VINEET KUMAR

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Current Address: CSIR-CIMAP, Lucknow, 226015
LinkedIn | Google Scholar

Research Interests

Remote Sensing (Satellites, UAVs, Sensor-based), Synthetic Aperture Radar (SAR) Remote Sensing, Geo-spatial Analytics, Precision Agriculture, Crop Mapping and Monitoring (Phenology, Bio-physical characteristics, Soil moisture, Water requirements, Yield, Stress factors), Land Use Analysis, Change Detection, Modelling and Observation of the Terrestrial Earth System

Employment

Scientist-D (Precision Agri) – CSIR-Central Institute of Medicinal and Aromatic Plants (CIMAP), Lucknow, India, March 2026 - Now

Lecturer/Researcher – IHE Delft Institute for Water Education, Delft, The Netherlands
Oct. 2024 – Oct. 2025

- Dashboard development for Irrigation scheme using WaPOR, Crop classification and Water Productivity Assessment, Teaching, MSc Supervision, MOOC contribution

Assistant Professor – Centre for Geo-Informatics, Tata Institute of Social Sciences, Mumbai, India
Nov. 2023 – Sep. 2024

- MSc Teaching, Supervision, Curriculum Development for 1-Year MSc, Hazard mapping using Geospatial Data

Geospatial Data Expert – Geospatial Unit, Land and Water Division, FAO, Rome, Italy
July 2023 – Oct. 2023

- Nationwide geospatial assessment of agricultural extent in conflict affected Sudan using WaPOR, Liaising with FAO Sudan and UN agencies stakeholders on Sudan Project, Technical Reporting

Postdoctoral Researcher – Civil Engineering and Geosciences Faculty, TU Delft, The Netherlands
May 2019 – Oct. 2022

- Agricultural SandboxNL: Developed crop parcel-wise satellite imagery retrieved information database over The Netherlands
- Coordinated with European Space Agency (ESA) project team and agro-service industries to provide actionable information using satellite database

Education

University Teaching Qualification (UTQ)/*Basiskwalificatie Onderwijs* (BKO) Diploma – 2025

Ph.D. – Synthetic Aperture Radar (SAR) Remote Sensing 2014 – 2019
Indian Institute of Technology Bombay, India (Supervisor: Prof. Y. S. Rao)
Thesis: *Full and Compact Polarimetric SAR Data Analysis for Various Land Features*

M.Tech. – Remote Sensing and GIS 2011 – 2013
Indian Institute of Remote Sensing, IIRS, ISRO, Dehradun, India &
Andhra University, Visakhapatnam, India
Thesis: *Leaf area index estimation of rice using canopy backscatter model and polarimetric SAR data*

B.Tech.– Electronics and Communication Engineering 2006 – 2010
Uttar Pradesh Technical University, Lucknow, India

Mentoring Experience (MSc/BSc/Interns)

- Merhawit Abera – MSc (2024-25), Water and Sustainable Development, IHE Delft (Co-Mentor)
- Gech Tsenga - MSc (2024-25), Water and Sustainable Development, IHE Delft (Co-Mentor)
- Arkapravo Kundu - MSc (2022-24), Centre for Geoinformatics, JTSDS, TISS (Main-Supervisor)
- Megha Shakya – MSc (2022-24), Centre for Geoinformatics, JTSDS, TISS (Main-Supervisor)
- Maurice Shorachi - MSc. (2019-21), Water Resource Management, TU Delft; Developed and supervision of MSc thesis (01 peer-reviewed journal and 01 conference paper published)
- Gerardos Drakonakis, BSc. (2021), Applied Earth Sciences, TU Delft; Supervision of BSc thesis
- Manuel Huber, (2020-2022), Mentored European Space Agency (ESA) Young Graduate Trainee on remote sensing data processing and research skills
- Mentored summer interns and short projects at CSRE, IIT Bombay, India and CEG, TU Delft
- **Assessing Students and Master Thesis Project, TU Delft:** Completed this course on bachelor and master thesis supervision and evaluation practices.

