



Academic Positions:

(15-September 2016 to 31 May 2019): Assistant Professor of Botany, DAV University, Jalandhar, Punjab, India

(25-October 2019 to 29-10-2023): Assistant Professor of Botany, Government Degree College, Ramban, Jammu and Kashmir, India

(30- October -2023 to present): Assistant Professor of Botany, Padma Shri Padma Sachdev Government College for Women, Gandhi Nagar, Jammu and Kashmir, India

Education:

2017	Ph.D. Botany, Guru Nanak Dev University, Amritsar
2012	M.Sc. Botany, Guru Nanak Dev University, Amritsar
2010	B.Sc. Medical, Gandhi Memorial Science College, Jammu
2007	12 th JK BOSE
2005	10 th JK BOSE

Academic Honours:

2014	CSIR-NET Qualified in life sciences
2014	GATE Qualified in life sciences

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Born: 22-01-1990

Nationality: Indian

Editorial activities:

Associate Editor of Environmental Geochemistry and Health

Associate Editor of Air, Soil and Water Research

Associate Editor of Frontiers in Soil Science

Editorial board member of Discover Environment

Guest Editor of Sustainability Journal (IF: 3.25) for special issue "Frontiers on Ecological and Environmental Risk Assessment and Remediation"

https://www.mdpi.com/journal/sustainability/special_issues/Frontiers_Remediation

Guest Editor of Frontiers in Soil Science for special issue "Appraisal of Ecological and Health Perils Associated with Emerging Heavy Metal Contaminants in the Environment".

Guest Editor of Chemosphere (IF: 8.94) for special issue "Surface water, groundwater, and soil pollution: sustainable water and soils resources management and human health risk assessment and ecology".

Guest Editor of Journal of Geochemical Exploration (IF: 4.16) for special issue "Assessment of environmental pollutants using remote sensing, GIS and multivariate techniques, and their sustainable management".

Reviewer:

Chemosphere, Environmental Science and Pollution Research, Science of the Total Environment, Journal of hazardous materials, Environment and Ecotoxicology Safety, Journal of Environmental management, Air, Soil and Water Research, Open Agriculture Journal, Water Research, Scientific Reports, & Environmental Monitoring and Assessment.

Patent: Germination Chamber to Observe Plant Growth in Laboratory with design no. 311150

Edited Books: 3

Text Book for undergraduate students:1

Book Chapters: 29

Journal Papers: 111

Conference papers: 3

H-Index: 42

Citations: 7600

i10-index: 102

Research Experience:

Heavy metal estimations in environmental pollutants using pollution indices and multivariate techniques.

Phytosociological analysis using multivariate and species diversity indices.

Teaching Experience

Undergraduate and Postgraduate levels

PUBLISHED WORK:

Research articles in Impact factor journals:

1. **V. Kumar**, A. Sharma, A. Chawla, R. Bhardwaj and A. K. Thukral. (2016). Water quality assessment of river Beas, India, using multivariate and remote sensing techniques. *Environmental Monitoring and Assessment*. 188:137, DOI 10.1007/s10661-016-5141-6. (IF= 3.30).
2. A. Sharma, R. Bhardwaj, **V. Kumar** and A. K. Thukral (2016). GC-MS studies reveal stimulated pesticide detoxification by brassinolide application in *Brassica juncea* L. plants. *Environmental Science and Pollution Research*. 23(14):14518-25. (IF= 5.19).
3. A. Sharma, **V. Kumar**, R. Singh, A. K. Thukral and R. Bhardwaj (2016). 24-epibrassinolide seed treatment reduces imidacloprid toxicity enhancing the photosynthetic performance of *Brassica juncea* L. *Ecotoxicology and Environmental Safety*. 133:195–201. (IF= 7.129).
4. A. Sharma, S. Thakur, **V. Kumar**, M. K. Kanwar, A. K. Kesavan, A. K. Thukral, R. Bhardwaj, P. Alam and P. Ahmad (2016). Ameliorating role of 24- Epibrassinolide against pesticide stress in *Brassica juncea* L. through the modulation of stress markers. *Frontiers in Plant Sciences*. DOI: 10.3389/fpls.2016.01569. (IF= 6.62).
5. A. Sharma, **V. Kumar**, R. Bhardwaj and A. K. Thukral (2017). Seed pre-soaking with 24-epibrassinolide reduces the imidacloprid pesticide residues in green pods of *Brassica juncea* L. *Toxicological and Environmental Chemistry*. 99:95-103. (IF= 1.56).
6. A. Sharma, **V. Kumar**, M. Kanwar, A. K. Thukral and R. Bhardwaj (2017). Phytochemical profiling of the leaves of *Brassica juncea* L. using GC-MS. *International Food Research Journal*. 24:547-551. (IF= 1.16).
7. **V. Kumar**, A. Sharma, A.K. Thukral, R. Bhardwaj. (2017). Water quality of river Beas of India. *Current Science*. 112:1-20. (IF= 1.16).
8. A. Sharma, S. Thakur, **V. Kumar**, A. K. Kesavan, A. K. Thukral and R. Bhardwaj (2017). 24-epibrassinolide stimulates imidacloprid detoxification by modulating the

gene expression of *Brassica juncea* L. BMC Plant Biology (2017) 17:56 DOI: 10.1186/s12870-017-1003-9. (IF= 5.26)

9. V. Kumar, A. Sharma, G. Dhunna, A. Chawla, R. Bhardwaj and A. K. Thukral (2017). A tabulated review on distribution of heavy metals in various plants. Environmental Science and Pollution Research. 24: 2210–2260. (IF= 5.19).

10. V. Kumar, A. Sharma, R. Kaur, A.K. Thukral, R. Bhardwaj and P. Ahmad (2017). Differential distribution of amino acids in plants. Amino acids. 49(5): 821-869. (IF= 3.78).

11. A. Sharma, V. Kumar, M.K. Kanwar, A. K. Thukral and R. Bhardwaj (2017). Ameliorating Imidacloprid Induced Oxidative Stress by 24-Epibrassinolide in *Brassica juncea* L. Russian Journal of Plant Physiology. 64(4):509-517. (IF= 1.41).

12. R. Kaur, P. Yadav, A. Sharma, A.K. Thukral, V. Kumar, S.K. Kohli and R. Bhardwaj (2017). Castasterone and citric acid treatment restores photosynthetic attributes in *B. juncea* L. under Cd(II) toxicity. Ecotoxicology and Environmental Safety. 145:466-475. (IF= 7.129).

