Sumanta Chatterjee, Ph.D.

Phone: +1-240-353-0812 | **Email**: sc3149@msstate.edu
Google Scholar | LinkedIn | Twitter

RESEARCH FOCUS

Quantitative ecohydrology, soil health, soil-plant-atmosphere processes, remote sensing of water-carbon coupling, machine learning for agricultural and ecosystem modeling. Work integrates multi-sensor satellite data, GHG flux measurements, and process-based/AI/ML modeling to improve prediction of drought, evapotranspiration, soil moisture, and ecosystem responses to climate stress.

EDUCATION

01/2019 – 05/2022 **Ph.D., Soil Science, University of Wisconsin- Madison, USA**
- **Major**: Soil Science
- **Minor**: Geography, Remote Sensing

08/2012 – 08/2014 **M.Sc., Agricultural Physics, Indian Agricultural Research Institute, Delhi, India**
- **Major**: Soil Physics, Hydrology
- **Minor**: Soil Chemistry, Statistics

07/2008 – 06/2012 **B.Sc., Agriculture (Honors), Bidhan Chandra Krishi Vishwavidyalaya, Nadia, India**
- **Electives:** Agronomy, Soil Science, Water Management, Meteorology

EMPLOYMENT

02/2026 – present **Research Compute Support Specialist,** High Performance Computing Collaboratory (HPC²), Mississippi State University, MS
- Bridge faculty research needs high-performance computing (HPC) infrastructure; translate scientific workflows into scalable, reproducible computational solutions.
- Co-develop HPC-enabled modeling and AI/ML pipelines; support secure, data-intensive research environments.
- Contribute to grant proposals by advising on computational design and infrastructure integration.
- Deliver workshops and technical documentation, mentor graduate and undergraduate students in research computing.
- **P.I.** Dr. Julie Jordan (julie.jordan@msstate.edu)

08/2025 – 02/2026 **Postdoctoral Associate,** Department of Biological Sciences, Mississippi State University, MS
- Lead parameterization and validation of Next Generation of Vegetation (GenVeg) process-based wetland vegetation model, integrating nutrient cycling, biomass allocation, and climate stress response metrics. *USACE Wetland Project*. $1M
- Designed and maintain multi-species wetland plant mesocosms to quantify nutrient fluxes, root–shoot allocation, and tolerance thresholds under heat and hydrologic stress.
- **P.I.** Dr. Gary Ervin (gary.ervin@msstate.edu)

07/2024 – 07/2025 **Faculty Research Assistant**, University of Maryland | USDA-ARS Precision Sustainable Ag. Lab
- Improved a climate smart cover crop decision support tool – Cover Crop N Calculator (CCNCALC) used across Maryland agricultural systems. *NRCS CIG grant.* $3M
- Developed machine learning driven biomass and N credit prediction algorithms, improving predictive accuracy by 20–30% over operational baselines. *USDA-NIFA Foundational Program.* $3M
- **P.I.** Dr. Brian Needelman (bneeed@umd.edu)

07/2022 – 06/2023 **ORISE-USDA Postdoctoral Fellow,** USDA-Hydrology and Remote Sensing Lab, Beltsville, Maryland
- Advanced **ALEXI/disALEXI evapotranspiration modeling** for croplands, rangelands and forests; improved ET retrieval accuracy at flux sites. *NASA ECOSTRESS.* 3M
- Integrated multi-sensor (ECOSTRESS, VIIRS, Landsat, HLS) datasets to quantify management/climate impacts on vegetation phenology, water use, and productivity.

- **P.I.** Dr. Martha Anderson (Martha.Anderson@usda.gov) & Dr. Feng Gao (feng.gao@usda.gov)

05/2022 – 06/2022 **Research Technician,** University of Wisconsin-Madison, Wisconsin, USA

- *Project: Wildfire-land-climate causality study in the North American Boreal Forests using long term remote sensing data and causality models*. *USDA Hatch Program.* $130,000
- Developed framework for wildfire-climate feedback assessment in Boreal forests.
- P.I. Dr. Jingyi Huang (jhuang426@wisc.edu)

01/2019 – 05/2022 **Graduate Research Assistant**, University of Wisconsin–Madison, Wisconsin, USA

- *Dissertation: Investigating the Role of Soil and Land Surface Properties in Agricultural and Ecosystem Modeling.*
- Developed geospatial and machine learning frameworks to quantify soil moisture dynamics, evapotranspiration, and drought forecasting across agricultural and natural landscapes using remote sensing, digital soil databases, terrain analysis, and AI/ML. Large scale computer simulations were performed using HPC system of UW-Madison.
- Developed digital soil mapping framework for field scale soil mapping in Wisconsin using soil spectroscopy (Vis-NIR, pXRF), proximal sensor (EMI), and remote sensing.
- Quantified land-atmosphere causality for forest fire probability in Northern Boreal Forests using causal models (EDM, Convergent Cross Mapping).
- Chairs: Dr. Jingyi Huang (jhuang426@wisc.edu) & Dr. Alfred Hartemink (alfred.hartemink@wisc.edu)
- Website: https://soilsensingmonitoring.soils.wisc.edu/lab-members/

01/2016 – 06/2024 **ICAR-ARS Scientist**, Indian Council of Agricultural Research (ICAR), India

Research Programs Led: Eddy covariance GHG fluxes, drought modeling, LU/LC change, ecosystem services, and crop–climate simulation modeling.

