Science Societies

Members reach impressive milestone for scholarly output

Weindorf and Chakraborty collaborate on 100 publications together

November 24, 2025

David Weindorf (second from right) and Somsubhra Chakraborty (rightmost) evaluating Cerrado soils of Brazil with Dr. Nilton Curi (Federal University of Lavras) and Dr. Autumn Acree.

In 2008, an associate professor from Louisiana State and a doctoral student from India began a collaboration that has lasted more than 15 years. Together, they pioneered innovations in soil sensing, AI-driven analysis, and sustainable land use and recently produced their 100th scholarly publication together. Their story is one of mentorship, collaboration, and the shared joy of discovery that transcends borders.

It was 2008 and David Weindorf was an aspiring Associate Professor at Louisiana State University's Agricultural Center. To grow his research program, he sought to add a talented new doctoral student. He put out a call and dozens of qualified applicants were received. In looking through the batch, he settled on a student from India named Somsubhra Chakraborty who had gone to Punjab Agricultural University. Little did they know at the time, but that singular decision would come to define a large part of both of their careers. A few months later, he arrived in Baton Rouge, his first time in America.

He called Dr. Weindorf one night and asked him to come over to talk. With some reassurance, Weindorf was able to connect Somsubhra (Som) with some students in the department. They also talked about expectations and the rules of engagement.

Som was expected to produce multiple top-notch peer-reviewed research papers as chapters of his dissertation and set a standard for research excellence. He did so with unswerving precision. Along the way, a friendship was forged that was different than anything Som had experienced in India. One of the informal aphorisms of the lab was – work hard and play hard. Som leaned into that in so many ways. He learned that it was ok to laugh and to be unconventional. He learned to help his lab-mates just as they helped him.

Research led to travel, which led to publications and the framework of his dissertation. His first research manuscript (Rapid Identification of Oil-Contaminated Soils Using Visible Near-Infrared Diffuse Reflectance Spectroscopy) was published in the *Journal of Environmental Quality*, just weeks before the Deepwater Horizon oil spill in the Gulf of Mexico. Immediately, Som's research was demonstrated for the U.S. Coast Guard and used in helping with restorations along the Gulf coast.

After graduating and working briefly as a post-doc at West Virginia University, Dr. Chakraborty returned to India to start his career as an academician. He spent years working at Ramakrishna Mission Vivekananda Educational and Research Institute and Uttar Banga Krishi Vishwavidyalaya before joining the Indian Institute of Technology, Kharagpur (IIT KGP—widely considered the Harvard of India). At the same time, Dr. Weindorf's career was also broadening. He moved to Texas Tech University to assume the BL Allen Endowed Chair of Pedology and continued expanding his research. But all the while, he and Chakraborty kept working together, half a world separating them. Their work struck such a cadence that their efficiency became legendary.

Step by step, paper by paper

Project by project, their collaborations went something like this: Weindorf and Chakraborty would meet once a year for a research retreat (e.g., Brazil, USA, Romania,

Italy, United Arab Emirates, India, China) to spend a few days of workshopping ideas, framing out papers, discussing novel ideas, etc. Then, Dr. Weindorf would work on field sampling and initial data collection. With the data in hand, he would send it to Dr. Chakraborty to analyze and model via machine learning and artificial intelligence. While Chakraborty was working on the statistics, Weindorf would further frame the paper, literature review, etc. They would then join the work together and finish out the real-world implications sections together. The exchange became so efficient that they would use time differences across the world to their advantage. As one slept on one side of the world, the other would be working on the other side of the world. Back and forth the work would pass, advancing step by step, paper by paper.

Drs. Weindorf and Chakraborty conducting research on catenas of the Transylvanian Plain, Romania with colleagues from University of Agricultural Sciences and Veterinary Medicine

of Cluj-Napoca.

Mentoring new graduate students, they developed a joint framework. Each dissertation under their direction should generate multiple peer-reviewed papers from the research. For the first paper, Weindorf and Chakraborty would provide heavy guidance and direction; for the second paper, the student would work more independently; and for the third paper and beyond, the student would truly manage and drive all aspects of the research. This approach worked time and again with graduate students gaining confidence and understanding in the process.

Along the pathway of their 15+ year partnership, Drs. Weindorf and Chakraborty have developed numerous patents with additional students as co-inventors. Those patents have now been commercially licensed and are powering a new generation of sensors with increased sensing capabilities. Most recently, Weindorf and Chakraborty (along with their third longtime collaborator—Dr. Bin Li), edited a book for Elsevier entitled "*Unlocking the Secrets of Soil—Applying AI and Sensor Technologies for Sustainable Land Use*."

And so, 15 years later, they recently celebrated their 100th scholarly output together (and actually reached 103 as of this publication). Chakraborty is now an Associate Professor at IIT KGP, and Weindorf is Vice President for Research and Economic Development at Georgia Southern University.