13. P. Yadav, R. Kaur, M. Kanwar, A. Sharma, V. Kumar, G. Sirhindi, R. Bhardwaj (2018). Castasterone confers copper stress tolerance by regulating antioxidant enzyme responses, antioxidants, and amino acid balance in *B. juncea* seedlings. Ecotoxicology and Environmental Safety. 147:725-734. (IF= 7.129)

14. S. K. Kohli, N. Handa, P. Kaur, A. Sharma, V. Kumar, R. Singh, S. Arora and R. Bhardwaj (2017). Additive effect of 24-Epibrassinolide and Salicylic Acid on Photosynthetic Efficiency and Gene Expression in *Brassica juncea* L. under Pb Stress. Turkish Journal of Biology. 41 (6): 943-953. (IF=3.24).

15. V. Kumar, A. Sharma, R. Bhardwaj, A.K. Thukral (2017). Analysis of organic acids of tricarboxylic acid cycle in plants using GC-MS, and systems modeling. Journal of Analytical Science and Technology. 8: 20. Doi.org/10.1186/s40543-017-0129-6. (IF= 3.56).

16. V. Kumar, A. Sharma, Minakshi, A.K. Thukral and R. Bhardwaj (2018). Temporal distribution, source apportionment and pollution assessment of metals in the sediments of river Beas, India. Human and Ecological Risk Assessment: An International Journal. Doi: 10.1080/10807039.2018.1440529 (IF= 4.99).

17. A. Sharma, V. Kumar, A.K. Thukral and R. Bhardwaj (2019). Physiological responses of plants to pesticide toxicity: An overview. Planta Daninha. Accepted

(IF=0.85).

18. R. Kaur, R. Kaur, A. Sharma, **V. Kumar**, M. Sharma, R. Bhardwaj and A.K. Thukral (2018). Microbial production of dicarboxylic acids from edible plants and milk using GC-MS. Journal of Analytical Science and Technology. DOI: 10.1186/s40543-018-0154-0 (*Springer*) (IF= 3.56).

19. **V. Kumar**, A. Sharma, P. Bakshi, A.K. Thukral and R. Bhardwaj (2018). Multivariate analysis on the distribution of elements in plants. Acta Physiologia Plantarum. DOI: 10.1007/s11738-018-2765-x (IF= 2.73).

20. A. Sharma, **V. Kumar**, H. Yuan, M. K. Kanwar, A.K. Thukral, R. Bhardwaj and B. Zheng (2018). Jasmonic acid seed treatment stimulates insecticide detoxification in *Brassica juncea* L. Frontiers in Plant Sciences. Doi: 10.3389/fpls.2018.01609 (IF= 6.62).

21. S. Yegemova, R. Kumar, J. Abuduwaili, M. Long, A. Samat, G. Issanova, G. Yongxiao, **V. Kumar**, A. Keshavarzi, J. Rodrigo-Comino (2018). Is water conservation a problem in the border areas of the Syr Darya River in Kazakhstan? Looking for key information on land management plans. Water. Doi: 10.3390/w10121754 (IF= 3.53).

22. **V. Kumar**, A. Sharma, R. Bhardwaj, A.K. Thukral (2018). Comparison of different reflectance indices for vegetation analysis using Landsat-TM data. Remote Sensing Applications: Society and Environment. Doi.org/10.1016/j.rsase.2018.10.013 (IF: 0.81).

23. A. Keshavarzi and **V. Kumar**(2019). Ecological Risk Assessment and Source Apportionment of heavy metal contamination in Agricultural Soils of North-eastern Iran. International Journal of Environmental Health Research. Doi: 10.1080/09603123.2018.1555638 (IF= 4.47).

24. **V. Kumar**, A. Sharma, P. Kaur, G.P.S. Sidhu, A.S. Bali, R. Bhardwaj, A.K. Thukral and A. Cerda (2019). Pollution assessment of heavy metals in soils of India and ecological risk assessment: A State-of-the-Art. Chemosphere. doi.org/10.1016/j.chemosphere.2018.10.066 (IF= 8.94).

25. **V. Kumar**, A. Sharma, R. Bhardwaj and A.K. Thukral (2019). Elemental composition of plants and multivariate analysis. National Academy of Science letters. 42(1): 45-50 (IF=0.64).

26. S.K. Kohli, S. Bali, R. Tejpal, V. Bhalla, **V. Kumar**, R. Bhardwaj, A. A. Alqarawi, E. F. AbdAllah, P. Ahmed (2019). In-situ localization and biochemical analysis of bio-

molecules reveals Pb-stress amelioration in *Brassica juncea* L. by co-application of 24-Epibrassinolide and Salicylic Acid. Scientific Reports. Doi.org/10.1038/s41598-019-39712-2 (IF= 4.99).

27. M. Sharma, V. Kumar, R. Bhardwaj and A.K. Thukral (2019). Tartaric acid mediated Cr hyperaccumulation and biochemical alterations in seedlings of *Hordeum vulgare* L. Journal of Plant Growth Regulation. DOI: 10.1007/s00344-019-09959-0 (IF: 4.64).

28. A. Sharma, H. Yuan, V. Kumar, M. Ramakrishnan, S. K. Kohli, R. Kaur, A.K. Thukral, R. Bhardwaj, B. Zheng (2019). Castasterone Attenuates Insecticide Induced Phytotoxicity in Mustard. Ecotoxicology and Environmental Safety. 179 (2019) 50–61. (IF= 7.129).

29. A. Keshavarzi, V. Kumar, E. L. Bottega and J.

Rodrigo-Comino (2019). Determining Land Management Zones Using Pedo-Geomorphological Factors in Potential Degraded Regions to Achieve Land Degradation Neutrality. Land. 8, 92; Doi:10.3390/land8060092. (IF = 3.90).

30. R. Kumar, S. Mahey, R. Arora, J. Mahajan, V. Kumar and S. Arora (2019). Insights into Biological Properties of Less Explored Bark of Industrially Important *Acacia catechu* Willd. Industrial Crops and Products. Doi.org/10.1016/j.indcrop.2019.111486 (IF= 6.44).

31. A. Sharma, C. Soares, B. Sousa, M. Martins, V. Kumar, B. Shahzad, G.P.S. Sidhu, A.S. Bali, M. Asgher, R. Bhardwaj, A.K. Thukral, F. Fidalgo and B. Zheng (2019). Nitric oxide-mediated regulation of oxidative stress in plants under metal stress: a review on molecular and biochemical aspects. Physiologia Plantarum. Doi.org/10.1111/ppl.13004. (IF= 5.081).

