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RESEARCH EXPERTISE

Soil proximal sensors, Diffuse reflectance spectroscopy, Portable XRF, NixPro, Smartphone-based Soil Sensing, Digital soil mapping, Soil chemistry, Machine learning, and Soil pedology and pedometrics

EDUCATION

- Ph.D. in Agronomy (Soil Science emphasis) (2008-2011) Louisiana State University, USA
- M.Sc. (Ag.) in Soils (2006-2008) Department of soils, Punjab Agricultural University, India
- B.Sc. (Ag.) Hons. (2002-2006) Dept. of Agril. Chem. and Soil Sci., BCKV, India

PROFESSIONAL EXPERIENCE

- Associate Professor of Soil Science (July 2022-till date), Agricultural and Food Engineering Department, Indian Institute of Technology Kharagpur, India
- Assistant Professor of Soil Science (September 2016 to July 2022), Agricultural and Food Engineering Department, Indian Institute of Technology Kharagpur, India
- Assistant Professor of Soil Science (May 2015 to August 2016), Uttar Banga Krishi Viswavidyalaya, West Bengal, India
- Assistant Professor of Soil Science (November 2011 to May 2015), RKMVU, Kolkata, India
- Post-doctoral researcher (September 2011 to October 2011), Geospatial Research Unit, West Virginia University, USA
- Graduate research assistant (August 2008 to July 2011), Louisiana State University, USA

RESEARCH EXPERTISE BY KEYWORDS

- Soil proximal sensors
- VisNIR DRS
- MIR DRS
- PXRF
- NixPro
- Digital soil mapping
- Sensor Fusion
- Spatial statistics
- Spatial model building
- Machine learning
- Statistical learning
- Pedometrics
- Soil heavy metal contamination
- Smartphone soil sensing
- Machine vision

RESEARCH IMPACTS

- Total citation: 3614 (as on 18th January, 2023)
- Google scholar h-index: 32
- Google scholar i10-index: 75

RESEARCH PROJECTS

- PI: Rapid assessment of soil arsenic and lead pollution risks via PXRF based spectral modeling (SRIC, IIT Kgp) 2017-20.
- PI: Rapid assessment of soil arsenic, cadmium and lead pollution in peri-urban agricultural fields via portable x-ray fluorescence spectrometry and machine learning (SERB, DST) 2017-20.
- PI: Rapid prediction of urban soil arsenic contamination by combined visible near infrared-mid infrared diffuse reflectance spectroscopy (SERB, DST) 2013-16.
- PI: Use of hyperspectral diffuse reflectance spectroscopy sensors for rapid assessment of soil quality (ICAR) 2016-17.
- Co-PI: Securing water for agricultural and food sustainability: developing transdisciplinary approach to ground water management (SPARC, MHRD)2019-22.
- Co-PI: Development and evaluation of realtime river reservoir water quality advisory system (Imprint 2, DST) 2019-22.
- Co-PI: estimation of soil properties and crop residue cover using AVIRIS data (SAC, ISRO) 2017-2019.
- Co-PI: Assessment of suspended sediments concentration and phytoplankton contents in the Chilika lagoon using hyperspectral remote sensing (DST).
- Co-PI: Non-enzymatic microfluidic electrochemical multiplex sensor for cost-effective soil testing (Indo-German science and technology centre) 2020-23.

CONSULTANCY PROJECTS

- PI: Estimation of tobacco nicotine content via hyperspectral imaging (ITC Ltd.) 2021.
- PI: Development of soil sensor probe for measuring soil parameters (Solarvibes, Germany) 2019.
- PI: Development of sensor based protocols for rapid testing of soil fertility parameters of coastal saline zone of West Bengal (IPNI) 2019-20.
- PI: Spatial mapping and analyzing heavy metal contamination in farmland soils (Texas tech university, USA) 2019-22.
- PI: Nutrient recommendations using novel XRF and IR based soil and plant analysis (Coromandel) 2019-22.
- Co-PI: Development of spectral algorithms for selected soil properties to improve soil management in small holding cocoa plantations of Papua New Guinea (The University of Sydney, Australia) 2017-20.