"Working with Dr. Weindorf has been a journey of shared curiosity, trust, and friendship that transcends borders," Chakraborty says. "Our collaboration has taught me that science becomes truly powerful when driven by purpose, humility, and joy in discovery."

“Som has been such a wonderful research collaborator, and I’m so very thankful for his years of commitment to our shared lines of research which have literally redefined areas of proximal sensing in soil science. With deep gratitude, I also acknowledge Dr. B.L. Allen and Clem Weindorf for cultivating the roots of my own academic tree, allowing its branches to spread across the world.”

“Working with Dr. Weindorf has been a journey of shared curiosity, trust, and friendship that transcends borders. Our collaboration has taught me that science becomes truly powerful when driven by purpose, humility, and joy in discovery.”

Check out the 100+ joint publications

Journals

1. Nayak, A., Cean, R., Chakraborty, S., Bakr, N., Biswas, A., Li, B., Swain, D.K., & Weindorf, D.C. (2025). Combining proximal and remote sensors for regional soil characterization in rural Haiti. *Geoderma Regional.* https://doi.org/10.1016/j.geodrs.2025.e01030

2. Singh, R., De, M., Banerjee, R., Nayak, A., Dasgupta, S., Das, A., Dey, S., Biswas, A., Weindorf, D.C., & Chakraborty, S. (2025). Enhancing soil organic carbon estimation with generative AI and Nix color sensor. *Scientific Reports*, *15*, 40628. https://doi.org/10.1038/s41598-025-24236-9
3. Pate, S., Donah, K., Chakraborty, S., Weindorf, D.C., Carvalho, G., Deb, S., Paramanik, B., Sirbescu, M.C., & Li, B. (2025). Prediction of compost organic matter via smartphone image analysis. *Agronomy Journal*, *117*(4), e7-121.
4. Das, A., Mishra, M.K., Chakraborty, S., Bhattacharya, B.K., Dave, R., Kumar, D., Patel, K., Setia, R., & Weindorf, D.C. (2025). Deep carbon: A multiscale feature-time fusion approach for field level digital soil organic carbon mapping. *European Journal of Soil Science*, *76*(4), e70161.
5. Alam, S.S., Chakraborty, S., Jain, F.C., Deb, S., Singh, R., & Weindorf, D.C. (2025). Proximal sensor integration for land use classification and soil analysis in a coastal environment. *Case Studies in Chemical and Environmental Engineering*, *11*, 101079.
6. Lavanya, V., Das, A., Nayak, A., Chawla, Y., Dasgupta, S., Weindorf, D.C., Li, B., & Chakraborty, S. (2024). Digital soil mapping of available phosphorus using a smartphone-integrated RGB imaging device and ascorbic acid extraction method. *Smart Agricultural Technology*, *9*, 100591.
7. Dasgupta, S., Pate, S., Rathore, D., Divyanth, L.G., Das, A., Nayak, A., Dey, S., Biswas, A., Weindorf, D.C., Li, B., Silva, S.H.G., Teixeira, B., Srivastava, S., & Chakraborty, S. (2024). Soil fertility prediction using combined USB-microscope based soil image, auxiliary variables, and portable X-ray fluorescence spectrometry. *Soil Advances*, *2*, 100016.
8. da Costa, M.V., de Souza Costa, E.T., de Oliveira, J.P.D., de Oliveira Lima, G.J., Guilherme, L.R.G., Carvalho, G.S., Duarte, M.H., Chivale, J.J., Weindorf, D.C.,

Chakraborty, S., & Ribeiro, B.T. (2024). Assessment of coffee leaves nutritive value via portable X-ray fluorescence spectrometry and machine learning algorithms. *Spectrochimica Acta Part B: Atomic Spectroscopy*, 106996.