- Operated and maintained a tropical rice eddy covariance site; quantified long-term CO_2 and CH_4 exchange and improved NEE partitioning. *NICRA grant*. $11,000
- Developed soil-moisture-driven drought forecasting, extending lead times by up to 3 weeks using SMAP and in-situ data.
- Conducted large-scale LU/LC analysis using Sentinel-2; delivered ecosystem service maps supporting regional land-use planning. *ICAR grant.* $6000
- Led simulation modeling (APSIM, DSSAT, INFOCROP), providing climate-scenario-based yield projections for government programs. *DST grant.* $5000
- Machine Learning for crop yield prediction and GHG modeling under water stress conditions. *ICAR grant*. $10,000

08/2014 – 12/2015 **Senior Research Fellow,** Indian Agricultural Research Institute, New Delhi, India

- *Project: Regional-scale root-zone soil moisture estimation from satellite-derived near-surface moisture*.
- Assessed multi-sensor satellite retrievals for surface soil moisture and modeling rootzone soil moisture from surface observations for semi-arid regions in India.
- Advisor: Dr. K.K. Bandyopadhyay (kk.bandyopadhyay@gmail.com)

07/2012 – 08/2014 **Graduate Research Assistant**, Indian agricultural Research Institute, New Delhi, India

- *Thesis: Effects of irrigation, mulch and nitrogen on soil structure, carbon pools, and input use efficiency in maize (Zea mays L).*
- Quantified soil carbon pools under irrigation and crop residue management in maize-wheat systems in North India.
- Quantified soil water dynamics and resource use efficiency (WUE, NUE) under management and climate change.
- Chair: Dr. K.K. Bandyopadhyay (kk.bandyopadhyay@gmail.com)

TEACHING AND MENTORING

Co-instructor, BIO 4263 – Wetland Plants & Sustainability *Mississippi State University*
Starkville, Mississippi (Fall 2025)

- Co-taught undergraduate course on concepts of wetland hydrology, mangrove ecosystem, ecosystem services, sustainability and climate change.
- Data analysis in R
- Developed course material and maintaining mesocosm experiments for diverse wetland plant species.
- Developed hands-on lab assignments.
- Mentored students for final term projects.

Teaching Assistant, SOIL 622 – Advanced Soil Physics *University of Wisconsin-Madison*
Madison, Wisconsin (Spring 2020 – 2021)

- Instructed computer lab on modeling soil water dynamics using HYDRUS 1D model and taught classes on hydraulic conductivity, soil compaction, and nutrient transport in soil system.
- Re-designed hands-on lab assignments by adding calibration/validation techniques to the coursework.
- Mentored students for final term projects.

Instructor, Remote Sensing and GIS for Soil, Water and Crop Studies; Soil Resource Management
Indian Council of Agricultural Research, India (2016–2019, 2023–2024)

- Instructed GIS and remote sensing lab for image processing, geospatial analysis for drought monitoring, and LU/LC analysis.
- Handling eddy covariance flux data and processing pipeline in R/Python.
- Instructed soil physics and hydrology lab for soil mapping and soil water dynamics assessment.
- Crop simulation modeling using the Decision Support System for Agrotechnology Transfer (DSSAT).
- Mentored students for final term projects.

Peer Mentoring – *UW-Madison, University of Maryland***,** *Mississippi State University* (Jan 2019 – Present)
Trained Undergrads, Graduate Research Assistants and Postdoctoral Research Associates in:

- Data analysis and machine learning model building in R.
- Handling CMIP6 future climate data.
- Crop modeling using the Decision Support System for Agrotechnology Transfer (DSSAT)
- Biome scale causality modeling using Environmental Dynamic Modeling and Convergent Cross Mapping models.
- Handling soil moisture sensors, eddy covariance tower, and processing satellite images.
- Students presented work at AGU/ASA meetings and co-authored publications.
- Currently guiding one masters student at Mississippi State University

GRANTS (*AWARDED/SUBMITTED*)

1. **NEON-AmeriFlux-CarbonDew** Workshop Grant (Awarded **$1000)** in 2026 for participating in Flux Scaling and Remote Sensing workshop at University of Colorado, Boulder, USA
2. **USDA-NIFA** call on "AgAI-ED: Agricultural Artificial Intelligence Education & Development Pipeline for K–12' (*Submitted, Co-PI, 2026*). 2M
3. **EPA** call on "Innovative Solutions for Improving Water Quality and Strengthening Local Economies in the Gulf of America Watershed'. Project title: SMART-Bay: Solutions for Monitoring and Assessing Reduction in nutrient Transport to the Bay (*Submitted, Co-PI, 2025*). 3M
4. **NIFA**-Data Science for Food and Agricultural Systems (DSFAS) (A1541)- Advanced Informatics Dashboard for Mississippi Agricultural Technology and Climate Hub (*Submitted, Co-PI, 2025).* $130,000
5. **FLUXNET Secondment Travel Grant 2025** (Awarded PI $6000) by FLUXNET to conduct research on AI/ML based evapotranspiration partitioning using eddy covariance data at University College Dublin, Ireland

