Bishal Roy

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📍 St. Louis, Missouri, United States

Education

Doctor of Philosophy (Ph.D.)   Aug 2024 – present
Saint Louis University ⧉   St. Louis, United States
    All but Dissertation (Expected May 2026)
    Major: Geoinformatics and Geospatial Analytics
    CGPA: 4.0 out of 4.0
    Research Topic: CARBonSense: Carbon Assessment through Remote Belowground Sensing for Climate Change and Flux Insights

Master of Science (M.S.)   Aug 2022 – May 2024
Saint Louis University ⧉   St. Louis, United States
    Major: Geographic Information Science
    CGPA: 4.0 out of 4.0
    Thesis Title: Seeing the Unseen: Soil Carbon Estimation from Hyperspectral Imagery with Wavelet Decomposition and Frame Theory

Bachelor of Science (B.Sc.)   Jun 2016 – Jul 2022
Begum Rokeya University, Rangpur ⧉   Rangpur, Bangladesh
    Major: Geography and Environmental Science
    CGPA: 3.38 out of 4.0
    Dissertation Title: Spatio-temporal analysis and cellular automata-based simulations of biophysical indicators under the scenario of climate change and urbanization using ANN

Working Experience

Graduate Research Assistant   Aug 2022 – present
Saint Louis University ⧉   St. Louis, United States
    Supervisor: Dr. Vasit Sagan
    Project: FIELDDOCK: An Integrated Smart Farm
- Performing hyperspectral analysis using airborne and proximal sensors
- Developing machine learning models to predict carbon sequestration in the root system
- Collecting and analyzing mineral/carbon content of soil and root samples
- Analyzing the above and below-ground biomass using airborne and spaceborne sensors
- Leading the ground data collection team to monitor the canopy (Proximal Sensing)
- Examining early water stress indicators in multiple species of durum wheat
- Assisting with grant writing, and the preparation of funding proposals.

Research Assistant   Nov 2021 – Apr 2022
Bangladesh Agricultural University, Mymensingh   Mymensingh, Bangladesh
- Performed analysis for coastal land use dynamics research
- Conducted field visits for ground truth verification
- Reviewed literature and oversaw data mining from preceding works

Undergraduate Research Assistant   Jan 2020 – Dec 2020
Begum Rokeya University, Rangpur ⧉   Rangpur, Bangladesh
    Supervisor: Md. Mostafizur Rahman
- Led a team of 52 individuals performing Aerial Photo and socio-economic surveys.
- Collected, Digitized, and Analyzed data collected from the field.
- Developed workflows, wrote reports, and coordinated with the team.

Teaching Experience

Assistant Instructor   Aug 2025 – Dec 2025
Saint Louis University   St. Louis, United States
  Introduction to Remote Sensing (UG/G)
  Led drone-photogrammetry labs integrating optical imagery, LiDAR point clouds, and 3D modeling.

Instructor   Jan 2020 – Dec 2020
Begum Rokeya University, Rangpur   Rangpur, Bangladesh
  Remote Sensing & Applied Remote Sensing (Lab) (UG)
  Taught undergraduate Remote Sensing and Lab; EM principles, image processing, and GNSS survey.

# Selected Publications

Citation to Date: 318 (Google Scholar) ⧉
 h-index: 8, i-10 index: 7

Published in Peer Reviewed Journals ⧉
*(Out of 13)*

Roy, Bishal, Vasit Sagan, Hamid Alifu, James Saxton, Caleb Gul, and Naushin Shakoor. 2026. "Physics-Aware Neural Framework for Multidepth Soil Carbon Mapping." IEEE Geoscience and Remote Sensing Letters, https://doi.org/10.1109/LGRS.2025.3632815 ⧉

Roy, Bishal, Vasit Sagan, Alifu Haireti, Jocelyn Saxton, Dorsa Ghoreishi, Nadia Shakoor. 2024. "Soil Carbon Estimation From Hyperspectral Imagery With Wavelet Decomposition And Frame Theory." IEEE Transactions on Geoscience and Remote Sensing, https://doi.org/10.1109/TGRS.2024.3461628 ⧉

Roy, Bishal, Vasit Sagan, Alifu Haireti, Maria Newcomb, Roberto Tuberosa, David LeBauer, Nadia Shakoor. 2023. "Early Detection of Drought Stress in Durum Wheat Using Hyperspectral Imaging and Photosystem Sensing." Remote Sensing, https://doi.org/10.3390/rs16010155 ⧉