9. Cean, R., Mancini, M., Silva, S.H.G., Bakr, N., Chakraborty, S., Li, B., Acree, A., Anjos, L.H.C.D., Curi, N., & Weindorf, D.C. (2024). Proximal sensor characterization of Haitian agricultural soils: A case study in the Central Plateau. *Journal of South American Earth Sciences*, *143*, 105007.
10. Carvalho, G.S., Weindorf, D.C., Mona-liza, C.S., Ribeiro, B.T., Chakraborty, S., Li, B., Weindorf, W., Acree, A., & Guilherme, L.R.G. (2024). Prediction of compost organic matter via color sensor. *Waste Management*, *185*, 55-63.
11. Mancini, M., Andrade, R., Silva, S.H.G., Rafael, R.B.A., Mukhopadhyay, S., Li, B., Chakraborty, S., Guilherme, L.R.G., Acree, A., Weindorf, D.C., & Curi, N. (2024). Multicontinental prediction of soil organic carbon and texture via proximal sensors. *Soil Science Society of America Journal*, *88*(1), 8-26.
12. Lavanya, V., Nayak, A., Deb Roy, P., Dasgupta, S., De, S., Li, B., Weindorf, D.C., & Chakraborty, S. (2023). A smartphone-enabled imaging device for chromotropic acid-based measurement of nitrate in soil samples. *Sensors*, *23* (17), 7345.
13. Weindorf, D.C., & Chakraborty, S. (2024). Balancing machine learning and artificial intelligence in soil science with human perspective and experience. *Pedosphere*, *34*(1), 9-12.
14. de Sá, R.T.S., Prianti, M.T.A., Andrade, R., Silva, A.O., Batista, E.R., Dos Santos, J.V., Silva, F.M., Carneiro, M.A.C., Guilherme, L.R.G., Chakraborty, S., Weindorf, D.C., Curi, N., Silva, S.H.G., & Ribeiro, B.T. (2023). Detailed characterization of iron-rich tailings after the Fundão dam failure, Brazil, with inclusion of proximal sensors data, as a secure basis for environmental and agricultural restoration.

Environmental Research, *228*, 115858.

15. Lavanya, V., Nayak, A., Dasgupta, S., Urkude, S., Dey, S., Biswas, A., Li, B., Weindorf, D.C., & Chakraborty, S. (2023). A smartphone-integrated imaging device for measuring nitrate and phosphate in soil and water samples. *Microchemical Journal*, *93*, 109042.
16. Dasgupta, S., Debnath, S., Das, A., Biswas, A., Weindorf, D.C., Li, B., Shukla, A.K., Das, S., Saha, S., & Chakraborty, S. (2023). Developing regional soil micronutrient management strategies through ensemble learning based digital soil mapping. *Geoderma*, *433*, 116457.
17. Mancini, M., Andrade, R., dos Santos Teixeira, A.F., Silva, S.H.G., Weindorf, D.C., Chakraborty, S., Guilherme, L.R.G., & Curi, N. (2022). Proximal sensor data fusion for Brazilian soil properties prediction: Exchangeable/available macronutrients, aluminum, and potential acidity. *Geoderma Regional*, *30*, e00573.
18. Gorthi, S., Singh, R., Chakraborty, S., Li, B., & Weindorf, D.C. (2022). Identification of Köppen climate classification and major land resource area in the United States using a smartphone application. *Geoderma Regional*, *30*, e00567.
19. Dasgupta, S., Chakraborty, S., Weindorf, D.C., Li, B., & Bhattacharyya, K. (2022). Influence of auxiliary soil variables to improve PXRF-based soil fertility evaluation in India. *Geoderma Regional*, *30*, e00557.
20. Swetha, R.K., Dasgupta, S., Chakraborty, S., Li, B., Weindorf, D.C., Mancini, M., Silva, S.H.G., Ribeiro, R.T., Curi, N., & Ray, D.P. (2022). Using Nix color sensor and Munsell soil color variables to classify contrasting soil types and predict soil organic carbon in Eastern India. *Computers and Electronics in Agriculture*, *199*, 107192.
21. Teixeira, A.F.D.S., Andrade, R., Mancini, M., Silva, S.H.G., Weindorf, D.C., Chakraborty, S., Guilherme, L.R.G., & Curi, N. (2022). Proximal sensor data fusion

for tropical soil property prediction: Soil fertility properties. *Journal of South American Earth Sciences*, *116*, 103873.

22. Andrade, R., Silva, S.H.G., Weindorf, D.C., Chakraborty, S., Guilherme, L.R.G., & Curi, N. (2022). Proximal sensor data fusion and auxiliary information for tropical soil property prediction: Soil texture. *Geoderma*, *422*.
23. Borges, C.S., Chakraborty, S., Weindorf, D.C., Lopes, G., Guilherme, L.R.G., Curi, N., Li, B., & Ribeiro, B.T. (2022). Pocket-sized sensor for controlled, quantitative and instantaneous color acquisition of plant leaves. *Journal of Plant Physiology*, *272*, 153686.
24. Divyanth, L.G., Chakraborty, S., Li, B., Weindorf, D.C., Deb, P., & Gem, C.J. (2022). Non-destructive prediction of nicotine content in tobacco using hyperspectral image–derived spectra and machine learning. *Journal of Biosystems Engineering*, *47*, 106–117.
25. Andrade, R., Silva, S.H.G., Weindorf, D.C., Chakraborty, S., Faria, W.M., Guilherme, L.R.G., & Curi, N. (2021). Micronutrients prediction via pXRF spectrometry in Brazil: Influence of weathering degree. *Geoderma Regional*, *27*, e00431.
26. Li, B., Marx, B.D., Chakraborty, S., & Weindorf, D.C. (2021). Multivariate calibration on heterogeneous samples. *Chemometrics and Intelligent Laboratory Systems*, *217*, 104386.
27. Gorthi, S., Swetha, R.K., Chakraborty, S., Li, B., Weindorf, D.C., Dutta, S., Banerjee, H., Das, K., & Majumdar, K. (2021). Soil organic matter prediction using smartphone-captured digital images: Use of reflectance image and image perturbation. *Biosystems Engineering*, *209*, 154-169.
28. Pelegrino, M.H.P., Silva, S.H.G., de Faria, A.J.G., Mancini, M., Teixeira, A.F.D.S., Chakraborty, S., Weindorf, D.C., Guilherme, L.R.G., & Curi, N. (2021). Prediction of soil nutrient content via pXRF spectrometry and its spatial variation in a highly