Teaching Experience and Assistance

- Coordinated special course for visiting PhD students at IHE Delft under RS4C-WDPP project
- M053: Remote Sensing for Agricultural Water Management, IHE Delft
- M055: Sensing and Geo-processing in Precision Agriculture, IHE Delft
- MDM-34: Geoinformatics in Disaster Preparedness and Response, JTSDS, TISS, Mumbai
- CIE-4609: Geodesy and Natural Hazards, CEG, TU Delft (TA)
- CIE-5401: GIS and Remote Sensing for Water Resources, CEG, TU Delft (TA)
- CTB-3310: Surveying and Mapping, CEG, TU Delft (TA)
- GNR-647: Microwave Remote Sensing, CSRE, IIT Bombay, India (TA)
- GNR-617: Image Interpretation Laboratory, CSRE, IIT Bombay, India (TA)

Skills

- Research, Data analysis, Scientific writing, Team management, Academic teaching
- Technical: Remote Sensing software's (ArcGIS, QGIS, ENVI, ERDAS, SNAP, PolSARpro), *Python* (geospatial libraries, scikit-learn) and MATLAB, *Jupyter* Notebook, Google Earth Engine
- Crop growth model – DSSAT,
- Language Known: English (Working), Hindi (Native), Malayalam (Elementary), Dutch (Basics)

Peer-Recognition/Synergistic Activities

- PhD/MSc Thesis External Reviewer – Bennett University, India (PhD Thesis – 01, Year 2025), TISS-Mumbai (MSc Thesis – 02, Year-2024-25)
- Master's student admission committee – IHE Delft (2025-26), TISS-Mumbai (2024-26)
- **Journal Reviewer** – Remote Sensing of Environment, IEEE-TGRS, IEEE-JSTARS, IEEE-GRSL, ISPRS Journal of Photogrammetry and Remote Sensing, GIScience and Remote Sensing, International Journal of Remote Sensing, Advances in Space Research, Remote Sensing (MDPI), Sustainability (MDPI), Journal of Applied Remote Sensing (SPIE), GeoCarto International
- Scientific Committee Member IGARSS - 2022, 2023, 2024, 2025, 2026
- Contributing research on novel **Radar Vegetation Indices** development implemented in European Space Agency (ESA) open-source remote sensing data processing software **SNAP** v. 8.0.4, 2021
- Session Co-Chair in IEEE International Geoscience and Remote Sensing Symposium (IGARSS-2021), Brussels, Belgium, 2021.
- Co-chair of the session on "Applications of SAR Polarimetry on Agriculture" in POLINSAR-2017 International Workshop, 23-27 January 23-27, 2017, Frascati (Rome), Italy.
- Bi-Weekly Journal club organizer for M-WAVE Lab, CEG, TU Delft, The Netherlands

Invited Talks

- *Parcel Level Crop Monitoring using Synthetic Aperture Radar Remote Sensing* at Indian Institute of Technology Kharagpur, India on 18th Dec. 2025
- *Basics of Remote Sensing* at IIT Indore, India, MeitY sponsored bootcamp program on "*Unmanned Aircraft Systems Navigation, Communication and Applications using AI/ML*", 19 March 2023.
- *Synthetic Aperture Radar Remote Sensing for Vegetation Monitoring: Research to Actionable Information* at Sparkgeo Consulting, Vancouver, Canada, 6 October 2022.
- *Google Earth Engine (GEE) for Geospatial Data Processing* at IIT Indore, India, AICTE-QIP course, 27 April 2022.
- *Remote Sensing and GIS Data Processing for Earth Observation* at DBIT, Mumbai, India, IEEE-GRSS sponsored event "Machine Learning Application for Spatio-Temporal Analysis", 7–11 January, 2019.
- Earth Observation Technologies for Crop Monitoring - A Workshop to Promote Collaborations among GEOGLAM/JECAM/Asia-RICE at TARI, Taichung, Taiwan. Sep-2018.
- Two-day TEQIP course on *Microwave Remote Sensing* at NIT Surathkal, Karnataka, India on 16-17 October 2016.

Awards

- Shastri Research Scholar Fellowship (SRSF-2016) by Shastri Indo-Canadian Institute (SICI) for 4 months (April-July 2016) visiting research at Agriculture and Agri-Food Canada (AAFC) and Carleton University, Ottawa, Canada

- IEEE Geoscience and Remote Sensing Society (GRSS) Travel Grant-2015 and 2017 to attend IGARSS-2015 at Milan, Italy and IGARSS-2017, Texas, USA.