32. V. Kumar, R.D. Parihar, A. Sharma, P. Bakshi, G.P.S. Sidhu, A.S. Bali, I. Karaouzas, R. Bhardwaj, A.K. Thukral, Y. Gyasi-Agyei and J. Rodrigo-Comino (2019). Global evaluation of heavy metal content in surface water bodies: A meta-analysis using heavy metal pollution indices and multivariate statistical analyses. Chemosphere. Doi.org/10.1016/j.chemosphere.2019.124364. (IF= 8.94).

33. A.K. Thukral, R. Bhardwaj, V. Kumar and A. Sharma (2019). New indices regarding the dominance and diversity of communities, derived from sample variance and standard deviation. Heliyon. Doi.org/10.1016/j.heliyon.2019.e02606 (IF: 3.77).

34. A. Sharma, B. Shahzad, V. Kumar, S.K. Kohli, G.P.S. Sidhu, A.S. Bali, N. Handa, D.

Kapoor, R. Bhardwaj, B. Zheng (2019). Phytohormones regulate accumulation of osmolytes in plants under abiotic stress. *Biomolecules*. Doi:10.3390/biom9070285. (IF= 6.06).

35. P. Sihag, V.P. Singh, A. Angelaki, **V. Kumar**, A. Sepahvand and E. E. Golia (2019). Modelling of infiltration using artificial intelligence techniques in semi-arid in Iran. *Hydrological Sciences Journal*. Doi: 10.1080/02626667.2019.1659965 (IF=3.94).

36. A. Sharma, **V. Kumar** et al. (2019). Photosynthetic response of plants under different abiotic stresses: A review. *Journal of Plant Growth Regulation*. Doi.org/10.1007/s00344-019-10018-x. (IF= 4.64).

37. A. Heidari, **V. Kumar** and A. Keshavarzi (2019). Appraisal of metallic pollution and ecological risks in agricultural soils of Alborz province, Iran. *International Journal of Environmental Health Research*. Doi:10.1080/09603123.2019.1677864. (IF= 4.47).

38. P. Sihag, **V. Kumar** et al. (2019). Predictive modeling of PM 2.5 using soft computing techniques: case study, Faridabad, Haryana, India. *Air Quality, Atmosphere & Health*. Doi.org/10.1007/s11869-019-00755-z. (IF= 5.80).

39. S. Pandita, **V. Kumar** and H.C. Dutt (2019). Environmental variables vis-a-vis distribution of herbaceous tracheophytes on northern sub-slopes in Western Himalayan ecotone. *Ecological Processes*. DOI: 10.1186/s13717-019-0200-x. (IF= 4.39).

40. A. Sharma, D. Kapoor, J. Wang, B. Shahzad, **V. Kumar** et al. (2020). Chromium bioaccumulation and its impacts on Plants: An overview. *Plants*. 9, 100; doi:10.3390/plants9010100. (IF= 4.65).

41. J. Rodrigo-Comino, M. López-Vicente, **V. Kumar** et al. (2020). Soil science challenges in a new era: A transdisciplinary overview of relevant topics. *Air, Soil and Water Research*. 13: 1–17 (IF: 0.61).

42. **V. Kumar**, A. Sharma, S. Pandita, R. Bhardwaj, A.K. Thukral and A. Cerda. (2020). A review of ecological risk assessment and associated health risks with heavy metals in sediments from India. *International Journal of Sediment Research*. Doi.org/10.1016/j.ijsrc.2020.03.012 (IF: 3.25).

43. A. Keshavarzi, H.O. Tuffour, L.P. Tattrah, **V. Kumar** et al. (2020). Using fuzzy-AHP and parametric technique to assess soil fertility status in Northeast of Iran. *Journal of Mountain Science*. Doi.org/10.1007/s11629-019-5666-6. (IF: 2.37).

44. **V. Kumar**, A. Sharma, R. Kumar, R. Bhardwaj, A.K. Thukral and J. Rodrigo Comino (2020). Assessment of heavy metal pollution in three different Indian water

bodies by combination of multivariate analysis and water pollution indices. Human and Ecological Risk Assessment: An International Journal. Doi: 10.1080/10807039.2018.1497946 (IF= 4.99).

45. N. Dogra, M. Sharma, A. Sharma, A. Keshavarzi, Minakshi, R. Bhardwaj, A.K. Thukral, **V. Kumar** (2020). Pollution assessment and spatial distribution of roadside agricultural soils: A case study from India. International Journal of Environmental Health Research. Doi.org/10.1080/09603123.2019.1578865 (IF= 3.47).

46. P. Pandit, P. Mangala, A. Saini, P. Bangotra, **V. Kumar** et al. (2020). Radiological and pollution risk assessments of terrestrial radionuclides and heavy metals in a mineralized zone of the Siwalik region (India). Chemosphere. Doi.org/10.1016/j.chemosphere.2020.126857. (IF= 8.94).

47. A.S. Bali, G.P.S. Sidhu and **V. Kumar** (2020). Root exudates ameliorate cadmium tolerance in plants: A review. Environmental Chemistry Letters. Doi.org/10.1007/s10311-020-01012-x (IF= 13.61).

48. **V. Kumar**, A. Sharma, R. Bhardwaj, A. K. Thukral (2020). Water quality of river Beas, India, and its correlation with reflectance data. Journal of Water Chemistry and Technology. 42: 134-141. (IF= 0.48).

49. R. Setia, S.S. Dhaliwal, **V. Kumar** et al. (2020). Impact assessment of metal contamination in surface water of Sutlej river (India) on human health risks. Environmental Pollution. Doi: 10.1016/j.envpol.2020.114907. (IF= 9.98).

50. K. Kiran, S. Mahey, A. Sharma, **V. Kumar** et al. (2020). Post-infectious changes associated with the progression of leaf spot disease in *Calotropis procera* Aiton. Physiological and Molecular Plant Pathology. 112. Doi.org/10.1016/j.pmpp.2020.101519. (IF= 2.74).

51. R. Kumar, **V. Kumar**, A. Sharma, N. Singh, R. Kumar, J.K. Katnoria, R. Bhardwaj, A.K. Thukral and J. Rodrigo-Comino (2019). Assessment of pollution in roadside soils by using multivariate statistical techniques and contamination indices. SN Applied Sciences. DOI: 10.1007/s42452-019-0888-3 (IF: 0.37).

52. R. Alamdar, **V. Kumar**, T. Moghtaderi and S.J. Naghibi (2019). Groundwater quality evaluation of Shiraz City, Iran using multivariate and geostatistical techniques. SN Applied Sciences. Doi.org/10.1007/s42452-019-1108-x (IF: 0.37).