variable tropical area. *Precision Agriculture*, 1-17. https://doi.org/10.1007/s11119-021-09825-8

29. Slaughter, L., Deb, S., Chakraborty, S., Li, B., Bakr, N., Edwards, B., & Weindorf, D.C. (2021). On-farm evaluation of regenerative land-use practices in a semi-arid pasture agroecosystem in West Texas, USA. *Revista Brasileira de Ciência do Solo*, *45*, e0200163, 1-19.
30. V□car, C.L., Covaci, E., Chakraborty, S., Li, B., Weindorf, D.C., Fren□u, T., Pârvu, M., & Podar, D. (2021). Heavy metal-resistant filamentous fungi as potential mercury bioremediators. *Journal of Fungi*, *7*, 386.
31. Teixeira, A.F.D.S., Silva, S.H.G., Weindorf, D.C., Chakraborty, S., de Carvalho, T.S., Silva, A.O., Guimarães, A.A., & Moreira, F.M.Z. (2021). Microbiological indicators of soil quality predicted via proximal and remote sensing. *European Journal of Soil Biology*, *104*, 103315.
32. Ferreira, G.W.D., Ribeiro, B.T., Weindorf, D.C., Teixeira, B.I., Chakraborty, S., Li, B., Guilherme, L.R.G., & Scolforo, J.R.S. (2021). Assessment of iron-rich tailings via portable X-ray fluorescence spectrometry: the Mariana dam disaster, southeast Brazil. *Environmental Monitoring and Assessment*, *193*(4), 193-203.
33. Jha, G., Mukhopadhyay, S., Ulery, A.L., Lombard, K., Chakraborty, S., Weindorf, D.C., VanLeeuwen, D., & Brungard, C. (2021). Agricultural soils of the Animas River watershed after the Gold King Mine spill: an elemental spatiotemporal analysis via portable x-ray fluorescence spectroscopy. *Journal of Environmental Quality*, *50*(3), 730-743.
34. Kagilery, J., Chakraborty, S., Li, B., Hull, M., & Weindorf, D.C. (2021). Portable X-ray fluorescence analysis of water: thin film and water thickness considerations. *EQA - International Journal of Environmental Quality*, *45*, 27-41.

35. Li, B., Weindorf, D.C., Chakraborty, S., & Yu, Q. (2021). Data integration using model-based boosting. *SN Computer Science*, *2*(5), 1-11.
36. Weindorf, D.C., & Chakraborty, S. (2020). Portable X-ray fluorescence spectrometry analysis of soils. *Soil Science Society of America Journal*, *84*(5), 1384-1392.
37. Andrade, R., Silva, S.H.G., Weindorf, D.C., Chakraborty, S., Faria, W.M., Guilherme, L.R.G., & Curi, N. (2020). Tropical soil order and suborder prediction combining optical and X-ray approaches. *Geoderma Regional*, *23*, e00331.
38. Acree, A., Weindorf, D.C., Paulette, L., Gestel, N.V., Chakraborty, S., Man, T., Jordan, C., & Prieto, J.L. (2020). Soil classification in Romanian catenas via advanced proximal sensors. *Geoderma*, *377*, 114587.
39. Zhou, S., Weindorf, D.C., Cheng, Q., Yang, B., Yuan, Z., & Chakraborty, S. (2020). Elemental assessment of vegetation via portable X-ray fluorescence: sample preparation and methodological considerations. *Spectrochimica Acta Part B: Atomic Spectroscopy*, *174*, 105999.
40. Swetha, R.K., Bende, P., Singh, K., Gorthi, S., Biswas, A., Li, B., Weindorf, D.C., & Chakraborty, S. (2020). Predicting soil texture from smartphone-captured digital images and an application. *Geoderma*, *376*, 114562.
41. Mancini, M., Weindorf, D.C., Monteiro, M.E.C., de Faria, A.J.G., Teixeira, A.F.D.S., Lima, W.D., Lima, F.R.D.D., Dijair, T.S.B., Marques, F.D., Ribeiro, D., Silva, S.H.D., Chakraborty, S., & Curi, N. (2020). From sensor data to Munsell color system: Machine learning algorithm applied to tropical soil color classification via Nix™ Pro sensor. *Geoderma*, *375*, 114471.
42. Gorthi, S., Chakraborty, S., Li, B., & Weindorf, D.C. (2020). A field-portable acoustic sensing device to measure soil moisture. *Computers and Electronics in*

Agriculture, *174*, 105517.