US PATENTS

1. Weindorf, D.C., and **S. Chakraborty,** 2018. Portable apparatus for soil chemical characterization. US Patent 10107770. Texas Tech University System.
2. Weindorf D.C., D. Pearson, and **S. Chakraborty**, 2020. Portable apparatus for liquid chemical characterization. US Patent US10697953B2. Texas Tech University System.
3. Weindorf D.C., D. Pearson, and **S. Chakraborty**, 2021. Enhanced chemical characterization of solid matrices using x-ray fluorescence and optical color reflectance. US Patent US11187692. Texas Tech University System.
4. Weindorf D.C., D. Pearson, and **S. Chakraborty**, 2021. Portable apparatus for determining an elemental composition of a sample. US Patent US10900947. Texas Tech University System.

HONOURS AND AWARDS

- Appeared in the list of top 2% scientists of the world (Stanford university, USA and Elsevier) (2021)
- Rank #5 researcher worldwide (out of >500 researchers) in the field of portable XRF (SciVal)
- Australia awards fellowship (Govt of Australia) (2016) for visiting the university of Sydney, Australia
- Shastri-Indo scholar travel subsidy grant (2019) for visiting the University of Guelph, Canada

- Geoderma best paper award (Geoderma, Elsevier, 2015)
- SPESS garden scholarship (LSU, USA, 2010)
- Honorary mention (47th annual SSLR meeting, Texas A&M University, USA, 2010)
- Editorial advisory board member (Geoderma, Elsevier, if= 6.11)
- Editorial board member (Sensors, MDPI, if =4.31)
- Editorial board member- Clay research (The clay minerals society india, new delhi)
- Life member- Indian science congress association
- ICAR junior research fellowship (Physical science, rank 15)
- National eligibility test (soil science, ICAR)
- Merit certificate (10th exam) (National scholarships scheme)

INTERNATIONAL COLLABORATION

- Coordinator- MoU between IIT KGP and Texas Tech University, USA
- International collaboration: NASA, Texas Tech University, Central Michigan University, University of Guelph, UFLA (Brazil) , Louisiana State University, Technical university of Munich, USAMV (Romania)

NPTEL COURSES OFFERED

- Soil Science and Technology
- Environmental Soil Chemistry
- Machine Learning for Soil and Crop Management
- Soil fertility and fertilizers

PUBLICATIONS (SCI indexed Peer-Reviewed Journals) *indicates corresponding author

1. Zingore, S., Adolwa, I.S., Njoroge, S., Johnson, J.M., Saito, K., Phillips, S., Kihara, J., Mutegi, J., Murell, S., Dutta, S. Chivenge, P., Amouzou, K.A., Oberthur, T., **Chakraborty, S.,** and Sileshi, G.W., 2022. Novel insights into factors associated with yield response and nutrient use efficiency of maize and rice in sub-Saharan Africa. A review. Agronomy for Sustainable Development, 42(5), pp.1-20.
2. De, P., Deb, S., Deb*, D., **Chakraborty, S.,** Santra, P., Dutta, P., Hoque, A., and Choudhury, A., 2022. Soil quality under different land uses in eastern India: Evaluation by using soil indicators and quality index. PlosOne, 17(9), e0275062.
3. Mancini, M., Andrade, R., dos Santos Teixeira, A.F., Silva, S.H.G., Weindorf*, D.C., **Chakraborty, S.,** Guilherme, L.R.G. and Curi, N., 2022. Proximal sensor data fusion for Brazilian soil properties prediction: Exchangeable/available macronutrients, aluminum, and potential acidity. Geoderma Regional, p.e00573.
4. Gorthi, S., Singh, R., **Chakraborty, S.*,** Li, B., and 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.
5. Dasgupta, S., **Chakraborty, S.*,** Weindorf, D. C., Li, B., Silva, S. H. G., and Bhattacharyya, K., 2022. Influence of auxiliary soil variables to improve PXRF-based soil fertility evaluation in India. Geoderma Regional, 30, e00557.
6. Swetha, R. K., Dasgupta, S., **Chakraborty, S.*,** Li, B., Weindorf, D. C., Mancini, M., Silva, S.H.G., Ribeiro, B.T., Curi, N., and 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.
7. Teixeira, A.F.D.S., R. Andrade, M. Mancini, S.H.G. Silva, D.C. Weindorf*, **S. Chakraborty**, L.R.G. Guilherme, and N. Curi. 2022. Proximal sensor data fusion for tropical soil property prediction: Soil fertility properties. Journal of South American Earth Sciences, 116, 103873 .