53. P. Sihag, A. Keshavarzi and **V. Kumar** (2019). Comparison of different

approaches for modelling of heavy metal estimations. SN Applied Sciences. DOI: 10.1007/s42452-019-0816 (IF: 0.37).

54. A. Sharma, **V. Kumar**, B. Shahzad* et al. (2019). Worldwide pesticide usage and its impacts on ecosystem. SN Applied Sciences. Doi.org/10.1007/s42452-019-1485-1 (IF: 0.37).

55. S. Mahey, R. Kumar, M. Sharma, **V. Kumar** and R. Bhardwaj (2020). A critical review on toxicity of cobalt and its bioremediation strategies. SN Applied Science. Doi.org/10.1007/s42452-020-3020-9 (IF: 0.37).

56. T. Moghtaderi, R. Alamdar, A. Rodríguez-Seijo, S. Javad Naghibi and **V. Kumar** (2020). Ecological risk assessment and source apportionment of heavy metal contamination in urban soils of Shiraz, southwest Iran. Arabian Journal of Geosciences. DOI: 10.1007/s12517-020-05787-9. (IF= 1.827).

57. R.D.Bidgoli, H. Koohbanani, A. Keshavarzi and **V. Kumar** (2020). Measurement and zonation of soil surface moisture in arid and semi-arid regions using Landsat 8 images. Arabian Journal of Geosciences. DOI: 10.1007/s12517-020-05837-2. (IF= 1.827).

58. M. Haghbin, A. Sharafati, D. Dixon and **V. Kumar** (2020). Application of Soft Computing Models for simulating nitrate contamination in groundwater: Comprehensive review, assessment and future Opportunities. Archives of Computational Methods in Engineering. Doi.org/10.1007/s11831-020-09513-2. (IF = 8.17).

59. **V. Kumar**, S. Pandita, S. Mahey and R. Kumar (2020). Appraisal of tissue compartmentalized metal(loid)s uptake by rice. Arabian Journal of Geosciences. Doi: 10.1007/s12517-020-06221-w. (IF = 1.827).

60. M. Sharma, **V. Kumar**, S. Mahey, R. Bhardwaj and A.K. Thukral (2020). Antagonistic effects of EDTA against biochemical toxicity induced by Cr(VI) in *Hordeum vulgare* L. seedlings. Physiology and Molecular Biology of Plants. Doi:

10.1007/s12298-020-00908-w. (IF = 3.02).

61. H. K. Butter, R. Kaur, **V. Kumar**, R. P. Singh and G. Manchanda (2020). Salt stress induced morphological, anatomical and ionic alterations in Chickpea. Communications in Soil Science and Plant Analysis. Doi.org/10.1080/00103624.2020.1862155 (IF = 1.58).

62. **V. Kumar**, S. Pandita, G.P.S. Sidhu, A. Sharma et al. (2021). Copper bioavailability, uptake, toxicity and tolerance in plants: A comprehensive review. Chemosphere. Doi.org/10.1016/j.chemosphere.2020.127810. (IF= 8.94).

63. R. Setia, S.S.Dhaliwal, R. Singh, **V. Kumar**, S. Taneja, S.S. Kukal and B. Pateriya (2021). Phytoavailability and human risk assessment of heavy metals in soils and food crops around Sutlej river, India. Chemosphere. Doi.org/10.1016/j.chemosphere.2020.128321. (IF= 8.94).

64. A. Keshavarzi, **V. Kumar**, G. Ertunc and E.C. Brevik (2021). Ecological risk assessment and source apportionment of heavy metals contamination: an appraisal based on the Tellus soil survey. Environmental Geochemistry and Health. Doi.org/10.1007/s10653-020-00787-w (IF = 4.89).

65. F. Verma, S. Singh, S. S. Dhaliwal, **V. Kumar**, R. Kumar, J. Singh and C. Parkash (2021). Appraisal of pollution of potentially toxic elements in different soils collected around the industrial area. Heliyon. Doi.org/10.1016/j.heliyon.2021.e08122 (IF: 3.77).

66. F. Verma, S. Singh, J. Singh, S. S. Dhaliwal, C. Parkash, **V. Kumar** and R. Kumar (2021). Assessment of heavy metal contamination and their effect on earthworms in different types of soils. International Journal of Environmental Science and Technology. Doi.org/10.1007/s13762-021-03297-z (IF: 3.51).

67. S.S. Dhaliwal, R. Setia, **V. Kumar**, T. Ghosh, S. Taneja, R. Singh, J. Ansari, S.S. Kukal and B. Pateriya (2021). Assessment of seasonal variations and human health

risks due to heavy metals in water, soils and food crops using multi-indices approach. Environmental Earth Sciences. DOI: 10.1007/s12665-021-09686-4 (IF: 3.11).

68. A. Keshavarzi, H. O. Tuffou, J. C. Oppong, M. Zeraatpisheh and **V. Kumar** (2021). Dealing with soil organic carbon modeling: some insights from an agro-ecosystem in Northeast Iran. Earth Science Informatics. DOI:10.1007/s12145-021-00638-x(IF: 2.70).

69. H. Hagh Nazar, K. A. Hudson-Edwards, **V. Kumar** et al. (2021). Potentially toxic elements contamination in surface sediment and indigenous aquatic macrophytes of the Bahmanshir River, Iran: Appraisal of phytoremediation capability. Chemosphere. Doi.org/10.1016/j.chemosphere.2021.131446 (IF= 8.94).

70. P. Sihag, P. Aggarwal, Y. Aggarwal and **V. Kumar** (2021). Discussion of "Evaluating the Performance of Self-Organizing Maps to Estimate Well-Watered Canopy Temperature for Calculating Crop Water Stress Index in Indian Mustard (Brassica juncea)" by Navsal Kumar; Vijay Shankar; Rabee Rustum; and Adebayo J. Adelaye. Journal of Irrigation and Drainage Engineering. (IF: 1.97).

71. R. Setia, S. Lamba, S. Chander, **V. Kumar**, N. Dhir, M. Sharma, R. P. Singh and B. Pateriya (2021). Hydrochemical evaluation of surface water quality of Sutlej river using multi-indices, multivariate statistics and GIS. Environmental Earth Sciences. Doi.org/10.1007/s12665-021-09875-1 (IF: 3.11).