43. Teixeira, A.F.D.S., Pelegrino, M.H.P., Faria, W.M., Silva, S.H.G., Goncalves, M.G.M., Junior, F.W.A., Gomide, L.R., Junior, A.L.P., Souza, I.A.D., Chakraborty, S., Weindorf, D.C., Guilherme, L.R.G., & Curi, N. (2020). Tropical soil pH and sorption complex prediction via portable X-ray fluorescence spectrometry. *Geoderma*, *361*, 114132.
44. Mukhopadhyay, S., Chakraborty, S., Bhadoria, P.B.S., Li, B., & Weindorf, D.C. (2020). Assessment of heavy metal and soil organic carbon by portable X-ray fluorescence spectrometry and NixPro™ sensor in landfill soils of India. *Geoderma Regional*, *20*, e00249.
45. Goff, K., Schaetzl, R.J., Chakraborty, S., Weindorf, D.C., Kasmerchak, C., & Bettis, E.A. (2020). Impact of sample preparation methods for characterizing the geochemistry of soils and sediments by portable X-ray fluorescence. *Soil Science Society of America Journal*, *84*(1), 131-143.
46. Kagiliery, J., Chakraborty, S., Acree, A., Weindorf, D.C., Brevik, E., Jelinski, N., Li, B., & Jordan, C. (2019). Rapid quantification of lignite sulfur content: combining optical and X-ray approaches. *International Journal of Coal Geology*, *216*, 103336.
47. Andrade, R., Faria, W.M., Silva, S.H.G., Chakraborty, S., Weindorf, D.C., Mesquita, L.F., Guilherme, L.R.G., & Curi, N. (2020). Prediction of soil fertility via portable X-ray fluorescence (pXRF) spectrometry and soil texture in the Brazilian Coastal Plains. *Geoderma*, *357*, 113960.
48. Andrade, R., Silva, S.H.G., Weindorf, D.C., Chakraborty, S., Faria, W.M., Mesquita, L.F., Guilherme, L.R.G., & Curi, N. (2020). Assessing models for prediction of some soil chemical properties from portable X-ray fluorescence (pXRF) spectrometry data in Brazilian Coastal Plains. *Geoderma*, *357*, 113957.

49. Mancini, M., Weindorf, D.C., Silva, S.H.G., Chakraborty, S., Teixeira, A.F.S., Guilherme, L.R.G., & Curi, N. (2019). Parent material distribution mapping from tropical soils data via machine learning and portable X-ray fluorescence (pXRF) spectrometry in Brazil. *Geoderma, 354*, 113885.
50. Deb, S., Kumar, D., Chakraborty, S., Weindorf, D.C., Choudhury, A., Banik, P., Deb, D., De, P., Saha, S., Patra, A.K., Majhi, M., Naskar, P., Panda, P., & Hoque, A. (2019). Comparative carbon stability in surface soils and subsoils under submerged rice and upland non-rice crop ecologies: A physical fractionation study. *Catena, 175*, 400-410.
51. Rawal, A., Chakraborty, S., Li, B., Lewis, K., Godoy, M., Paulette, L., & Weindorf, D.C. (2019). Determination of base saturation percentage in agricultural soils via portable X-ray fluorescence spectrometer. *Geoderma, 338*, 375-382.
52. Mancini, M., Weindorf, D.C., Chakraborty, S., Silva, S.H.G., Teixeira, A.F.D.S., Guilherme, L.R.G., & Curi, N. (2019). Tracing tropical soil parent material analysis via portable X-ray fluorescence (pXRF) spectrometry in Brazilian Cerrado. *Geoderma, 337*, 718-728.
53. Chakraborty, S., Li, B., Weindorf, D.C., & Morgan, C.L.S. (2019). External parameter orthogonalisation of Eastern European VisNIR-DRS soil spectra. *Geoderma, 337*, 65-75.
54. Chakraborty, S., Li, B., Weindorf, D.C., Deb, S., Acree, A., De, P., & Panda, P. (2019). Use of portable X-ray fluorescence spectrometry for classifying soils from different land use land cover systems in India. *Geoderma, 338*, 5-13.
55. Acree, A., Weindorf, D.C., Chakraborty, S., & Godoy, M. (2019). Comparative geochemistry of urban and rural playas in the Southern High Plains. *Geoderma, 337*, 1028-1038.