8. Andrade, R., M. Mancini, A.F.D.S. Teixeira, S.H.G. Silva, D.C. Weindorf*, **S. Chakraborty**, L.R. G. Guilherme, and N. Curi. 2022. Proximal sensor data fusion and auxiliary information for tropical soil property prediction: Soil texture. Geoderma 422.

9. Borges, C.S., **S. Chakraborty**, D.C. Weindorf, G. Lopes, L.R.G. Guilherme, N. Curi, B. Li, and B.T. Ribeiro*. 2022. Pocket-sized sensor for controlled, quantitative and instantaneous color acquisition of plant leaves. Journal of Plant Physiology 272. 153686.

10. Andrade, R., S.H.G. Silva*, D.C. Weindorf, **S. Chakraborty**, W.M. Faria, L.R.G. Guilherme, and N. Curi. 2021. Micronutrients prediction via pXRF spectrometry in Brazil: Influence of weathering degree. Geoderma Regional 27: e00431.

11. Ghosh, R. K.*, D.P. Ray, **S. Chakraborty,** B. Saha, K. Manna, A. Tewari, and S. Sarkar. 2021. Cadmium removal from aqueous medium by jute stick activated carbon using response surface methodology: factor optimisation, equilibrium, and regeneration. International Journal of Environmental Analytical Chemistry 101(14): 2171-2188.

12. Li, B., B.D. Marx*., **S. Chakraborty**, and D.C. Weindorf. 2021. Multivariate calibration on heterogeneous samples. Chemometrics and Intelligent Laboratory Systems 217: 104386.

13. Gorthi, S., R.K. Swetha, **S. Chakraborty*,** B. Li, D.C. Weindorf, S. Dutta, H. Banerjee, K. Das, and K. Majumdar. 2021. Soil organic matter prediction using smartphone-captured digital images: Use of reflectance image and image perturbation. Biosystems Engineering 209: 154-169.

14. Timsina, J, S. Dutta*, K.P. Devkota, **S. Chakraborty**, R.K. Neupane, S. Bishta, L.P. Amgain, V.K. Singh, S. Islam, and K. Majumdar. 2021. Improved nutrient management in cereals using Nutrient Expert and machine learning tools: productivity, profitability and nutrient use efficiency. Agricultural Systems 192: 103181.

15. Pelegrino, M.H.P., S.H.G. Silva, A.J. G. de Faria, M. Mancini, A.F.D.S. Teixeira, **S. Chakraborty**, D. C. Weindorf, L.R.G. Guilherme, and N. Curi*. 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.

16. Slaughter, L., S. Deb, **S. Chakraborty**, B. Li, N. Bakr, B. Edwards, and D. Weindorf*. 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.

17. Văcar, C.L., E. Covaci, **S. Chakraborty**, B. Li, D. C. Weindorf, T. Frențiu, M. Pârvu, and D. Podar*. 2021. Heavy metal-resistant filamentous fungi as potential mercury bioremediators. Journal of Fungi 7:386.

18. Teixeira, A.F.D.S., S.H.G. Silva, D. C. Weindorf, **S. Chakraborty**, T.S. de Carvalho, A.O. Silva, A.A. Guimarães, and F.M.Z. Moreira*. 2021. Microbiological indicators of soil quality predicted via proximal and remote sensing. European Journal of Soil Biology 104: 103315.

19. Ferreira, G.W.D.*, B.T. Ribeiro, D. C. Weindorf, B. I. Teixeira, **S. Chakraborty**, B. Li, L.R.G. Guilherme, J.R.S. Scolforo. 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.

20. Kebonye, N.M.*, K. John, **S. Chakraborty**, P.C. Agyeman, S.K. Ahado, P.N. Eze, K. Němeček, O. Drábek, and L. Borůvka. 2021. Comparison of multivariate methods for arsenic estimation and mapping in floodplain soil via portable X-ray fluorescence spectroscopy. Geoderma 384:114792.

21. Silva, S. H. G., B.T. Ribeiro, M.B.B. Guerra, H.W.P. de Carvalho, G. Lopes, G.S. Carvalho, L.R.G. Guilherme, M. Resende, M. Mancini, N. Curi, R.B.A. Rafael, V. Cardelli, S. Cocco, G. Corti, **S. Chakraborty**, B. Li, and D. C. Weindorf*. 2021. pXRF in tropical soils: Methodology, applications, achievements and challenges. Advances in Agronomy 167:1–62.

22. Jha, G.*, S. Mukhopadhyay, A.L. Ulery, K. Lombard, **S. Chakraborty,** D.C. Weindorf, D. VanLeeuwen, and C. Brungard. 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.