6. **Conference Travel Grant 2019** (Awarded $1000) by Department of Soil Science, UW-Madison for attending PEDOMETRICS conference in Canada.
7. **Ecohydrology Early Career Tiny Grant** (Awarded $250) to support attendance at the 2022 AGU Fall Meeting.
8. **Conference Travel Grant 2021** (Awarded $1000) by Department of Soil Science, UW-Madison for attending AGU Fall Meeting 2021 conference in New Orleans, USA.
9. **Student Research Grants Competition–Conference Presentation Grant 2021** (Awarded $1000) by UW-Madison for attending AGU Fall Meeting 2021 conference in New Orleans, Louisiana, USA.
10. **GA Harris Honorable Mention Instrument Grant (**Awarded $5000) in 2021 by METER Group, Inc. USA to purchase soil moisture sensors for research
11. **ESIIL workshop Grant (**Awarded **$2500)** in 2023 for participating in data science workshop at University of Colorado, Boulder, USA

PUBLICATIONS (*Google Scholar citations: 1144, h-index: 15, i-10 index:19*)

PEER-REVIEWED JOURNAL ARTICLES

*PUBLISHED (25) [*corresponding author]*

1. Rai, V., **Chatterjee, S.,** Singh, N., & Kumar, M., 2026. Comparative evaluation of traditional, machine learning, and deep learning models for estimation of key soil properties using pedotransfer functions in the Indo-Gangetic Plains. *Vadose Zone Journal*, 25, e70091. https://doi.org/10.1002/vzj2.70091
2. **Chatterjee, S*.,** Mahapatra, S.S., Nayak, A.K., et al., 2025. Rapid urbanization leads to decline in forest cover and ecosystem services in india: insights from 10-m ESA Sentinel-2 land use land cover product. *Theoretical and Applied Climatology*, 156(10), pp.1-19. https://doi.org/10.1007/s00704-025-05800-9
3. Debnath, M., **Chatterjee, S.,** Nayak, A.K., et al., 2025. Water Use in Rice Crop Cultivation in India: A Quantitative Assessment. *Agricultural Research*, pp.1-13. https://doi.org/10.1007/s40003-025-00892-1
4. Bhagwan, P.V., Anjaiah, T., … **Chatterjee, S*.,** 2025. Delineating Soil Fertility Management Zones Using Geostatistics and Fuzzy Clustering in Semi-Arid Maize Systems in India. *Environ Monit Assess* 197, 1230. https://doi.org/10.1007/s10661-025-14608-z
5. Swain, C.K., Nayak, A.K., Chatterjee, D., … **Chatterjee, S**., et al., 2025. Quantifying Climate Influence on Net Ecosystem Exchange in Lowland Tropical Rice: A Five-Year Eddy Covariance Study. *Agricultural Research*, pp.1-17. https://doi.org/10.1007/s40003-024-00755-1
6. Maiti, A., Hasan, M.K., Sannigrahi, S., … **Chatterjee, S.,** et al., 2024. Optimal rainfall threshold for monsoon rice production in India varies across space and time. *Nature Communications Earth & Environment*, 5(1), p.302. https://doi.org/10.1038/s43247-024-01414-7
7. Mahapatra, S.S., Parameswaran, C., Chowdhury, T., Senapati, A., **Chatterjee, S.,** et al., 2024. Unraveling the Efficient Cellulolytic and Lytic Polysaccharide Monooxygenases Producing Microbes from Paddy Soil for Efficient Cellulose Degradation. *Journal of Advances in Biology & Biotechnology*, *27*(3), pp.47-56. https://doi.org/10.9734/jabb/2024/v27i3720
8. Raza, T., Qadir, M.F., … **Chatterjee, S**., et al., 2023. Unrevealing the potential of microbes in decomposition of organic matter and release of carbon in the ecosystem. *Journal of Environmental Management*, *344*, p.118529. https://doi.org/10.1016/j.jenvman.2023.118529
9. Meena, M.D., Dotaniya, M.L., Meena, ... **Chatterjee, S.,** et al., 2023. Municipal solid waste: Opportunities, challenges and management policies in India: A review. *Waste Management Bulletin*, *1*(1), pp.4-18. https://doi.org/10.1016/j.wmb.2023.04.001
10. Al Zihad, S.R., Islam, A.R.M.T., … **Chatterjee, S**., 2023. Fuzzy logic, geostatistics, and multiple linear models to evaluate irrigation metrics and their influencing factors in a drought-prone agricultural region. *Environmental Research*, p.116509. https://doi.org/10.1016/j.envres.2023.116509
11. Vijayakumar, S., Rajpoot, SK., Manikandan, N., … **Chatterjee, S**., et al., 2023. Extreme temperature and rainfall event trends in the Middle Gangetic Plains from 1980 to 2018. *Current Science* 124(11). doi: 10.18520/cs/v124/i11/1300-1307
12. **Chatterjee, S.,** Desai, A. R., Zhu, J., Townsend, P., Huang, J., 2022. Soil moisture as an essential component for delineating and forecasting agricultural rather than meteorological drought. *Remote Sensing of Environment*, Vol. 269, 112833, ISSN 0034-4257, https://doi.org/10.1016/j.rse.2021.112833.