72. K. Pandit, A. Kumar, S. Kaur, **V. Kumar**, S. Jain, R. Bhardwaj and S. Kaur (2021). Amelioration of oxidative stress by trans-Anethole via modulating Phase I and Phase II enzymes against hepatic damage induced by CCl₄ in male Wistar rats. Environmental Science and Pollution Research. DOI: 10.1007/s11356-021-16070-z. (IF: 5.19).

73. **V. Kumar**, P. Sihag, A. Keshavarzi, S. Pandita and A. Rodríguez-Seijo (2021). Soft

Computing Techniques for Appraisal of Potentially Toxic Elements from Jalandhar (Punjab), India. *Applied Sciences*. Doi.org/10.3390/app11188362 (IF: 2.83).

74. R. Setia, S. Lamba, S. Chander, **V. Kumar**, R. Singh, P.K. Litoria, R.P. Singh and B. Pateriya (2021). Spatio-temporal variations in water quality, hydrochemistry and its controlling factors in a perennial river in India. *Applied Water Science*. Doi.org/10.1007/s13201-021-01504-3 (IF: 5.41).

75. M. Radziemska, Z. M. Gusiatin, **V. Kumar** and M. Brtnicky (2022). Co-application of nanosized halloysite and biochar as soil amendments in aided phytostabilization of metal(-oid)s-contaminated soil under different temperature conditions. *Chemosphere*. Doi.org/10.1016/j.chemosphere.2021.132452 (IF: 8.94).

76. R. Setia, S.S. Dhaliwal, **V. Kumar** et al. (2021). Assessment of metal contamination in sediments of a perennial river in India using pollution indices and multivariate statistics. *Arabian Journal of Geosciences*. DOI: 10.1007/s12517-021-08524-y (IF: 1.827).

77. K. Khanna, S.K. Kohli, **V. Kumar** et al. (2021). Multiple Facets of Plant-Microbiome Associations in Unlocking the Communication Paradigm through Extracellular Vesicles. *Current Protein and Peptide Science*. DOI: 10.2174/1389203722666211109101140 (IF: 3.11).

78. **V. Kumar**, S. Pandita and R. Setia (2021). A meta-analysis of potential ecological risk evaluation of heavy metals in sediments and soils. *Gondwana Research*. DOI: 10.1016/j.gr.2021.10.028 (IF: 6.15).

79. **V. Kumar** and M. Radziemska (2021). Impact of physiochemical properties, microbes and biochar on bioavailability of toxic elements in the soil: A review. *Environmental Geochemistry and Health*. DOI: 10.1007/s10653-021-01157-w (IF: 4.89).

80. H. Haghazadeh, J.A. Cunningham, **V. Kumar** et al. (2022). COVID-19 and urban rivers: Effects of lockdown period on surface water pollution and quality- A case study of the Zarjoub River, north of Iran. *Environmental Science and Pollution Research*. Doi.org/10.1007/s11356-021-18286-5 (IF: 5.19).
81. M. Radziemska, Z. M. Gusiatin, Z. Mazur, T. Hammerschmiedt, A. Bęś, A. Kintl, M.V. Galiova, J. Holatko, A. Blazejczyk, **V. Kumar** and M. Brtnicky (2022). Biochar-assisted phytostabilization for potentially toxic element immobilization. *Sustainability*. Doi.org/10.3390/su14010445 (IF: 3.88).
82. R. Johnson, K. Vishwakarma, M.S. Hossen, **V. Kumar** et al. (2022). Potassium in plants: Growth regulation, signaling, and environmental stress tolerance. *Plant Physiology and Biochemistry*. Doi.org/10.1016/j.plaphy.2022.01.001 (IF:5.41).
83. M. Sarraf, K. Vishwakarma, **V. Kumar** et al. (2022). Metal/Metalloid-Based Nanomaterials for Plant Abiotic Stress Tolerance: An Overview of the Mechanisms. *Plants*. Doi.org/10.3390/plants1103031 (IF:4.65).
84. **V. Kumar**, S. Pandita et al. (2022). Biogeochemical cycling, tolerance mechanism and phytoremediation strategies of boron in plants: A critical review. *Chemosphere*. Doi.org/10.1016/j.chemosphere.2022.134505 (IF: 8.94).
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86. P. Pandit, A. Saini, S. Chidhambaram, **V. Kumar** et al. (2022). Tracing geochemical sources and health risk assessment of uranium in groundwater of arid zone of India. *Scientific Reports*. DOI: 10.1038/s41598-022-05770-2 (IF: 4.99).
87. M. Radziemska, M. Z. Gusiatin, A. Cydzik-Kwiatkowska, A. Blazejczyk, **V. Kumar** et al. (2022). Effect of Biochar on Metal Distribution and Microbiome Dynamic of a Phytostabilized Metalloid-Contaminated Soil Following Freeze-Thaw Cycles. *Materials*. DOI: 10.3390/ma15113801 (IF: 3.74).
88. **V. Kumar**, S. Pandita, S. Singh and A. Sharma (2022). An integration of health risk indices and statistical techniques to appraise the associated human risks and

source apportionment of potentially toxic elements in roadside soils. *Arabian Journal of Geosciences*. Doi.org/10.1007/s12517-022-10547-y. (IF = 1.827).

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94. A. Kumar, V. Kumar, M. Thakur et al. (2023). Comprehensive review of nickel biogeochemistry, bioavailability, and health risks in the environment. *Land Degradation and Development*. Doi.1002/ldr.4775 (IF: 4.37).

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98. M. Sarraf, E. Janeeshma, N. Arif, M. Q. U. Farooqi, **V. Kumar** et al. (2023). Understanding the role of beneficial elements in developing plant stress resilience: Signalling and crosstalk with phytohormones and microbes. *Plant Stress*. DOI:10.1016/j.stress.2023.100224 (IF: 5).

Research papers in journals with no impact factor:

1. **V. Kumar**, A. Sharma, A.K. Thukral, R. Bhardwaj (2016). Assessment of soil enzyme activities based on soil samples from the Beas river bed, India using multivariate techniques. *Malaysian Journal of Soil Science*. 20:135-145. (Scopus, peer reviewed).

2. A. Sharma, **V. Kumar**, R. Bhardwaj and A. K. Thukral (2016). Epibrassinolide-imidacloprid interaction enhances non-enzymatic antioxidants in *Brassica juncea* L. *Indian Journal of Plant Physiology*. 21:70-75.

3. A. Sharma, **V. Kumar**, A.K. Thukral and R. Bhardwaj (2017). 24-epibrassinolide restores the synthesis of proteins and amino acids in *Brassica juncea* L. plants under imidacloprid stress. *Journal of Horticultural Research*. 25(2): 85-90.