- DST, Govt. of India, Young Scientist International Travel Grant to attend POLINSAR-2017 International Workshop, January 23-27, 2017 held at Frascati (Rome), Italy.

- Ph.D. Teaching Assistantship by Ministry of HRD, Govt. of India at IIT Bombay (2014-2019)

- Best Paper Award for oral presentation on "Rice crop monitoring using quad-pol SAR data in part of Indo-Gangetic plain of India" at GBPUA&T, Pantnagar, Uttarakhand, India. 2013.

Field Expeditions

- Diurnal and seasonal bio-geophysical parameter collection: Experimental site - Reusel, Netherlands in 2019 and 2021. Supported in installation of truck mounted scatterometer, soil moisture and leaf wetness sensors.

- Soil Moisture Active Passive Validation Experiment (SMAPVEX) Manitoba, Canada -2016 field campaign: jointly by Agriculture Agri-Food Canada (AAFC) and NASA, USDA and various universities. Crop and soil parameter measurements using state of art instruments and sampling.

- JECAM India test site-Vijayawada, Andhra Pradesh, 2014 to 2018, Collection of geo-tagged LULC points, crop LAI and biomass measurements, planning, coordination and acquisitions of satellite data from various space agencies Radarsat-2 (CSA), RISAT-1 (ISRO), ALOS-1/2 (JAXA).

Project acquisition contribution

- ESA-EO-Africa R&D Call: Cloud-Based and AI-Enhanced Earth Observation for Mapping and Forecasting Hydrological Extremes and Irrigation Demand across Malawi, **Project status – Accepted** (Role – Contributed to proposal writing and acquisition activities, **Team Member-IHE**)

Non-Funded Projects

- Title: AWS4AgriSAR: Crop Inventory Mapping from SAR Data on Cloud Computing Platform. Financial Support: GEO-Amazon Earth Observation Cloud Credits Programme., 2019-2021, (Responsibility-**Co PI**)

- Title: Crop characterization using quad-pol Radarsat-2 SAR data. Canadian Space Agency and MDA Education International proposal under SOAR initiative, 2017-19, (Responsibility-**Co PI**)

- Title: Joint Experiment for Crop Assessment and Monitoring (JECAM) SAR Inter-Comparison project to globally monitor variety of agricultural cropping systems, India site-Vijayawada, A.P. Duration: 2017-2020, (Responsibility-**Team Member**)

Scientific Publications (See attached list for full details)

- Total publications: 45+
- Peer-reviewed journals: 26
- Book Chapters: 03
- Conference proceedings: 20
- FAO open reports: https://www.fao.org/documents/card/en/c/cc8795en
- H-index: Google Scholar-20/Scopus-15 (as of Dec. 2025)
- Citations: 1500+ (as of Dec. 2025)
- Google Scholar: https://scholar.google.com/citations?user=NVGe-u4AAAAJ&hl=en

Publication List: Vineet Kumar

➢ Peer Reviewed Journals

1. S. Jain, U. Khati, and **V. Kumar**, "Integrating Dual-pol SAR parameters and Multi-spectral vegetation indices for Wheat crop classification in fragmented land parcels", *Remote Sensing Applications: Society and Environment*, 2026 (Accepted)

2. S. Jain, U. Khati, **V. Kumar** and R. K. Verma, "Detection of Soybean Pod Formation Stage Using Sentinel-1 SAR Data," in *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing (IEEE-JSTARS)*, vol. 18, pp. 4020-4031, 2025

3. Nikaein, Tina, Paco Lopez-Dekker, Susan Steele-Dunne, **Vineet Kumar**, and Manuel Huber. "Modeling SAR Observables with Combining a Crop-Growth Model and a Machine-Learning." *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing (IEEE-JSTARS)* 2023.

4. **Vineet Kumar**, Manuel Huber, Bjorn Rommen and Susan C. Steele-Dunne, "Agricultural SandboxNL: A National-scale database of parcel-level, processed Sentinel-1 SAR data", *Nature Scientific Data*, 9, 402, 2022.