13. Shahid, M., Goud, B.R., … **Chatterjee, S**., et al., 2022. Simulation of rice yield with resource conserving technologies for early, mid and end centuries under changing climatic conditions using DSSAT model. ORYZA-An International Journal on Rice 59(3):359-369. DOI: 10.35709/ory.2022.59.3.12
14. **Chatterjee, S.**, Stoy, P. C., Debnath, M., et al., 2021. Actual evapotranspiration and crop coefficients for tropical lowland rice (Oryza sativa L.) in eastern India. *Theoretical and Applied Climatology*, 1-17. https://doi.org/10.1007/s00704-021-03710-0
15. **Chatterjee, S.**, Hartemink, A. E., Triantafilis, J., Desai, A. R., Soldat, D., ... and Huang, J., 2021. Characterization of field-scale soil variation using a stepwise multi-sensor fusion approach and a cost-benefit analysis. *CATENA*, 201, 105190. https://doi.org/10.1016/j.catena.2021.105190
16. Debnath, M., Tripathi, R., **Chatterjee, S**. *et al.* (2021). Long-Term Yield of Rice–Rice System with Different Nutrient Management in Eastern India: Effect of Air Temperature Variability in Dry Season. *Agric Res*. https://doi.org/10.1007/s40003-021-00541-3
17. **Chatterjee, S.**, Huang, J., Hartemink, A.E., 2020. Establishing an Empirical Model for Surface Soil Moisture Retrieval at the U.S. Climate Reference Network Using Sentinel-1 Backscatter and Ancillary ata. *Remote Sensing* 12, 1242. https://doi.org/10.3390/rs12081242
18. **Chatterjee, S.,** Swain, C.K., Nayak, A.K., et al., 2020. Partitioning of eddy covariance-measured net ecosystem exchange of CO_2 in tropical lowland paddy. *Paddy and Water Environment.* https://doi.org/10.1007/s10333-020-00806-7
19. Chatterjee, D., Swain, C.K., **Chatterjee, S**., et al., 2020. Is energy balance in a tropical lowland rice perfectly closed? *Atmosfera*. https://doi.org/10.20937/ATM.52734
20. Chatterjee, D., Nayak, A.K., … **Chatterjee, S**., et al., 2019. Water vapor flux in tropical lowland rice. *Environ. Monit. Assess*. 191 (9), 550. https://doi.org/10.1007/s10661-019-7709-4
21. Chatterjee, D., Tripathi, R., **Chatterjee, S**., et al., 2018. Characterization of land surface energy fluxes in a tropical lowland rice paddy. *Theor. Appl. Climatol.* doi: https://doi.org/10.1007/s00704-018-2472-y
22. **Chatterjee, S**., Bandyopadhyay, K.K., Pradhan, S., Singh, R. and Datta, S.P. 2018. Effects of irrigation, crop residue mulch and nitrogen management in maize (*Zea mays* L.) on soil carbon pools in a sandy loam soil of Indo-gangetic plain region. *CATENA* 165, 207-216. doi: https://doi.org/10.1016/j.catena.2018.02.005
23. Swain, C.K., Nayak, A.K., … **Chatterjee, S**., et al., 2018 Greenhouse gas emissions and energy exchange in wet and dry season rice: eddy covariance-based approach. *Environ. Monit. Assess*. 190: 423. https://doi.org/10.1007/s10661-018-6805-1
24. **Chatterjee, S**., Bandyopadhyay, K.K., Pradhan, S., Singh, R. and Datta, S.P. 2017. Yield and Input Use Efficiency of Maize (*Zea mays* L.) as Influenced by Crop Residue Mulch, Irrigation and Nitrogen Management. *J. Indian Soc. Soil Sci.* 65 (2): 199-209. doi: https://doi.org/10.5958/0974-0228.2017.00023.8
25. **Chatterjee, S**., Bandyopadhyay, K.K., Pradhan, S., Singh, R. and Datta, S.P. 2016. Influence of Irrigation, Crop Residue Mulch and Nitrogen Management Practices on Soil Physical Quality. *J. Indian Soc. Soil Sci.* 64 (4): 351-367. doi: https://doi.org/10.5958/0974-0228.2016.00048.7

UNDER REVIEW / IN PREPARATION **(13)**

1. **Chatterjee** et al., 2026. Evaluating the emergent wetland plant Juncus effusus as a tool in phytoremediation of nitrogen and copper. In preparation for *Ecological Engineering***.**
2. **Chatterjee** et al., 2026. Water use efficiency in dual-purpose vs grain-only winter wheat under contrasting tillage: Eight years of eddy covariance observations in Southern Great Plains winter wheat systems. In preparation for *Ag. For. Met.*
3. Sharma & **Chatterjee** et al., 2026. Agricultural Production Risks, Crop Losses, and the Role of Extension Services: Insights from India. Submitted to *Environmental Development.*
4. Pandit & **Chatterjee** et al., 2026. Soil Erosion Response to Future Climate Variability and Best Management Practices in the Kesinga Catchment. In preparation for *GEODERMA.*
5. Pandit & **Chatterjee** et al., 2026. Integration of Geostatistical Analysis, Multivariate Analysis and Geographical Weighted Clustering with Fuzzy Logic Indices for Delineation of Soil Fertility Management Zones in Rice Cultivated Regions of Telangan. In preparation for *CATENA.*
6. **Chatterjee** et al., 2026. Land-wildfire causality and feedbacks in the North American Boreal Forests using Convergent Cross Mapping approach. Submitted to *PNAS.*
7. **Chatterjee** et al., 2026. Machine learning based rice yield prediction using remote sensing and ancillary covariates. Submitted to *Remote Sensing of the Environment.*