4. A. Sharma*, **V. Kumar***, R. Kumar, B. Shahzad, A. K. Thukral and R. Bhardwaj (2018). Brassinosteroid-mediated pesticide detoxification in crop plants. *Cogent Food & Agriculture*. 49(1). DOI: 10.1080/23311932.2018.1436212 (*equally contributed).

5. R. Sharma, **V. Kumar** and R. Kumar (2018). Distribution of phytoliths in plants: A review. *Geology, Ecology and Landscape*. Doi:10.1080/24749508.2018.1522838.

6. R. Kumar and **V. Kumar** (2018). A review of phylogeography: biotic and abiotic factors. *Geology, Ecology and Landscape*. Doi.org/10.1080/24749508.2018.1452486.

7. **V. Kumar**, A. Sharma, P. Kaur, R. Kumar, A. Keshavarzi, A.K. Thukral and R. Bhardwaj (2019). Assessment of soil properties from catchment areas of Ravi and Beas Rivers: A review. *Geology, Ecology, and Landscapes*. Doi: 10.1080/24749508.2018.1525669.

8. **V. Kumar**, A. Sharma, S.K. Kohli, S. Bali, M. Sharma, R. Kumar, R. Bhardwaj and A. K. Thukral (2019). Differential distribution of polyphenols in plants using multivariate techniques. *Biotechnology Research and Innovation*. DOI: 10.1016/j.biori.2019.03.001.

9. **V. Kumar**, A. Sharma, S.K. Kohli, P. Yadav, S. Bali, P. Bakshi, R.D. Parihar, H. Yuan, D. Yan, Y. He, J. Wang, Y. Yang, R. Bhardwaj, A.K. Thukral and B. Zheng (2019). Amino

acids distribution in economical important plants: A review. *Biotechnology Research and Innovation*. Doi.org/10.1016/j.biori.2019.06.004.

10. Sonia, R. Kumar, **V. Kumar**, M. Sharma, R. Sharma, R. Bhardwaj and A.K. Thukral (2019). Maleic Acid and EDTA mediated extenuation of Co(II) stress in *Hordeum vulgare* seedlings. *Biotechnology Research and Innovation*. Doi.org/10.1016/j.biori.2019.07.002.

11. **V. Kumar**, S. Pandita et al. (2019). Ecological and human health risks appraisal of metal(loid)s in agricultural soils: a review. *Geology, Ecology and Landscape*. Doi.org/10.1080/24749508.2019.1701310.

12. A. Keshavarzi and **V. Kumar** (2020). Spatial distribution and potential ecological risk assessment of heavy metals in agricultural soils of Northeastern, Iran. *Geology, Ecology and Landscape*. Doi: 10.1080/24749508.2019.1587588.

13. **V. Kumar**, A.K. Thukral, A. Sharma and R. Bhardwaj (2021). Extending the concept of entropy-negentropy for the assessment of ecological dominance and diversity at alpha, beta and gamma levels. *Geology, Ecology, and Landscapes*. Doi:10.1080/24749508.2021.1923270.

Papers in conferences:

1. **V. Kumar**, A. Sharma, S. Kohli, R. Bhardwaj and A.K. Thukral (2017). Multivariate statistical analysis of secondary metabolites and total lipid antioxidants. *International Journal of Tropical Agriculture*. 35:377-381.

2. A. Sharma, **V. Kumar**, S. Kohli, A.K. Thukral and R. Bhardwaj (2017). Brassinolide seed treatment modulates the enzymatic antioxidative defense system in Indian mustard under imidacloprid toxicity. *International Journal of Tropical Agriculture*. 35:383-388.

3. **V. Kumar**, A. Sharma, R. Bhardwaj and A.K. Thukral (2017). Phytosociology and Landsat TM data: A case study from river Beas bed, Punjab, India. 38th **Asian Conference on Remote Sensing (ACRS, 23-27 October 2017)**.

Book Chapters in edited books:

1. R. Sharma, R. Bhardwaj, A. K. Thukral, D. Kapoor, A. Rattan, Sonia, **V. Kumar**, A. Sharma, S. Kaur and N. Arora (2014). Oxidative Stress Management through Sugar Signaling and Antioxidant Network in Plants. *Photosynthesis: Functional Genomics, Physiological Processes and Environmental Issues*. 185-210. **NOVA Science Publishers, New York**.
2. R. Sharma, R. Bhardwaj, A. K. Thukral, N. Honda, R. Kaur and **V. Kumar** (2014). Osmolyte dynamics: New strategies for crop tolerance to abiotic stress signals. *Emerging Technologies and Management of Crop Stress Tolerance*. Vol. 2. 405-430. **Elsevier, New York**.
3. H. Kaur, R. Bhardwaj, **V. Kumar**, A. Sharma, R. Singh and A. K. Thukral (2014). Effect of pesticides on leguminous plants: An overview. *Legumes under Environmental Stress: Yield, Improvement and Adaptations*. 91-102. **John Wiley and Sons**.
4. R. Bhardwaj, N. Handa, R. Sharma, H. Kaur, S. Kohli, **V. Kumar** and P. Kaur (2014). Lignins and Abiotic Stress: An Overview. *Physiological mechanisms and adaptation strategies in plants under changing environment-I*. 267-296; **Springer, New York**.
5. R. Kaur, R. Bhardwaj, R. Sharma, D. Kapoor, S. Kohli, **V. Kumar**, P. Kaur (2016). Hormonal regulation of drought stress in plants. *Water Stress and Crop Plants: A Sustainable Approach*, 582-599, **John Wiley and Sons**.
6. S. Bali, Poonam, V. Gautam, S.K. Kholi, A. Sharma, **V. Kumar**, P. Saini, A.K. Thukral, S. Arora, P. Ohri and R. Bhardwaj (2017). Interactions of plant hormones under abiotic stress. In: *Mechanisms Behind Phytohormonal Signalling and Crop Abiotic Stress Tolerance*. **NOVA Science Publishers, New York**, pp. 89-115.
7. N. Honda, R. Sharma, Poonam, R. Kaur, **V. Kumar**, A. Sharma, A.K. Thukral and R. Bhardwaj (2017). Brassinosteroids crosstalk with other hormones in plants under abiotic stresses. In: *Mechanisms Behind Phytohormonal Signalling and Crop Abiotic Stress Tolerance*. **NOVA Science Publishers, New York**, pp. 243-264.
8. V. Gautam, R. Kaur, S. Kohli, **V. Verma**, P. Kaur, R. Singh, P. Saini, S. Arora, A.K. Thukral, Y.K. Karpets, Y.E. Kolupaev and R. Bhardwaj (2017). ROS

Compartmentalization in Plant Cells under Abiotic Stress Condition. In: Reactive Oxygen Species and Antioxidant Systems in Plants: Role and Regulation under Abiotic Stress. **Springer**, pp. 89-114.