5. Maurice Shorachi, **Vineet Kumar** and Susan C. Steele-Dunne, "Sentinel-1 SAR Backscatter Response to Agricultural Drought in The Netherlands" *Remote Sensing* (MDPI), 14(10), 2022.

6. Paul Vermunt, Saeed Khabbazan, Susan C. Steele-Dunne, **Vineet Kumar** and Jasmeet Judge, "Towards understanding the influence of vertical water distribution on radar backscatter from vegetation using multi-layer water cloud model", *Remote Sensing* (MDPI), 14(16), 2022.

7. Hosseini et al., "A Comparison between Support Vector Machine and Water Cloud Model for Estimating Crop Leaf Area Index", *Remote Sensing* (MDPI), Vol-13, pp. 1348, 2021.

8. Dipankar Mandal, **Vineet Kumar**, Avik Bhattacharya, Heather McNairn, and Y. S. Rao. "A multi-year cross-validation experiment for estimating rice plant area index (PAI) over the JECAM-India test site from simulated RADARSAT constellation mission (RCM) compact polarimetric SAR data." *International Journal of Remote Sensing* 42, no. 24, 9515-9547, 2021.

9. **Vineet Kumar**, Dipankar Mandal, Avik Bhattacharya and Y. S. Rao, "Crop characterization using an improved scattering power decomposition technique for compact polarimetric SAR data" *International Journal of Applied Earth Observation and Geoinformation*, vol.88, pp.102052, 2020.

10. Dipankar Mandal, **Vineet Kumar**, Debanshu Ratha, Subhadip Dey, Avik Bhattacharya, Juan M. Lopez-Sanchez, Heather McNairn, and Y. S. Rao. "Dual Polarimetric Radar Vegetation Index for Crop Growth Monitoring Using Sentinel-1 SAR Data," *Remote Sensing of Environment*, 247: 111954, 2020.

11. Dipankar Mandal, **Vineet Kumar**, Debanshu Ratha, Juan M. Lopez-Sanchez, Avik Bhattacharya, Heather McNairn, Y. S. Rao, and K.V. Ramana, "Assessment of rice growth conditions in a semi-arid region of India using the Generalized Radar Vegetation Index derived from RADARSAT-2 polarimetric SAR data" *Remote Sensing of Environment*, vol. 23, pp. 111561, 2020.

12. Dipankar Mandal, Debanshu Ratha, Avik Bhattacharya, **Vineet Kumar**, Heather McNairn, Y. S. Rao, and A. C. Frery, "A Radar Vegetation Index for crop monitoring using compact polarimetric SAR data" *IEEE Transactions on Geosciences and Remote Sensing*, 2020.

13. Subhadip Dey, Dipankar Mandal, Laura Dingle Robertson, Biplab Banerjee, **Vineet Kumar**, Heather McNairn, Avik Bhattacharya, Y. S. Rao "In-season crop classification using elements of the Kennaugh matrix derived from polarimetric RADARSAT-2 SAR data" *International Journal of Applied Earth Observation and Geoinformation*, vol.88, pp.102059, 2020.

14. Dipankar Mandal, **Vineet Kumar** and Y. S. Rao, "An assessment of temporal RADARSAT-2 SAR data for crop classification using KPCA based support vector machine", *GeoCarto International*, July 2020.

15. Dipankar Mandal, **Vineet Kumar**, Juan M. Lopez-Sanchez, Avik Bhattacharya, Heather McNairn, and Y. S. Rao. "Crop biophysical parameter retrieval from Sentinel-1 SAR data with a multi-target inversion of Water Cloud Model." *International Journal of Remote Sensing*, vol. 41, no. 14, 2020.

16. **Vineet Kumar**, Y. S. Rao, Avik Bhattacharya and Shane Cloude, "Classification Assessment of Real vs. Simulated Compact and Quad-Pol Modes of ALOS-2" *IEEE Geosciences and Remote Sensing Letters*, vol. 16, no. 9, pp. 1497-1501, 2019. (**Front cover of issue**)

17. Debanshu Ratha, Dipankar Mandal, **Vineet Kumar**, Heather McNairn, Avik Bhattacharya, and A. C. Frery, "A Generalized Volume Scattering Model-Based Vegetation Index from Polarimetric SAR Data." *IEEE Geoscience and Remote Sensing Letters*, vol. 16, Issue: 11, pp. 1791-1795, 2019.