23. Swetha, R.K., and **S. Chakraborty*.** 2021. Combination of soil texture with Nix color sensor can improve soil organic carbon prediction. Geoderma 382:114775.

24. Ghosh, R. K.*, D.P. Ray, **S. Chakraborty**, B. Saha, K. Manna, A. Tewari, and S. Sarkar. 2021. Cadmium removal from aqueous medium by jute stick activated carbon using response surface methodology: factor optimisation, equilibrium, and regeneration. International Journal of Environmental Analytical Chemistry 101(14): 2171-2188.

25. Weindorf, D.C.*, and **S. Chakraborty**. 2020. Portable X-ray fluorescence spectrometry analysis of soils. Soil Science Society of America Journal 84(5): 1384-1392.

26. Andrade, R., S.H.G. Silva, D.C. Weindorf*, **S. Chakraborty**, W.M. Faria, L.R.G. Guilherme, and N. Curi. 2020. Tropical soil order and suborder prediction combining optical and X-ray approaches. Geoderma Regional 23:e00331.

27. Acree, A., D.C. Weindorf*, L. Paulette, N.V. Gestel, **S. Chakraborty**, T. Man, C. Jordan, and J.L. Prieto. 2020. Soil classification in Romanian catenas via advanced proximal sensors. Geoderma 377:114587.

28. Zhou, S., D.C. Weindorf*, Q. Cheng, B. Yang, Z. Yuan, and **S. Chakraborty**. 2020. Elemental assessment of vegetation via portable X-ray fluorescence: sample preparation and methodological considerations. Spectrochimica Acta Part B: Atomic Spectroscopy 174:105999.

29. Swetha, R.K., P. Bende, K. Singh, S. Gorthi, A. Biswas, B. Li, D.C. Weindorf, and **S. Chakraborty***. 2020. Predicting soil texture from smartphone-captured digital images and an application. Geoderma 376:114562.

30. Mancini, M., D.C. Weindorf*, M.E.C. Monteiro, A.J.G.D. Faria, A.F.D.S. Teixeira, W.D. Lima, F.R.D.D. Lima, T.S.B. Dijair, F.D. Marques, D. Ribeiro, S.H.D. Silva, **S. Chakraborty,** and N. Curi. 2020. From sensor data to Munsell color system: Machine learning algorithm applied to tropical soil color classification via Nix™ Pro sensor. Geoderma 375:114471.

31. Mukhopadhyay, S., and **S. Chakraborty***. 2020. Use of diffuse reflectance spectroscopy and Nix pro color sensor in combination for rapid prediction of soil organic carbon. Computers and Electronics in Agriculture 176:105630.

32. Gorthi, S., **S. Chakraborty***, B. Li, and D.C. Weindorf. 2020. A field-portable acoustic sensing device to measure soil moisture. Computers and Electronics in Agriculture 174: 105517.

33. Teixeira, A.F.D.S., M.H.P. Pelegrino, W.M. Faria, S.H.G. Silva, M.G.M. Goncalves, F.W.A. Junior, L.R. Gomide, A.L.P. Junior, I.A.D. Souza, **S. Chakraborty***, D.C. Weindorf, L.R.G. Guilherme, and N. Curi. 2020. Tropical soil pH and sorption complex prediction via portable X-ray fluorescence spectrometry. Geoderma 361: 114132.

34. Dutta, S.*, **S. Chakraborty**, R. Goswami, H. Banerjee, K. Majumdar, B. Li, and M.L. Jat. 2020. Maize yield in smallholder agriculture system—an approach integrating socio-economic and crop management factors. PloS ONE 15(2): e0229100.

35. Mukhopadhyay, S., **S. Chakraborty***, P.B.S. Bhadoria, B. Li, and D.C. Weindorf. 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: eoo249

36. Goff, K., R.J. Schaetzl*, **S. Chakraborty**, D.C. Weindorf, C. Kasmerchak, and E.A. Bettis. 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.

37. Kagiliery, J., **S. Chakraborty**, A. Acree, D.C. Weindorf*, E. Brevik, N. Jelinski, B. Li, and C. Jordan, 2019. Rapid quantification of lignite sulfur content: combining optical and X-ray approaches. International Journal of Coal Geology 216:103336.