9. S. K. Kohli, N. Handa, R. Kaur, **V. Kumar**, K. Khanna, P. Bakshi, R. Singh, S. Arora, R. Kaur and R. Bhardwaj (2017). Role of Salicylic acid in Heavy Metal Tolerance: Insight into Underlying Mechanism. In book: Salicylic Acid: A Multifaceted Hormone. **Springer**, pp.123-144.

10. P. Kaur, S. Bali, **V. Kumar**, K. Khanna, P. Ohri, A.K. Thukral, A.P. Vig and R. Bhardwaj (2017). Regulation of Photosynthesis under Metal Stress. In book: Environment and Photosynthesis: A Future Prospect. **Studium Press India Pvt. Ltd**,pp. 241-260.

11. A. Sharma, **V. Kumar**, N. Honda, S. Bali, R. Kaur, K. Khanna, A.K. Thukral and R. Bhardwaj (2018). Potential of endophytic bacteria in heavy metal and pesticide detoxification. In book: Plant Microbiome: Stress Response. **Springer**,DOI.10.1007/978-981-10-5514-0_14.

12. R. Sharma, R. Bhardwaj, V. Gautam, S. Bali, R. Kaur, P. Kaur, M. Sharma, **V. Kumar**, A. Sharma, Sonia, A.K. Thukral, A.P. Vig, and P. Ohri (2018). Phytoremediation in Waste Management: Hyperaccumulation Diversity and Techniques. In book: Plants Under Metal and Metalloid Stress. **Springer**. Doi: https://doi.org/10.1007/978-981-13-2242-6_11.

13. N. Handa, S.K. Kohli, R. Kaur, A. Sharma, **V. Kumar**, A.K. Thukral, S. Arora, and R. Bhardwaj (2018). Role of Compatible Solutes in Enhancing Antioxidative Defense in Plants Exposed to Metal Toxicity. In book: Plants Under Metal and Metalloid Stress. **Springer**. Doi: https://doi.org/10.1007/978-981-13-2242-6_11.

14. G.P.S. Sidhu, A.S. Bali, **V. Kumar** and R. Bhardwaj (2018). Mitigating cadmium toxicity in plants by phytohormones. In book: Cadmium Toxicity and Tolerance in Plants: From Physiology to Remediation. Publisher: Academic Press **Elsevier UK**.

15. R. Kaur, P. Yadav, S. K. Kohli, **V. Kumar**, P. Bakshi, B. A. Mir, A. K. Thukral and R. Bhardwaj (2018). Emerging trends and tools in transgenic plant technology for Phytoremediation of toxic metals and metalloids. In book: Transgenic Plant Technology for Remediation of Toxic Metals and Metalloids. Publisher: Academic Press Elsevier Inc.

16. S.K. Kohli, S. Bali, K. Khanna, P. Bakshi, P. Sharma, **V. Kumar**, P. Ohri, B.A. Mir, R. Kaur, R. Bhardwaj and A. Sharma (2019). A current scenario on role of

Brassinosteroids in plant defense triggered in response to biotic challenges. In book: Brassinosteroids: Plant Growth and Development. Publisher: Springer. Pp. 367-388.

17. P. Sharma, P. Sharma, P. Arora, **V. Kumar**, K. Khanna, P. Saini and R. Bhardwaj (2019). Role and Regulation of ROS and Antioxidants as Signaling Molecules in Response to Abiotic Stresses. In book: Plant Signaling Molecules Role and Regulation Under Stressful Environments. Publisher: Elsevier, pp. 141-156.

18. A. Sharma, **V. Kumar**, G.P.S. Sidhu, R. Kumar, S.K. Kohli, P. Yadav, D. Kapoor, A.S. Bali, B. Shahzad, K. Khanna, S. Kumar. R. Bhardwaj and A. K. Thukral. (2019). Abiotic stress management in plants: Roles of Ethylene. In book: Molecular Plant Abiotic Stress: Biology and Biotechnology, Publisher: John Wiley & Sons Ltd. U.K

19. S.K. Kohli, N. Honda, P. Kaur, P. Yadav, **V. Kumar**, R. Kaur, S. Arora, A.P. Vig and R. Bhardwaj (2019). Sulfur Nutrition and Abiotic Stress Tolerance in Plant. In book: Plant Tolerance to Environmental Stress. DOI:10.1201/9780203705315-14. Taylor and Francis Group.

20. P. Kaur, N. Handa, **V. Verma**, P. Bakshi, R. Kalia, S. Sareen, A. Nagpal, A.P. Vig, B.A. Mir and R. Bhardwaj (2019). Cross Talk Among Reactive Oxygen, Nitrogen and Sulfur During Abiotic Stress in Plants. In book: Reactive Oxygen, Nitrogen and Sulfur Species in Plants: Production, Metabolism, Signaling and Defense Mechanism. John Wiley & Sons Ltd.

21. K. Khanna, N. Handa, P. Yadav, V. Gautam, **V. Kumar**, P. Ohri and R. Bhardwaj (2019). Molecular Approach in Enhancing Antioxidant Defense in plants. In book: Reactive Oxygen, Nitrogen and Sulfur Species in Plants: Production, Metabolism, Signaling and Defense Mechanisms. Publisher: Wiley-Blackwell.

22. U. Dhiman, S. Rana, S. Kesar, A. Panwar, M. Devi, **V. Kumar**, et al. (2019). Entomopathogenic nematodes: their occurrence and pathogenicity. In book: Parasitology Taxonomy and Bioecology.

23. A. Sharma, **V. Kumar**, R. Kumar et al. (2020). Role of plant growth regulators in ameliorating heavy metal caused oxidative stress in plants: An update. In book: Metal toxicity in Higher Plants. Publisher: Nova Science Publishers, Inc. NY, USA.

24. A. Sharma, **V. Kumar**, S.K. Kohli et al. (2020). Pesticide Metabolism in Plants, Insects, Soil Microbes, and Fishes: An Overview. In book: Pesticides in Crop Production: Physiological and Biochemical Action. John Wiley & Sons Ltd. Published 2020 by John Wiley & Sons Ltd.