56. Li, B., Chakraborty, S., Godoy, M., Kusi, N.Y.O., & Weindorf, D.C. (2018). Compost cation exchange capacity via portable X-ray fluorescence (PXRF) spectrometry. *Compost Science and Utilization*, *26*(4), 271-278.
57. Li, B., Marx, B.D., Chakraborty, S., & Weindorf, D.C. (2018). Multivariate calibration with robust signal regression. *Statistical Modelling*. https://doi.org/10.1177/1471082X18782813
58. Weindorf, D.C., Chakraborty, S., Li, B., Deb, S., Singh, A., & Kusi, N.Y. (2018). Compost salinity assessment via Portable X-ray fluorescence (PXRF) spectrometry. *Waste Management*, *78*, 158-163.
59. Pearson, D., Weindorf, D.C., Chakraborty, S., Li, B., Koch, J., Van Deventer, P., de Wet, J., & Kusi, N.Y. (2018). Analysis of metal-laden water via portable X-ray fluorescence spectrometry. *Journal of Hydrology*, *561*, 267-276.
60. Deb, S., Debnath, M.K., Chakraborty, S., Weindorf, D.C., Kumar, D., Deb, D., & Choudhury, A. (2018). Impact of anthropogenic and agricultural intensification on forest land use and land cover change and modelling for future possibilities: A case study from the Himalayan Terai. *Anthropocene*, *21*, 32-41.
61. McGladdery, C., Weindorf, D.C., Chakraborty, S., Li, B., Paulette, L., Podar, D., Pearson, D., Kusi, N.Y.O., & Duda, B. (2018). Elemental assessment of vegetation via portable X-ray fluorescence (PXRF) spectrometry. *Journal of Environmental Management*, *210*, 210-225.
62. Raj, A., Chakraborty, S., Duda, B.M., Weindorf, D.C., Li, B., Roy, S., Sarathjith, M.C., & Das, B.S. (2018). Soil mapping via diffuse reflectance spectroscopy based variable indicators: an ordered predictor selection approach. *Geoderma*, *314*, 146-159.
63. Chakraborty, S., Man, T., Paulette, L., Deb, S., Li, B., Weindorf, D.C., & Frazier, M. (2017). Rapid assessment of smelter/mining soil contamination via portable X-

ray fluorescence spectrometry and indicator kriging. *Geoderma*, *306*, 108-119.

64. Shutic, S., Chakraborty, S., Li, B., Weindorf, D.C., Sperry, K., & Casadonte, D. (2017). Forensic identification of pharmaceuticals via portable X-ray fluorescence and diffuse reflectance spectroscopy. *Forensic Science International*, *279*, 22-32.
65. Koch, J., Chakraborty, S., Li, B., Kucera, J.M., Deventer, P.V., Daniell, A., Faul, C., Man, T., Pearson, D., Duda, B., Weindorf, C.A., & Weindorf, D.C. (2017). Proximal sensor analysis of mine tailings in South Africa: An exploratory study. *Journal of Geochemical Exploration*, *181*, 45-57.
66. Chakraborty, S., Weindorf, D.C., Weindorf, C.A., Das, B.S., Li, B., Duda, B., Pennington, S., & Ortiz, R. (2017). Semiquantitative evaluation of secondary carbonates via portable x-ray fluorescence spectrometry. *Soil Science Society of America Journal*, *81*, 844–852.
67. Duda, B., Weindorf, D.C., Chakraborty, S., Li, B., Man, T., Paulette, L., & Deb, S. (2017). Soil characterization across catenas via advanced proximal sensors. *Geoderma*, *298*, 78-91.
68. Chakraborty, S., Li, B., Deb, S., Paul, S., Weindorf, D.C., & Das, B.S. (2017). Predicting soil arsenic pools by visible near infrared diffuse reflectance spectroscopy. *Geoderma*, *296*, 30-37.
69. Chakraborty, S., Weindorf, D.C., Deb, S., Li, B., Paul, S., Choudhury, A., & Ray, D.P. (2017). Rapid assessment of regional soil arsenic pollution risk via diffuse reflectance spectroscopy. *Geoderma*, *289*, 72-81.
70. Deb, S., Chakraborty, S., Weindorf, D.C., Murmu, A., Banik, P., Debnath, M.K., & Choudhury, A. (2016). Dynamics of organic carbon in deep soils under rice and non-rice cropping systems. *Geoderma Regional*, *7*(4), 388-394.
71. Pearson, D., Chakraborty, S., Duda, B., Li, B., Weindorf, D.C., Deb, S., Brevik, E., & Ray, D.P. (2017). Water analysis via portable X-ray fluorescence spectrometry.

Journal of Hydrology, *544*, 172-179.

