaking Organization), Khulna University, 2017-2022
- Associate Publicity and Publication Manager, Pedon (Departmental Organization), Khulna University, 2018-2020
- Host, 3-Minute Thesis, Khulna University, Bangladesh, 2018

RESEARCH COMPETENCIES

Technical Skills:

- ✓ **Programming and Statistical Analysis:** R (advanced; spatial analysis, parallel computing, data visualization), MATLAB, JavaScript, Python (basic), MS Excel
- ✓ **Geospatial and Remote Sensing:** ArcGIS Pro, QGIS, R spatial packages; satellite and observational products including SMAP, MODIS, LANDSAT, ECOSTRESS, OpenET, GridMET, AmeriFlux, USCRN, SCAN
- ✓ **Hydrological and Environmental Modelling:** Hydrus-1D, RETC, STANMOD, AquaCrop, WATEM, CLIMWAT 2.0 for CROPWAT, Climate Physics Models (MODTRAN, ISAM), Carbon Cycle Models (GEOCARB, METHANE)

Laboratory and Field Instrumentation:

- ✓ Column leaching experiment setup and sampling; soil hydraulic conductivity measurement (HYPROP); particle size analysis via wet and dry sieving for textural classification; Flame Emission Spectroscopic meter, Distillation Apparatus, Kjeldahl Digestion Apparatus, Titration Apparatus
- ✓ Field instrumentation and maintenance of automated environmental monitoring stations including ATMOS 41 Gen 2 weather stations, Infrared Thermometer, NDVI sensors, ZL6 Pro automated data loggers, TEROS 12 soil water content sensors and TEROS 21 soil matric potential sensors across multiple depths

LANGUAGE SKILLS

Bengali (Native) | English (Proficient; IELTS Band 7, Duolingo 125/160) | Hindi (Conversational) | Urdu (Conversational)

AFFILIATIONS

- American Society of Agronomy (ASA), Member
- Crop Science Society of America (CSSA), Member
- Soil Science Society of America (SSSA), Member
- American Geophysical Union (AGU), Member
- Graduate Student Association, SPESS, LSU, Member
- International Student Association, LSU, Member