25. A.S. Bali, G.P.S. Sidhu and **V. Kumar** (2020). Plant enzymes in metabolism of

organic pollutants. In book: Handbook of Bioremediation. Publisher: Elsevier, pp. 464-475.

26. **V. Kumar**, S. Pandita, A. Sharma, V. Sharma, M. Sharma and A. Cerda (2020). Combination of contamination indices and ecological risk assessment index for evaluation of pollution level in sediments. In book: Heavy Metals in the Environment. Impact, Assessment and Remediation. Publisher: Elsevier. DOI: <https://doi.org/10.1016/B978-0-12-821656-9.00006-7>.

27. V. Sharma, M. Sharma, S. Pandita, **V. Kumar**, J. Kour and N. Sharma (2020). Assessment of water quality using different pollution indices and multivariate statistical techniques. In book: Heavy Metals in the Environment. Impact, Assessment and Remediation. Publisher: Elsevier. DOI: <https://doi.org/10.1016/B978-0-12-821656-9.00009-2>.

28. P. Bakshi, S. Kohli, S. Bali, P. Kaur, **V. Kumar** et al. (2021). NO and phytohormones cross-talk in plant defense against abiotic stress. In book: Nitric Oxide in Plant Biology. 1st Edition Publisher: Academic Press. DOI: 10.1016/B978-0-12-818797-5.00028-5.

29. **V. Kumar**, S. Pandita et al. (2022). Background level, occurrence, speciation, bioavailability, and phyto-management of Cu-polluted soils. In book: Appraisal of Metal (Loids) in the Ecosystem. Publisher: Elsevier. DOI: 10.1016/B978-0-323-85621-8.00003-0

Conferences/workshops/faculty induction programmes

1. **Oral presentation** at International conference on Environmental mutagenesis, carcinogenesis and health. 17-19 February 2016, GNDU, Amritsar.
2. **Presented Poster** at National Seminar on Trends and Advances in Plant Sciences. Sept. 21-22, 2013. Department of Botany, Aligarh Muslim University, Aligarh, India.
3. **Oral presentation** at 5th International Conference on Agriculture, Horticulture and Plant Science, Rishikesh (U.K.), India. 24-25th June 2017.
4. **Oral presentation** at 38th Asian conference on Remote Sensing held at New Delhi from 23-27 October 2017.
5. **Oral Presentation** at International Conference on Advances in Biosciences and Biotechnology. Feb. 1-3, 2018. Organized by Department of Biotechnology, JIIT, Noida.

6. **Poster Presentation** at International Conference on Advances in Analytical Sciences. March 15-17, 2018. Organized by CSIR Indian Institute of Petroleum, Dehradun.
7. **Poster Presentation** at National Seminar on Emerging Trends in Plant and Environmental Sciences. March 29-30, 2018, organized by Deptt. Of Botanical and Environmental Sciences, GNDU, Amritsar.
8. **Poster Presentation** at National conference on Current Interventions to Plants and Microbes for Environmental and Agricultural Sustainability. March 6-8, 2019, organized by Deptt. Of Botanical and Environmental Sciences, GNDU, Amritsar.
9. **Participated** in National Conference on Perspectives & Trends in Plant Sciences and Biotechnology. Feb. 21-23, 2014. Organized by Department of Botany, Panjab University, Chandigarh & Society of Plant Research, India.
10. **Participated** in the IIRS user interaction meet at IIRS, ISRO, Dehradun. 26-27 Feb. 2015.
11. **Presented poster** in National Conference on Preservation of Environment: Challenges before Humanity, Shri Guru Granth Sahib World University, Fatehgarh Sahib, Punjab, India. (2013).
12. **Participated in** International Conference on Environment and Human Health at Indian National Science Academy, New Delhi, India. 28-29 November 2012.
13. **Attended** International Conference on Environment & Human Health, Organized by National Environmental Science Academy, in Association with Department of Botany, Jamia Hamdard at Indian National Science Academy, New Delhi, India. (Nov. 28-29, 2012).
14. **Participated** in 15th Punjab Science Congress at GNDU, Amritsar. 7-9 Feb. 2012.
15. **Participated** in UGC-SAP Sponsored National Seminar on Environmental Management, Organized by Dept. of Botanical & Environmental Sciences, GNDU, Amritsar, India (Mar. 22-23, 2012).
16. **Participated in** 1st International Conference on Fatty Liver, Seville, Spain 1-3 June 2017.

Workshops Attended

1. **DST Sponsored Brain Storming Workshop on Promoting Extramural**

- Research in Punjab**, Organized by Dept. of Botanical & Environmental Sciences, GNDU, Amritsar, India.(Feb. 12, 2013).
2. **Workshop on Statistics for Ph.D/Post Doctorate Scholars/ Faculty Members**, Organized by Academic Staff College (University Grants Commission), GNDU, Amritsar, India. (Aug. 27-29, 2013)
 3. **National Workshop on Advances in Biotechnology** held at Arni University, Kathgarh (Kangra), H.P., India. (Oct.24-25, 2013).
 4. **Advanced Webinar: Methods in Using NASA Remote Sensing for Health Applications** held at NASA, 1-15 June 2017.
 5. **Remote Sensing of Land Indicators for Sustainable Development Goal 15** held at NASA, 20-22 June 2017.
 6. **Introduction to Synthetic Aperture Radar** held at NASA, 28 June-6 July 2017
 7. **Introduction to Remote Sensing for Scenario-Based Ecoforecasting** held at NASA, 7-27 September, 2017.
 8. **Introduction to Remote Sensing of Harmful Algal Blooms** held at NASA, 5-26 September, 2017.
 9. GIAN Workshop organized by Department of Botanical and Environmental Sciences, Guru Nanak Dev University, Amritsar entitled "**Concepts in Cancer Biology: Drug Discovery, Biochemical and Molecular Mechanism of Cancer Drugs, Clinical Implications (3-7 October 2017)**".
 10. GIAN Workshop organized by Department of National Institute of Technology, Hamirpur entitled **Structural Health Monitoring by Full Field Measurement Techniques and Simulation Models (16-22 June 2018)**.
 11. Science Academics, **Science Leadership Workshop**, from 22 to 28 June 2020, Organized by Central University of Punjab, Bathinda.

Faculty development programmes/orientation courses

1. Completed two weeks Faculty Development Program on Managing online classes and Co-creating Moocs from 20 April to 6 May 2020, organized by Ramanujan College, University of Delhi.
2. Completed four weeks Faculty Development Program from 26 June to 24 July 2020, organized by Ramanujan College, University of Delhi.