72. Cardelli, V., Weindorf, D.C., Chakraborty, S., Li, B., DeFeudis, M., Cocco, S., Agnelli, A., Choudhury, A., Ray, D., & Corti, G. (2017). Non-saturated soil organic horizon characterization via advanced proximal sensors. *Geoderma*, *288*, 130-142.
73. Chakraborty, S., Weindorf, D.C., Michaelson, G.J., Ping, C.L., Choudhury, A., Kandakji, T., Acree, A., Sharma, A., & Wang, D. (2016). In-situ differentiation of acidic and non-acidic tundra via portable X-ray fluorescence (PXRF) spectrometry. *Pedosphere*, *26*(4), 549–560.
74. Weindorf, D.C., Chakraborty, S., Herrero, J., Li, B., Castaneda, C., & Choudhury, A. (2016). Simultaneous assessment of key properties of arid soil by combined PXRF and Vis-NIR data. *European Journal of Soil Science*, *67*, 173-183.
75. Weindorf, D.C., Chakraborty, S., Aldabaa, A.A.A., Paulette, L., Corti, G., Cocco, S., Micheli, E., Wang, D., Li, B., Man, T., Sharma, A., & Person, T. (2015). Lithologic discontinuity assessment in soils via portable X-ray fluorescence (PXRF) spectrometry and visible near infrared diffuse reflectance spectroscopy (VisNIR DRS). *Soil Science Society of America Journal*, *79*, 1704-1716.
76. Chakraborty, S., Weindorf, D.C., Paul, S., Ghosh, B., Li, B., Ali, M.N., Ghosh, R.K., Ray, D.P., & Majumdar, K. (2015). Diffuse reflectance spectroscopy for monitoring lead in landfill agricultural soils of India. *Geoderma Regional*, *5*, 77-85.
77. Chakraborty, S., Weindorf, D.C., Li, B., Aldabaa, A.A.A., Ghosh, R.K., Paul, S., & Ali, N. (2015). Development of a hybrid proximal sensing method for rapid identification of petroleum contaminated soils. *Science of the Total Environment*, *514*, 399-408.
78. Wang, D., Chakraborty, S., Weindorf, D.C., Li, B., Sharma, A., Paul, S., & Ali, N. (2015). Synthesized use of VisNIR DRS and PXRF for soil characterization: Total carbon and total nitrogen. *Geoderma*, *243-244*, 157-167.

79. Weindorf, D.C., Chakraborty, S., Paulette, L., Micheli, E., Li, B., & Man, T. (2015). Proximal sensor identification of lithologic discontinuities in Eastern Europe. *ProEnvironment*, *8*, 176-185.
80. Swanhart, S., Weindorf, D.C., Chakraborty, S., Bakr, N., Zhu, Y., Nelson, C., Shook, K., & Acree, A. (2015). Soil salinity measurement via portable X-ray fluorescence (PXRF) spectrometry. *Soil Science*, *179*(9), 417-423.
81. Sharma, A., Weindorf, D.C., Wang, D., & Chakraborty, S. (2015). Characterizing soils via portable X-ray fluorescence spectrometer: 4. Cation exchange capacity (CEC). *Geoderma*, *239-240*, 130-134.
82. Aldabaa, A.A.A., Weindorf, D.C., Chakraborty, S., Sharma, A., & Li, B. (2015). Combination of proximal and remote sensing methods for rapid soil salinity quantification. *Geoderma*, *239-240*, 34-46.
83. Sharma, A., Weindorf, D.C., Mann, T., Aldabaa, A.A.A., & Chakraborty, S. (2014). Characterizing soils via portable X-ray fluorescence spectrometer: 3. Soil reaction (pH). *Geoderma*, *232-234*, 141-147.
84. Chakraborty, S., Weindorf, D.C., Li, B., Ali, N., Majumder, K., & Ray, D.P. (2014). Analysis of petroleum contaminated soils by spectral modeling and pure response profile recovery of n-hexane. *Environmental Pollution*, *190*, 10-18.
85. Chakraborty, S., Weindorf, D.C., Ali, N., Li, B., Ge, Y., & Darilek, J.L. (2013). Spectral data mining for rapid measurement of organic matter in unsieved moist compost. *Applied Optics*, *52*(4), B82-B92.
86. Chakraborty, S., Weindorf, D.C., Zhu, Y., Li, B., Morgan, C.L.S., Ge, Y., & Galbraith, J. (2012). Assessing spatial variability of soil petroleum contamination using visible near-infrared diffuse reflectance spectroscopy. *Journal of Environmental Monitoring*, *14*, 2886-2892.