8. Debnath & **Chatterjee** et al., 2026. Sustainability of Rice Based Farming System in high rainfall Deltaic region of Eastern India: A unique hydrological Water Balance Model. Under review in *Physics and Chemistry of the Earth*.
9. Heydari & **Chatterjee** et al., 2026. Spatio-temporal assessment of soil fertility and the effects of environmental factors and land use/cover changes using remote sensing and machine learning in Zagros semiarid forest ecosystem. Under review in *Journal of Environmental Management*.
10. **Chatterjee** et al., 2026. Time-Integrated Radiant Thermal Growth Index (TIRGI): A Novel Approach to Integrate Satellite Imagery and Weather Variables for Enhanced Cover Crop Biomass Estimation. Submitted to *Computers and Electronics in Agriculture*.
11. **Chatterjee** et al, 2026. Water use efficiency in dual-purpose vs grain-only winter wheat under contrasting tillage: Eight years of eddy covariance observations in Southern Great Plains winter wheat systems. In preparation for *Ag. For. Meteorology.*
12. Mahapatra & **Chatterjee** et al., 2026. Methanogenic diversity and dynamics of methane emissions from rice fields. In preparation for *Journal of Environmental Management.*
13. Pandit, VB., Ravali, C., & **Chatterjee,** S. 2026. Soil Resource Management for Climate-Resilient Agriculture: Integrating Science, Technology, and Climate-Smart Approaches (***Edited book***). Submitted to Scrivener Publishing.

BOOK CHAPTERS (8)

1. Prasanna, T., Pandit, V., Ravali, C., Shyamsunder, B., **Chatterjee, S.**, Tariq, A., 2026. Precision Agriculture and Resource Optimization. In Harnessing AI to Reshape the Future of Agriculture (pp. 411-436). Cham: Springer Nature Switzerland. https://doi.org/10.1007/978-3-032-12118-9_19

2. Mrudula, D., Pandit, V.B., Ravali, C., Fiaz, S., Tariq, A., **Chatterjee, S**. (2026). The Role of GIS and GPS in Modern Agricultural Practices. In: Fiaz, S., Nadeem, M.A., Baloch, F.S., Chung, Y.S. (eds) Artificial Intelligence and Data Sciences for Precision Agriculture. Springer, Cham. https://doi.org/10.1007/978-3-032-12770-9_4.

3. Pandit, V., Sravya, M., Ravali, C., Fiaz, S., Tariq, A., **Chatterjee, S.** (2026). Precision Agriculture in the Era of Technological Advancement. In: Fiaz, S., Nadeem, M.A., Baloch, F.S., Chung, Y.S. (eds) Artificial Intelligence and Data Sciences for Precision Agriculture. Springer, Cham. https://doi.org/10.1007/978-3-032-12770-9_8.

4. Basveshwar, S.A., Ravali, C., Bhagwan, P.V., **Chatterjee, S.** (2026). Data Science for Precision Agriculture. In: Fiaz, S., Nadeem, M.A., Baloch, F.S., Chung, Y.S. (eds) Artificial Intelligence and Data Sciences for Precision Agriculture. Springer, Cham. https://doi.org/10.1007/978-3-032-12770-9_2.

5. Bhaduri, D., Chatterjee, D., Chakraborty, K., **Chatterjee, S**., Saha, A., 2018. Bioindicators of Degraded Soils. In book: *Sustainable Agriculture Reviews 33*: Climate Impact on Agriculture (Editor: Eric Lichtfouse) Publisher: Springer Switzerland. p.p 231-257.doi: 10.1007/978-3-319-99076-7_8

6. Tripathi, R., Debnath, M., **Chatterjee, S**., et al., 2018. Assessing Energy and Water Footprints for Increasing Water Productivity in Rice-based Systems. In: H. Pathak, AK. Nayak, M. Jena, ON. Singh, P. Samal and SG. Sharma, ed., *Rice Research for Enhancing Productivity, Profitability and Climate Resilience*, 1st ed. Cuttack, Odisha, India: ICAR-National Rice Research Institute, Cuttack 753006, Odisha, India, p.p x+542.

7. Saha, S., Munda, S., Patra, … **Chatterjee, S**., 2018. Dynamics and Management of Weeds in Rice. In: H. Pathak, AK. Nayak, M. Jena, ON. Singh, P. Samal and SG. Sharma, ed., *Rice Research for Enhancing Productivity, Profitability and Climate Resilience*, 1st ed. Cuttack, Odisha, India: ICAR- National Rice Research Institute, Cuttack 753006, Odisha, India, p.p x+542

8. Mohapatra, S.D., … **Chatterjee, S**., et al., 2018. Bio-ecology of Rice Insects Pests and Diseases: Paving the way to Climate-smart Rice Protection Technologies. In: H. Pathak, AK. Nayak, M. Jena, ON. Singh, P. Samal and SG. Sharma, ed., *Rice Research for Enhancing Productivity, Profitability and Climate Resilience*, 1st ed. Cuttack, Odisha, India: ICAR-National Rice Research Institute, Cuttack 753006, Odisha, India, p.p x+542

RESEARCH BULLETINS

Chatterjee, D., Nayak, A. K., Swain, C. K., Tripathi, R., **Chatterjee, S.**, et al., 2021. Eddy Covariance Technique for Measurement of Mass and Energy Exchange in Lowland Rice. ICAR- National Rice Research Institute, Cuttack, Odisha, 753006, India. pp 34 + vi

EDITORIAL & PROFESSIONAL SERVICE

- **Associate Editor**, *Agrosystems, Geosciences & Environment* (2024–present).

- **Sectional Editor**, *ORYZA – International Journal of Rice* (2022–present).
- **Topic Editor** in *Frontiers* for "Innovations in Forest Hydrology: Climate Adaptation and Technological Integration"
- **Reviewer** for: *Nature Geoscience*, *Ag.For.Met*, *Remote Ssens. Environ.*, *JGR-Biogeosciences*, *Geoderma*, *Catena*, *Journal of Hydrology*, *Ecological Indicators*.
- Leadership roles in **ASA-CSSA-SSSA** (**Chair/Vice-Chair**, Model Applications in Field Research Community).