38. Andrade, R., W.M. Faria, S.H.G. Silva, **S. Chakraborty**, D.C. Weindorf*, L.F. Mesquita, L.R.G. Guilherme, and N. Curi. 2020. Prediction of soil fertility via portable X-ray fluorescence (pXRF) spectrometry and soil texture in the Brazilian Coastal Plains. Geoderma 357: 113960.

39. Andrade, R., S.H.G. Silva, D.C. Weindorf, **S. Chakraborty***, W.M. Faria, L.F. Mesquita, L.R.G. Guilherme, and N. Curi. 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.

40. Mancini, M., D.C. Weindorf*, S.H.G. Silva, **S. Chakraborty**, A.F.S. Teixeira, L.R.G. Guilherme, and N. Curi. 2019. Parent material distribution mapping from tropical soils data via machine learning and portable X-ray fluorescence (pXRF) spectrometry in Brazil. Geoderma 354: 113885.

41. Deb, S., D. Kumar, **S. Chakraborty***, D.C. Weindorf, A. Choudhury, P. Banik, D. Deb, P. De, S. Saha, A.K.Patra, M. Majhi, P. Naskar, P. Panda, and A. Hoque. 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.

42. Rawal, A., **S. Chakraborty**, B. Li, K. Lewis, M. Godoy, L. Paulette, and D.C. Weindorf*. 2019. Determination of base saturation percentage in agricultural soils via portable X-ray fluorescence spectrometer. Geoderma 338:375-382.

43. Mancini, M., D.C. Weindorf*, **S. Chakraborty**, S.H.G. Silva, A.F.D.S. Teixeira, L.R.G. Guilherme, and N. Curi. 2019. Tracing tropical soil parent material analysis via portable X-ray fluorescence (pXRF) spectrometry in Brazilian Cerrado. Geoderma 337:718-728.

44. **Chakraborty, S**., B. Li, D.C. Weindorf*, and C.L.S. Morgan . 2019. External parameter orthogonalisation of Eastern European VisNIR-DRS soil spectra. Geoderma 337:65-75.

45. **Chakraborty, S**., B. Li, D.C. Weindorf*, S. Deb, A. Acree, P. De, and P. Panda. 2019. Use of portable X-ray fluorescence spectrometry for classifying soils from different land use land cover systems in India. Geoderma 338:5-13.

46. Acree, A., D.C. Weindorf*, **S. Chakraborty**, and M. Godoy. 2019. Comparative geochemistry of urban and rural playas in the Southern High Plains. Geoderma 337:1028-1038.

47. Li, B., **S. Chakraborty**, M. Godoy, N.Y.O. Kusi, and D.C. Weindorf*. 2018. Compost cation exchange capacity via portable X-ray fluorescence (PXRF) spectrometry. Compost Science and Utilization 26(4):271-278.

48. Li, B.*, B.D. Marx, **S. Chakraborty**, and D.C. Weindorf. 2018. Multivariate calibration with robust signal regression. Statistical Modelling doi.org/10.1177/1471082X18782813.

49. Weindorf, D.C.*, **S. Chakraborty**, B. Li, S. Deb, A. Singh, and N.Y. Kusi. 2018. Compost salinity assessment via Portable X-ray fluorescence (PXRF) spectrometry. Waste Management 78:158-163.

50. Pearson, D., D.C. Weindorf*, **S. Chakraborty**, B. Li, J. Koch, P. Van Deventer, J. de Wet, and N. Yaw Kusi. 2018. Analysis of metal-laden water via portable X-ray fluorescence spectrometry. Journal of Hydrology 561:267-276.

51. Deb, S.*, M.K. Debnath, **S. Chakraborty**, D.C. Weindorf, D. Kumar, D. Deb, and A. Choudhury. 2018. Impact of anthropogenic and agricultural intensification on forest land use and land cover change and modelling for future possibilities: A case study from of Himalayan Terai. Anthropocene 21:32-41.

52. McGladdery, C., D.C. Weindorf*, **S. Chakraborty**, B. Li, L. Paulette, D. Podar, D. Pearson, N.Y.O. Kusi, and B. Duda. 2018. Elemental assessment of vegetation via portable X-ray fluorescence (PXRF) spectrometry. Journal of Environmental Management 210:210-225.

53. Raj, A., **S. Chakraborty**, B.M. Duda, D.C. Weindorf*, B.Li, S. Roy, M.C. Sarathjith, and B.S. Das. 2018. Soil mapping via diffuse reflectance spectroscopy based variable indicators: an ordered predictor selection approach. Geoderma 314:146-159.

