

Tanuj **Pareek**

Remote Sensing & GeoAI Expert

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Personal statement

I build GeoAI pipelines that turn aerial imagery, satellite data and LiDAR into reliable maps at country scale. At Cobra Groeninzicht, I am the main engineer on the automated pipeline behind Bomenmonitor, the company's map of about 100 million trees across the Netherlands. My research background in urban growth, drought and landslide hazards helps me turn geodata into insight that supports decision-making and policy.

Work experience

Cobra Groeninzicht

Vianen, Netherlands

Remote sensing specialist | GeoAI expert

February 2024 to present

- Main engineer on the pipeline behind Bomenmonitor, an existing Cobra product: turned an earlier code base into an automated, scalable Python pipeline that runs end to end, from data acquisition to publishing to the database. Bomenmonitor is Cobra's national tree dataset, on which products such as the 3-30-300 rule and the Bomenkansenkaart are built.
- Tools in use: Python (TensorFlow, PyTorch, raster and vector packages), contributing to data pipelines useful for large-scale environmental monitoring.)

Faculty of Geo-Information Science and Earth Observation (ITC), University of Twente

Enschede, Netherlands

Researcher

July 2023 to December 2023

- Project: Critical Water Shortages and the Groundwater Gamble: A New Lens on Future Agrarian Distress in South-Asia
- Tasks: Groundwater dataset (GRACE) processing and trans-disciplinary integration (Geo-Techno-Socio approach), Python-based Big-GeoData handling and analysis (India level)
- Tools used: Python (Pandas, NumPy, netCDF4, Xarray, Xclim), Dask for parallel computing, Linux (CDO), ArcGIS Pro
- Supervisor: Dr R.J. (Robbin Jan) van Duijne (Currently at Columbia University), Prof. Karin Pfeffer

Faculty of Geo-Information Science and Earth Observation (ITC), University of Twente

Enschede, Netherlands

Researcher

Mar 2023 to Jun 2023

- Project: On the move: Fine-scale climate migration modelling in India
- Tasks: Generating high resolution (5 KM) Standardized Precipitation-Evapotranspiration Index (SPEI, 1981 - 2022, aggregation time scales of 1 to 48 months), integrating with proxy-based migration datasets, Big-Geodata handling, processing and analysis
- Tools used: Python (Pandas, NumPy, netCDF4, Xarray, Xclim), Dask for parallel computing, Linux (CDO), ArcGIS Pro
- Supervisor: Dr R.J. (Robbin Jan) van Duijne (Currently at Columbia University), Prof. Karin Pfeffer

Faculty of Geo-Information Science and Earth Observation (ITC), University of Twente

Enschede, Netherlands

Researcher

Dec 2022 to Jun 2023

- Project: Characterizing spatio-temporal trajectories of built-up change in Chennai, India - A socio-spatial analytics approach
- Tasks: Deep learning for Multi-temporal urban mapping, spatio-temporal mapping and characterization, linking patterns with governance & policy feedbacks, scientific writing
- Tools used: Deep learning models (U-Net), Python (PyLandStats, Geopandas, pandas), ArcGIS Pro, ERDAS Imagine
- Supervisor: Prof. Karin Pfeffer, Ast. Prof. Divyani Kohli

Department of Geosciences, University of Padova

Padova, Italy

Research Intern

Jan 2022 to Apr 2022

- Project: Application of improved U-Net models to detect landslides using spectral and topographic information.
- Tasks: Training data preparation, model training and optimization, testing and evaluation, post-processing of results
- Tools used: Python (NumPy, gdal, Scikit-learn, PyTorch, Pandas, matplotlib), ArcGIS pro
- Supervisor: Prof. Filippo Catani

Education

Faculty of Geo-Information Science and Earth Observation (ITC), University of Twente — *Enschede, The Netherlands*

MSc in Geoinformation Science and Earth Observation — *2020–2022*

- Thesis: "*Analysing the posterior predictive capability of landslide susceptibility maps*"*
- Grade: *8.23/10 (Cum-laude)*
- **Relevant Courses & projects:**
  - Global Challenges Local Action: *Geo-information science for tackling wicked problems, Geodata as stepping stone for urban policy making and governance.*
  - GIS & RS for Geospatial Solutions: *Project: Identification and analysis of slum characteristics using spatial metrics using remote sensing and GIS in Rio and Nairobi*
  - Advanced Image Analysis: *Project: Building footprint detection using U-Net model*

Kumaun University — *Uttarakhand, India*

MSc in Remote Sensing and GIS — *2018–2020*

Grade: *82.40/100 (First position)*

Jamia Millia Islamia — *New Delhi, India*

Post-Graduate Diploma in Remote Sensing and GIS — *2017–2018*

Grade: *8.76/10 (With distinction)*

Kirorimal College, University of Delhi — *New Delhi, India*

BA (Honours) in Geography — *2014–2017*

Grade: *75.07/100*

Software & Technical Skills

Computer operating systems: Windows, Linux-based.

Text processors: Word, LaTeX

Programming languages: Python (Advanced), R (Basic)

Mapping/Modelling: SLEUTH, Dyna-Clue, Fragstats, PyLandStats

Remote Sensing & GIS: ERDAS IMAGINE, ArcGIS Pro, QGIS,

Photogrammetry: NFrames SURE, ArcGIS Reality Studio

Technical skills: Image processing and analysis, Deep learning, Spatio-temporal metrics analysis, Technical report writing

Peer-reviewed publications

1. van Duijne RJ, Cottier F, **Pareek T**, Dablander F (2025). *Drought permanently displaces agricultural labor: Evidence from 450,000 Indian villages.* Under review: Nature Communications. Preprint link*
2. **Pareek T**, Bhuyan K, van Westen C, Rajaneesh A, Sajinkumar KS, Lombardo L (2024). *Analysing the posterior predictive capability and usability of landslide susceptibility maps: a case of Kerala, India*. Published in *Landslides* journal.*
   For other publications, visit my *ORCID* profile.*

Publications in preparation

1. **Pareek T**, Pfeffer K, Kohli D, Kennedy L, Follmann A (2026). *Characterising spatio-temporal trajectories of built-up change in Chennai, India - A socio-spatial analytics approach.*

Academic awards

Climate Centre Seed Fund* for a project on impacts of climate change on water scarcity by UT Climate Centre (Amount: €24.000,-)

ITC Excellence Scholarship Programme (ITC-ESP) Award for very good academic track record to pursue MSc at ITC (2020 - 2022).

Central Sector Scholarship Scheme (CSSS) a financial assistance to meritorious students by Ministry of Human resource development - MHRD India (2014 - 2017).

Languages

English: C1; **Dutch**: A2

References

Available on request.