RESEARCH SKILLS & METHODS

- **Remote Sensing & Geospatial**: ECOSTRESS, Sentinel-1/2, Landsat, SMAP, MODIS, TRMM, PlanetScope; ENVI, ArcGIS Pro, QGIS, Google Earth Engine.
- **Modeling & Data Science**: land surface models (e.g., ALEXI/disALEXI, TSEB), process-based models (e.g., APSIM, DSSAT), HYDRUS; AI/ML (e.g., Random Forests, XGBoost, PLSR, SVM, CNNs); Causal modeling (e.g., Convergent Cross Mapping, Environmental Dynamic Model).
- **Programming & High Performing Computing**: R, Python, MATLAB, Linux/HPC workflows.
- **Field Instrumentation:** Eddy covariance systems, weather sensors, GHG chambers, spectral reflectance sensors, DUALEM/EMI, lysimeters, soil moisture sensors.

FIELD RESEARCH EXPERIENCE

- Led multi-year eddy-covariance GHG monitoring in tropical rice.
- Managed flux tower datasets (NEE partitioning, EB closure, ET modeling).
- Installed lysimeters and soil-moisture networks across crop trials.
- Conducted rangeland, forest, and crop sensing campaigns using multispectral and microwave sensors.

AWARDS/FELLOWSHIPS

1. **Outstanding Agricultural Postdoc Award 2024** by the Association of Agricultural Scientists of Indian Origin (AASIO), USA during the 2024 ASA-CSA-SSSA Annual Meeting in San Antonio, Texas.
2. **Best Poster Presentation Award (3rd position, $250**) at University of Maryland Systems-Postdoctoral Research Symposium 2024, College Park, Maryland, USA.
3. **Netaji Subhas-ICAR International Fellowship 2018-19** for PhD study at University of Wisconsin-Madison, USA.
4. **University of Maryland postdoctoral fellowship 2024** for pursuing research at University of Maryland, USA.
5. **ORISE-USDA Postdoctoral Fellowship 2022** for pursuing research at USDA Hydrology and Remote Sensing Lab, Beltsville, Maryland, USA.
6. **FLUXNET Scholarship 2022** for attending the Flux Course training at the University of Colorado, USA.
7. **New Frontiers Scholarship 2021** by CORTEVA Agriscience, USA
8. **Richard D. Powell Memorial Scholarship 2021** from Department of Soil Science, UW-Madison, USA for outstanding performance in graduate studies.
9. **Richard D. Powell Memorial Scholarship 2020** from Department of Soil Science, UW-Madison, USA for outstanding performance in graduate studies.
10. **Best Reviewer Award** for the journal Current World Environment in 2020.
11. **Graduate Research Assistantship** for pursuing PhD studies at the University of Wisconsin-Madison, USA.
12. **Best Oral Presentation award** at International Conference on Climate Change, Biodiversity and Sustainable Agriculture (ICCBSA-2018), Assam Agricultural University, Assam, India.
13. **ICAR-Junior Research Fellowship 2012** by Indian Council of Agricultural Research in Physical Sciences
14. **Merit Fellowship Awards** for Secondary Examination (2006), Higher Secondary Examination (2008), and undergrad (2008-2012) by govt. of West Bengal, India.
15. Qualified **ICAR-National Eligibility Test** (ICAR-NET) in Agrometeorology in 2015.
16. Qualified **ICAR-Agricultural Research Service** (ICAR-ARS) in Agrometeorology in 2015.

PROFESSIONAL MEMBERSHIP

- Annual member- American Geophysical Union (AGU) (2019-present)
- Annual member- ASA-CSSA-SSSA (2019-present)
- Annual member -American Meteorological Society (AMS) (2021-present)
- Life member- Association of Agrometeorologists (AAM) (2019-present)
- Annual member - The Indian Society of Soil Science (ISSS) (2016-present)
- Life member - ORYZA, National Rice Research Institute, Cuttack (2016-present)
- Life member of Agricultural Research Service Scientists' Forum (ARSSF) (2016-present)
- Annual Member- Association of Agricultural Scientists of Indian Origin (AASIO) (2020, 2024)

LEADERSHIP/SERVICE

1. Served as **Chair and session moderator** of the *Model Applications in Field Research Community* for ASA-CSA-SSSA Tri-Society Meeting in Salt Lake City, Utah, 9-13 Nov 2025.
2. Served as a **Judge** for the AASIO Outstanding MS Student Award that will be awarded at ASA-CSA-SSSA Annual Meeting in Salt Lake City, Utah, 9-13 Nov 2025.
3. Served as **Vice-chair** and **moderator** of three symposiums at ASA-CSA-SSSA Annual Meeting in San Antonio, Texas during 9-13 Nov 2024
4. Served as a **Judge** for oral and poster competitions by students at ASA-CSSA-SSSA Annual Meeting 2024, San Antonio, Texas (9-13 Nov 2024) in the oral and poster session – "Model Applications in Field Research".
5. Served as a **Judge** at ASA-CSSA-SSSA Annual Meeting 2022, Baltimore, Maryland (9-13 Nov 2022) in the oral and poster session – "Animal Agriculture and the Environmental Community".
6. **Selection Committee Member** of 'Gary "Pete" Peterson Dryland Soil Management Scholarship' award committee (Jan 2023-Dec 2024) of American Society of Agronomy.
7. Serving as an **Associate Editor** of Agrosystems, Geosciences & Environment Editorial (AGE) journal of ASA-CSA-SSA society since January 2024.
8. Serving as a **Sectional Editor** of the journal ORYZA An International Journal on Rice since January 2021.
9. Served as **international student representative member** at International Student Services (ISS), University of Wisconsin-Madison in 2019.
10. Served as **Member Secretary** in institute Agro-advisory Services for farmers in ICAR-National Rice Research Institute, Cuttack during 2016-2023.
11. Served as **In-charge** of institute agrometeorological observatory of India Meteorological Department (IMD) at ICAR-NRRI, Cuttack, India for during 2016-2023.
12. Served as a **Farm Advisor** in Mera Gaon Mera Gaurav (MGMG) program hosted by ICAR-NRRI, Cuttack, India.
13. Served as a **Coordinator** in organizing Krishi Mela 2017 held at ICAR-NRRI, Cuttack.