87. McWhirt, A.L., Weindorf, D.C., Chakraborty, S., & Li, B. (2012). Visible near infrared diffuse reflectance spectroscopy (VisNIR DRS) for rapid measurement of organic matter in compost. *Waste Management and Research*, *30*(10), 1049-1058.
88. Weindorf, D.C., Zhu, Y., Haggard, B., Lofton, J., Chakraborty, S., Bakr, N., Zhang, W., Weindorf, W.C., & Legoria, M. (2012). Enhanced soil pedon horizonation using portable X-ray fluorescence spectroscopy. *Soil Science Society of America Journal*, *76*(2), 522-531.
89. Chakraborty, S., Weindorf, D.C., Zhu, Y., Li, B., Morgan, C.L.S., Ge, Y., & Galbraith, J. (2012). Spectral reflectance variability from soil physicochemical properties in oil contaminated soils. *Geoderma*, *177-178*, 80-89.
90. Weindorf, D.C., Zhu, Y., Chakraborty, S., Bakr, N., & Huang, B. (2012). Use of portable X-ray fluorescence spectrometry for environmental quality assessment of peri-urban agriculture. *Environmental Monitoring and Assessment*, *184*(1), 217-227.
91. Zhu, Y., Weindorf, D.C., Chakraborty, S., Haggard, B., & Bakr, N. (2010). Characterizing surface soil water with field portable diffuse reflectance spectroscopy. *Journal of Hydrology*, *391*, 133–140.
92. Chakraborty, S., Weindorf, D.C., Morgan, C.L.S., Ge, Y., Galbraith, J., Li, B., & Kahlon, C.S. (2010). Rapid identification of oil contaminated soils using visible near-infrared diffuse reflectance spectroscopy. *Journal of Environmental Quality*, *39* (4), 1378-1387.

Conference Proceedings

93. Dam, U., Singh, R., Nayak, A., Dey, S., Biswas, A., Weindorf, D.C., & Chakraborty, S. (2025).

Enhancing soil organic carbon prediction using FTIR spectroscopy and generative AI-augmented machine learning models. In *Proceedings of the 2025 IEEE India Geoscience and Remote Sensing Symposium (InGARSS 2025), India* (in press).

94. Singh, R., Dam, U., Nayak, A., Dey, S., Biswas, A., Weindorf, D.C., & Chakraborty. S. (2025). Soil organic carbon prediction and mapping using laboratory hyperspectral imaging. In *Proceedings of the 2025 IEEE India Geoscience and Remote Sensing Symposium (InGARSS 2025), India* (in press).
95. Weindorf, D.C., Chakraborty, S., Zhu, Y., Galbraith, J., & Ge, Y. (2011). New technologies in field soil survey. In *Applied Industrial Optics: Spectroscopy, Imaging, and Metrology [AIO], Optical Society of America, July 10-14, Toronto, Canada.*

Books

96. Weindorf, D.C., Chakraborty, S., & Li, B. (Eds.). 2025. *Unlocking the secrets of soil: Applying AI and sensor technologies for sustainable land use.* Elsevier.

Book Chapters

97. Chakraborty, S., Weindorf, D.C. & Dasgupta, S. (2025). Introduction. In D.C. Weindorf, S. Chakraborty, and B. Li (Eds.), *Unlocking the secrets of soil: Applying AI and sensor technologies for sustainable land use* (pp. 1-16). Elsevier.
98. Silva, S. H. G., Ribeiro, B.T., Guerra, M.B.B., de Carvalho, H.W.P., Lopes, G., Carvalho, G.S., Guilherme, L.R.G., Resende, M., Mancini, M., Curi, N., Rafael, R.B.A., Cardelli, V., Cocco, S., Corti, G., Chakraborty, S., Li, B., & Weindorf, D. C. (2021). pXRF in tropical soils: Methodology, applications, achievements and challenges. *Advances in Agronomy, 167*:1–62.

99. Chakraborty, S., Weindorf D.C., & Ray, D.P. (2018). Advanced hyperspectral and X-ray fluorescence sensors for monitoring contaminated soils. In A. Rakshit, B. Sarkar & P.C. Abhilash (Eds.), *Soil amendments for sustainability challenges and perspectives* (pp. 53–62). CRC Press.

U.S. Patents

100. Weindorf, D.C., & Chakraborty, S. (2018). *Portable apparatus for soil chemical characterization* (U.S. Patent US10107770). Texas Tech University System.
101. Weindorf D.C., Pearson, D., & Chakraborty, S. (2020). Portable apparatus for liquid chemical characterization (U.S. Patent US10697953). Texas Tech University System.
102. Weindorf, D.C., Pearson, D. & Chakraborty, S. (2021). *Portable apparatus for determining an elemental composition of a sample* (U.S. Patent US10900947). Texas Tech University System.
103. Weindorf D.C., Pearson, D., & Chakraborty, S. (2021). *Enhanced chemical characterization of solid matrices using x-ray fluorescence and optical color reflectance* (U.S. Patent US11187692). Texas Tech University System.

More member news

Back to current issue

Back to home