18. Dipankar Mandal, Mehdi Hosseini, Heather McNairn, **Vineet Kumar**, Avik Bhattacharya, Y. S. Rao, Scott Mitchell, Laura D. Robertson, Andrew Davidson, K. Dabrowska-Zielinska, "An Investigation of Inversion Methodologies to Retrieve the Leaf Area Index of Corn from C-Band SAR Data" *International Journal of Applied Earth Observations and Geoinformation*, Elsevier, vol. 82, pp. 101893, 2019.

19. Dipankar Mandal, **Vineet Kumar**, Heather McNairn, Avik Bhattacharya, and Y. S. Rao, "Joint Estimation of Plant Area Index (PAI) and Wet biomass in Wheat and Soybean from C-band Polarimetric SAR Data" *International Journal of Applied Earth Observations and Geoinformation*, Elsevier, vol. 79, pp. 24-34, 2019

20. Siddharth Hariharan, Dipankar Mandal, Siddhesh Tirodkar, **Vineet Kumar**, Avik Bhattacharya, and J. M. Lopez-Sanchez, "A Novel Phenology Based Feature Subset Selection using Random Forest for Multi-temporal PolSAR Crop Classification", *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, vol. 11, no. 11, pp. 4244-4258, 2018

21. Unmesh Khati, **Vineet Kumar**, Debmita Bandyopadhyay, Mohammad Musthafa, and Gulab Singh, "Identification of forest cutting in managed forest of Haldwani, India using ALOS-2/PALSAR-2 SAR data" *Journal of Environmental Management*, vol-213, pp. 503-512, 2018.

22. Dipankar Mandal, **Vineet Kumar**, Avik Bhattacharya, Y. S. Rao, Paul Siqueria and Soumen Bera, "Sen4Rice: A Processing Chain for Differentiating Early and Late Transplanted Rice using Time-Series Sentinel-1 SAR Data with Google Earth Engine" *IEEE Geoscience and Remote Sensing Letters*, vol. 15, no. 12, pp. 1947-1951, 2018.

23. **Vineet Kumar**, Heather McNairn, Avik Bhattacharya, and Y. S. Rao, "Temporal Response of Scattering from Crops for Transmitted Ellipticity Variation in Simulated Compact-Pol SAR Data", *IEEE-Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, vol. 10, no. 12, pp. 5163-5174, 2017.

24. **Vineet Kumar**, Mamta Kumari and S. K. Saha, "Discrimination of Basmati and Non-basmati Rice Types using Polarimetric Target decompositions of Temporal SAR Data" *Current Science*; (00113891), 110(11), 2016.

25. Mamta Kumari, **Vineet Kumar** and S. K. Saha, "Rice Crop Growth Assessment using C-Band RISAT-1 data" *Asian Journal of Geo-informatics*, Vol. 15(1): pp. 09-14, 2015

26. **Vineet Kumar**, Mamta Kumari and S. K. Saha, "Leaf Area Index Estimation of Lowland Rice using Semi-empirical Backscattering Model" *Journal of Applied Remote Sensing*; vol. 7(1):073474, 2013.

Book Chapters

1. S. Hariharan, D. Mandal, S. Tirodkar, **V. Kumar**, A. Bhattacharya, "Multi-frequency Polarimetric SAR Data Analysis for Crop Type Classification using Random Forest", *Synthetic Aperture Radar (SAR) Data Applications*, Springer, 2023

2. D. Mandal, **V. Kumar**, A. Bhattacharya, H. McNairn, and Y. S. Rao, "Crop LAI and Biomass Estimation from Different Polarization Modes of Simulated NISAR Data" *Remote Sensing of Agriculture and Land Cover/Land Use Changes in South and Southeast Asian Countries,* Springer, 2022

3. D. Mandal, **V. Kumar**, Y. S. Rao, H. McNairn, J. M. Lopez-Sanchez, A. Bhattacharya, S. Mitchell, "A processing chain for estimating crop biophysical parameters using multi-temporal Sentinel-1 SAR data in cloud computing framework", *Radar Remote Sensing*, Elsevier, 2022.