ORAL PRESENTATION IN CONFERENCES (9)

1. On "*Forecasting soil tension from weather data using LSTM for agricultural water monitoring*", at AGU Fall Meetings 2025, 15-19 December 2025, in New Orleans, Louisiana, USA.

2. On "*Integrating Satellite Imagery and Weather Variables for Enhanced Cover Crop Biomass Estimation*", at AGU Fall Meetings 2024, 9-13 December 2024, in Washington, D.C., USA.

3. On "*Modeling Growth Dynamics of Cereal Cover Crops Using Satellite Imagery and Weather Indices"*, at ASA-CSSA-SSSA International Annual Meetings 2024, 9-13 Nov 2024, in San Antonio, Texas, USA.

4. On "*Can Soil Properties Explain the Causality Strength of Wildfire with Environmental Factors in the North American Boreal Forests?"*, at ASA-CSSA-SSSA International Annual Meetings 2022, Baltimore, Maryland held during 6-9 Nov 2022.

5. On "*Determination of Actual Evapotranspiration and Crop Coefficients of Tropical Indian Lowland Rice (Oryza sativa) Using Eddy Covariance Approach*", at AGU Fall Meetings 2021, New Orleans, Louisiana held during 13-17 Dec 2021.

6. On "*Machine learning models for surface soil moisture retrieval using Sentinel-1 backscatter, soil and terrain data*" at New Frontiers Artificial Intelligence in Agriculture Scholars: conference organized by CORTEVA Agriscience, USA (31 July–Sept 2, 2021).
7. On "Characterization of Field-Scale Soil Variation Using a Stepwise Multi-Sensor Fusion Approach and a Cost-Benefit Analysis" at ASA-CSSA-SSSA International Annual Meetings 2020 (9-13 Nov 2020) VIRTUAL.
8. On "*Actual evapotranspiration and crop coefficients for tropical lowland rice: Eddy Covariance approach*" at PEDOMETRICS2019, held during 2–6 June 2019, University of Guelph, Ontario, Canada.
8. On "*Actual evapotranspiration and crop coefficients for tropical lowland paddy by Eddy Covariance approach*" in International Conference on Climate Change, Biodiversity and Sustainable Agriculture (ICCBSA-2018) held during 13-16 Dec 2018 at Assam Agricultural University, Jorhat, Assam, India.
9. On "*Influence of Irrigation, Crop Residue Mulch and Nitrogen Management Practices on Soil Physical Quality*" in an international symposium on "New-Dimensions in Agrometeorology for Sustainable Agriculture" conducted by Association of Agrometeorologists during 16-18 Oct 2014 at GB Pant University of Agriculture and Technology (GBPUAT), Pantnagar, India.

POSTER PRESENTATION IN CONFERENCES (10)

1. Poster presentation at ASA-CSSA-SSSA International Annual Meetings (9-13 Nov 2024) on "*Rapid Urbanization Leads to Decline in Forest Cover and Ecosystem Services in India: Insights from 10-m ESA Sentinel-2 Product*" in San Antonio, Texas, USA.
2. Poster presentation at the 8th Annual Postdoctoral Research Symposium, September 27, 2024, hosted by the University of Maryland, on "*Do Land-Wildfire-Environment Causal Links Exist in North American Boreal Forests?*".
3. Poster presentation at AGU Fall Meetings 2022, Chicago on "*Do Land Surface, Vegetation, and Climate have Causality with Wildfire in Boreal Forests?*" In *AGU Fall Meeting Abstracts* (Vol. 2022, pp. GC25G- 0755).
4. Poster presentation at AGU Fall Meetings 2021, New Orleans, Louisiana on "*Soil Moisture Plays Crucial Role in Delineating and Forecasting Agricultural and Meteorological Drought*", held during 13-17 Dec 2021.
5. Poster presentation at ASA, CSSA and SSSA International Annual Meetings (9-13 Nov 2020) VIRTUAL on "*Agricultural and Meteorological Drought Assessment across the CONUS Using SMAP Soil Moisture and Ancillary Data*".
6. Presented a poster at Spring–2020 Climate Change Symposium, Reid Bryson poster session & Reception on "*Establishing an empirical model for surface soil moisture retrieval at the U.S. Climate Reference Network using Sentinel-1 and ancillary data*" on 13 Feb 2020.
7. Poster presentation at AGU, San Francisco, California on "*Mapping Surface Soil Moisture at the 30-m Resolution at the U.S. Climate Reference Network Stations Using Sentinel-1 and Ancillary Data*", held during 8-13 Dec 2019.
8. Poster presentation on "*Mapping Surface Soil Moisture at the 30-m Resolution at the U.S. Climate Reference Network Stations Using Sentinel-1 and Ancillary Data*" at 'Water@UW-Madison Fall 2019 Poster Session & Reception', on 20th Nov 2019 at University of Wisconsin-Madison, USA.
9. Poster presentation on "*Global mapping of soil water at fine spatio-temporal resolutions using deep learning and big data*" in College of Agriculture & Life Sciences (CALS) Go-Global Spring Symposium, on 9th April 2019 at University of Wisconsin-Madison, USA, which has the theme "Advancing the United Nations Sustainable Goals through University Engagement."
10. Poster presentation on "*Comparison of two Flux Partitioning Models for Net Ecosystem Exchange of CO_2 in lowland rice ecology of tropical India*" in 3rd ARRW International Symposium on "Frontiers of Rice Research for Improving Productivity, Profitability and Climate Change" organized by Association of Rice Research Workers & ICAR-National Rice Research Institute during 6-9 Feb 2018 at ICAR-NRRI, Cuttack, India.