54. Duppeti, H., **S. Chakraborty***, B.S. Das, N. Mallick, and J.N.R. Kotamreddy. 2017. Rapid assessment of algal biomass and pigment contents using diffuse reflectance spectroscopy and chemometrics. Algal Research 27:274-285.

55. **Chakraborty, S.**, T. Man, L. Paulette, S. Deb, B. Li, D.C. Weindorf*, and M. Frazier. 2017. Rapid assessment of smelter/mining soil contamination via portable X-ray fluorescence spectrometry and indicator kriging. Geoderma 306: 108-119.

56. Shutic, S., **S. Chakraborty**, B. Li, D.C. Weindorf*, K. Sperry, and D. Casadonte. 2017. Forensic identification of pharmaceuticals via portable X-ray fluorescence and diffuse reflectance spectroscopy. Forensic Science International 279:22-32.

57. Koch, J., **S. Chakraborty**, B. Li, J.M. Kucera, P.V. Deventer, A. Daniell, C. Faul., T. Man, D. Pearson, B. Duda, C.A. Weindorf, and D.C. Weindorf*. 2017. Proximal sensor analysis of mine tailings in South Africa: An exploratory study. Journal of Geochemical Exploration 181:45-57.

58. **Chakraborty, S.,** D.C. Weindorf*, C.A. Weindorf, B.S. Das, B. Li, B. Duda, S. Pennington, and R. Ortiz. 2017. Semiquantitative evaluation of secondary carbonates via portable x-ray fluorescence spectrometry. Soil Science Society of America Journal 81:844–852.

59. Duda, B., D.C. Weindorf*, **S. Chakraborty**, B. Li, T. Man, L. Paulette, L., and S. Deb. 2017. Soil characterization across catenas via advanced proximal sensors. Geoderma 298: 78-91.

60. **Chakraborty, S.**, B. Li, S. Deb, S. Paul, D.C. Weindorf*, and B.S. Das. 2017. Predicting soil arsenic pools by visible near infrared diffuse reflectance spectroscopy. Geoderma 296: 30-37.

61. **Chakraborty, S.**, D.C.Weindorf*, S. Deb, B. Li, S. Paul, A. Choudhury, and D.P. Ray. 2017. Rapid assessment of regional soil arsenic pollution risk via diffuse reflectance spectroscopy. Geoderma 289: 72-81.

62. Paul, S., M.N. Ali*, **S. Chakraborty**, and S. Mukherjee. 2017. Diversity of bacterial communities inhabiting soil and groundwater of arsenic contaminated areas in West Bengal, India. Microbiology 86 (2): 264-275.

63. Deb, S., **S. Chakraborty***, D.C. Weindorf, A. Murmu, P. Banik, M.K. Debnath, and A. Choudhury. 2016. Dynamics of organic carbon in deep soils under rice and non-rice cropping systems. Geoderma Regional 7(4): 388-394.

64. Pearson, D., **S. Chakraborty**, B. Duda, B. Li, D.C. Weindorf*, S. Deb, E. Brevik, and D.P. Ray. 2017. Water analysis via portable X-ray fluorescence spectrometry. Journal of Hydrology 544:172-179.

65. Cardelli, V., D.C. Weindorf*, **S. Chakraborty**, B. Li, M. DeFeudis, S. Cocco, A. Agnelli, A. Choudhury, D. Ray, and G. Corti. 2017. Non-saturated soil organic horizon characterization via advanced proximal sensors. Geoderma 288:130-142.

66. **Chakraborty, S.,** D.C. Weindorf*, G.J. Michaelson, C.L. Ping, A. Choudhury, T. Kandakji, A. Acree, A. Sharma, and D. Wang. 2016. In-situ differentiation of acidic and non-acidic tundra via portable X-ray fluorescence (PXRF) spectrometry. Pedosphere 26(4): 549–560.

67. Weindorf, D.C. *, **S. Chakraborty**, J. Herrero, B.Li, C. Castaneda, and A. Choudhury. 2016. Simultaneous assessment of key properties of arid soil by combined PXRF and Vis−NIR data. European Journal of Soil Science 67:173-183.

68. Weindorf, D,C. *, **S. Chakraborty**, A.A.A. Aldabaa, L. Paulette, G. Corti, S. Cocco, E. Micheli, D. Wang, B.Li, T. Man, A. Sharma, and T. Person. 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.

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