Roy, Bishal, and Md Zakiur Rahman. 2023. "Spatio-temporal analysis and cellular automata-based simulations of biophysical indicators under the scenario of climate change and urbanization using artificial neural network." Remote Sensing Applications: Society and Environment, https://doi.org/10.1016/j.rsase.2023.100992 ⧉

Roy, Bishal. 2021. "Optimum Machine Learning Algorithm Selection for Forecasting Vegetation Indices: MODIS NDVI & EVI." Remote Sensing Applications: Society and Environment, https://doi.org/10.1016/j.rsase.2021.100582 ⧉

Roy, Bishal, Ehsanul Bari, Nusrat Jahan Nipa, and Sadia Afrin Ani. 2021. "Comparison of Temporal Changes in Urban Settlements and Land Surface Temperature in Rangpur and Gazipur Sadar, Bangladesh after the Establishment of City Corporation." Remote Sensing Applications: Society and Environment, https://doi.org/10.1016/j.rsase.2021.100587 ⧉ .

Roy, Bishal. 2021. "A Machine Learning Approach to Monitoring and Forecasting Spatio-Temporal Dynamics of Land Cover in Cox's Bazar District, Bangladesh from 2001 to 2019." Environmental Challenges, https://doi.org/10.1016/j.envc.2021.100237 ⧉ .

Roy, Bishal, and Ehsanul Bari. 2022. "Examining the Relationship between Land Surface Temperature and Landscape Feature Using Spectral Indices with Google Earth Engine." Heliyon, https://doi.org/10.1016/j.heliyon.2022.e10668 ⧉

Published in Proceedings of Conferences

Roy, Bishal, Vasit Sagan, Alifu Haireti, Jocelyn Saxton, Nadia Shakoor. (2024). Comparative Analysis of Wavelet Transformation Techniques in Enhancing Soil Organic Carbon Detection through Hyperspectral Imaging. The 44th IEEE International Geoscience and Remote Sensing Symposium (IGARSS) 2024. https://doi.org/10.1109/IGARSS53475.2024.10641176 ⧉

Roy, Bishal, Vasit Sagan. (2025). Geolocating Images Using Solar and Scanning Geometry. The 45th IEEE International Geoscience and Remote Sensing Symposium (IGARSS) 2025. https://doi.org/10.1109/IGARSS55030.2025.11243632 ⧉

Grants Received

Dean's Travel Grant United States
SLU School of Science and Engineering
    To attend the American Geophysical Union's Fall Meeting 2023
    To attend the American Association of Geographers Annual Meeting 2024
    To attend the American Geophysical Union's Fall Meeting 2025

Training

sUAS Multi-Rotor Operator Course Dec 2023 – Jan 2024
Taylor Geospatial Institute Saint Louis, United States
    Equipment Flown: Alta X, Parrot Anafi, Skydio 2+, PX4 Based AP
    Practical Part (EP/IP): Takeoff, Landing, Remote Landings, Procedural Turns, and Navigation
    Academic Part: FAA Regulations, sUAS Applications, Unmanned Aerial Systems Overview, Crew Resource Management (CRM), Fundamental Operating, Basic Aerodynamics, Mission Planning, Basic maintenance and troubleshooting, Mishap Reporting, and Flight Simulator training

Awards

1st Runner-up - Physical Sciences Category Apr 02, 2025
Sigma Xi Research Symposium
    Organized by Saint Louis University Chapter

1st Runner-up - 18th SMC Development Category ⧉ Nov 30, 2020
SuperMap GIS
    Organized by The Geographical Society of China, CAGIS, and SuperMap GIS.

Winner of Mapathon 2020 ⧉ Nov 19, 2020
Bangladesh Netherlands Water Youth Forum
    "Mapathon: Where DId the Dikes Go" was held between 12th November and 19th November.

Workshops

iServer Development and Desktop Environment Workshop ⧉ May 2020 – Jun 2020
SuperMap GIS
    WebGIS on Server, Server preparation, data, management, markup and style languages, SQL query, and 3D scene concepts; Data processing, symbolizing, making thematic maps, setting layout, etc. using iDesktop.

NASA COVID-19 Project Aug 2020 – Aug 2020
URISA's GIS Corps
    COVID-19 Human Activity Monitoring (HAM) with Satellite Synthetic Aperture Radar (SAR) Observations, a voluntary project under Dr. Sang-Ho Yun, Principal Investigator, NASA Jet Propulsion Laboratory.

Skills

Software
ArcGIS Product Suite, ENVI, ERDAS Imagine, IBM SPSS, Pix4D, Python, R, Matlab, SAGA GIS, SuperMap Product Suite, QGIS

Language
Bengali (Native), English (C1 Certified), Hindi (Conversational)