GUEST LECTURES / INVITED TALKS

1. Invited talk on "*Career Development and Learning Opportunities in International Institutes*" at a webinar organized by the University of Agricultural and Horticultural Sciences, Shivamogga, India (12–14 July 2021). https://www.youtube.com/watch?v=dqUt2NqmJMo&list=PLyd1fFRivRh8u7qnXMUjYh3zOeWaa

M0dZ&index=11

2. Invited talk at Carbon Climate Collaborative Network forum organized by Society of Young Agri. and Hydro. Scholar of India (SYAHI) on "Roles of Soil and Climate in Ecosystem Modeling", July 30, 2023, USA (https://twitter.com/syahindia/status/1681634897478455298)

WORKSHOPS/ SYMPOSIUMS/ WINTER SCHOOL/ TRAINING ATTENDED/CERTIFICATES

1. Remote Sensing and Fluxes for Real-World Impact: Integration with Advanced Techniques Workshop in Boulder, Colorado during March 4-6, 2026 hosted by NEON, AmeriFlux and CarbonDew.
2. DayCent Training hosted by the Soil Carbon Solutions Center - Ecosystem Modeling and Data Consortium at Colorado State University during Feb 9-12, 2026
3. DSSAT Crop Modeling Workshop at Department of Plant and Soil Sciences, Mississippi State University, Starkville, Mississippi during July 8-11, 2025.
4. NCAR-NEON workshop on data science at NCAR Mesa lab, Colorado during May 31-June 2, 2023.
5. 2023 Innovation Summit workshop by ESIIL (Environmental Data Science Innovation & Inclusion Lab) on Environmental Data Science at University of Colorado, Boulder during May 23-25, 2023.
6. AGU2022 workshop on "Large-scale Geospatial Data Analysis and Visualization in R (SCIWS30)".
7. AGU2022 workshop on "Python for Remote Sensing: Analysis, Visualization, and Workflow for Earth Scientists (SCIWS3)" on Dec 06, 2022.
8. Online Training Program on "Analysis of Experimental Data in R" Organized by ICAR-National Academy of Agricultural Research Management, Hyderabad, India, during 19-28 Dec 2022.
9. Certificate on "Creating Maps with R" from Linked Learning completed on Nov 13, 2022, (https://www.linkedin.com/learning/certificates/58545a6e31351e2789f438cb124071854aa0ae17aa22e3f3dbeaff0e3e4f3b98?u=56745513)
10. Attended "How to Write Your Research Statement for an R1/R2 Tenure Track professorship in the USA", Oct 28, 2022, organized by American Society of Plant Biologists.
11. Flux Course (July 25-Aug 5, 2022) training (www.fluxcourse.org) at the University of Colorado Mountain Research Station at Niwot Ridge in Colorado on novel flux corrections and gap filling techniques, insights on carbon and energy cycles, and basic understanding of land surface models.
12. Fundamentals of Deep Learning Workshop (July 13-14, 2022) by NIVDIA.
13. Online seminar on "Big data Analytics in Agriculture" Organized by ICAR-National Academy of Agricultural Research Management, Hyderabad, India, during 10-11 Dec 2020.
14. Participated "Young Professional and Student Consortium Summer school" on Geospatial Data Analysis organized by IEEE GRSS & ISPRS during Oct 16 – Dec 10, 2020.
15. Participated in the International Webinar on "Building Climate Resilience in Agriculture through Agrometeorology and other Technological Interventions" organized by Centre for Advance Studies on Climate Change, Dr. Rajendra Prasad Central Agricultural University, Pusa, India during 15 - 17 Dec 2020.
16. Certificate of completion on "Modeling in Microwave and Optical Remote Sensing", online, 14 July 2020 Beijing, China organized by The Institute of Electrical and Electronics Engineers, INC (IEEE), New York.
17. Certificate of completion on "Multidimensional Analysis: Change, Predictions, and Change Detection", Aug 5, 2020, organized by DirectionsMag.
18. Webinar on "Are you measuring the soil moisture correctly", June 10, 2020, organized by Satyukt Analytics Pvt. Ltd., India.
19. Workshop on "Machine Learning as a Framework for Predictive Soil Mapping: incorporating distances and spatial connectivity into machine learning-based modeling" during Pedometrics 2019, 2–6 June 2019, Guelph, Ontario, Canada.