

# Prakhar Misra

Assistant Professor,  
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📄 <https://mprakhar.github.io/>

Keywords: Applied remote sensing, Optical and SAR, Land-use change, Urbanization, Emission inventory, Air quality

## Experience

- 2023/7 - present **Indian Institute of Technology Roorkee**, Assistant Professor (Civil Engineering Department).
- 2021/6 - **Synspective Inc.**, Tokyo, Chief Tech Lead (Applied Research) | SAR Application Engineer.  
2023/7 Geo-spatio-temporal SAR-based solution development for infrastructure and forestry.
- 2020/4 - **Research Institute of Humanity and Nature**, Kyoto, Researcher.  
2021/3 '*Interdisciplinary study towards clean air, public health and sustainable agriculture: case of crop residue burning in India.*'
- 2019/10 - **Institute of Industrial Science, The University of Tokyo**, Project Assistant Professor.  
2020/3
- 2018/08 - **Institute of Industrial Science, The University of Tokyo**, Project Researcher.  
2019/10 Researching agromet cross comparison and validation for rice crop outlook in Thailand.
- 2015/10 - **Sony Computer Science Laboratories**, Tokyo, Research Assistant (part-time).  
2016/12 Analyzed energy exchange efficiency in '*Open Energy System*' for decentralized solar PV grid.
- 2013/06 - **Inductis**, New Delhi, Data Science Consultant.  
2015/02 Predictive modelling of unsecured credit risk.
- 2011/05 - **Bharat Petroleum Corporation Limited**, Mumbai, Internship.  
2011/06 Performed energy audit and feasibility study for solar-wind powered renewable energy plant.

## Education

- 2015–2018 **Civil Engineering, The University of Tokyo, Japan**,  
**PhD** Title: Analyzing Impact of Socio-economic Growth and Land-use Change on Urban Air Quality in India.
- 2008–2013 **Civil Engineering, Indian Institute of Technology Kanpur, India**,  
**B.Tech-** Title: Multi-resolution Segmentation Based Classification of Polarimetric SAR Imagery.  
**M.Tech**

## Publications (peer-reviewed)

- Sovisoth E., Kuntal V.S., **Misra P.**, Takeuchi W., Nagai K.; Estimation of Year of Construction of Bridges in Cambodia by Analyzing the Landsat Normalized Difference Water Index *Infrastructures*, 8, 77, (2023).
- Sakti A.D., Anggraini T.S., Ihsan K.T., **Misra P.**, Nguyen T.T.N., Pradhan B., Wenten I.G., Hadi P.O., Wikantika K.; Multi-Air Pollution Risk Assessment in Southeast Asia Region Using Integrated Remote Sensing and Socio-Economic Data Products *Science of Total Environment*, 854, 158825, (2023).
- Nitta K., **Misra P.**, Hayashida S.; Intercomparison of Tropospheric Nitrogen Dioxide over Indian Subcontinent Observed by TROPOMI and OMI. *Journal of The Remote Sensing Society of Japan*, 42, 36-50, (2022). **RSSJ Paper Encouragement Award**
- Misra P.**, Takigawa M., Khatri P., Dhaka S.K., Dimri A.P., Yamaji K., Kajino M., Takeuchi W., Imasu R., Patra P.K., Hayashida S.; NO<sub>2</sub> Concentration and Emission change detection during COVID-19 restrictions in North India. *Nature Scientific Reports*, 11, 9800, (2021).
- Nguyen T.T.Q, Takeuchi W., **Misra P.**, Hayashida S.; Emission mapping of key sectors in Ho Chi Minh city,

- Vietnam using satellite derived urban land-use data. *Atmospheric Chemistry and Physics*, 21, 2795-2818, (2021).
6. Rahman M.M., Avtar R., Ahmed S., Inostroza L., **Misra P.**, Kumar P., Takeuchi W., Surjan A., Saito O.; Does Building Development in Dhaka Comply Land Use Zoning? Analysis Using Nighttime Light and Digital Building Heights. *Sustainability Science*, 16, 1323-1340, (2021).
  7. Khatri P., Hayasaka T., Holben B., Tripathi S.N., **Misra P.**, Patra P.K., Hayashida S., Dumka U.C.; Aerosol loading and radiation budget perturbations in densely populated and highly polluted Indo-Gangetic Plain by COVID-19: Influences on cloud properties and air temperature. *Geophysical research letters*, 48, 20, (2021).
  8. Avtar R., Kouser K., Kumar A., Singh D., **Misra P.**, Gupta A., Yunus A.P., Kumar P., Johnson B.A., Dasgupta R., Sahu N., Rimba A.B.; Remote Sensing for International Peace and Security: Its Role and Implications. *Remote Sensing*, Vol 13(3), 439, (2021).
  9. Avtar R., Singh D., Umarhadi D.A., Yunus A.P., **Misra P.**, Desai P.N., Kouser A., Kurniawan T.A., Phanindra K.B.V.N.; Impact of COVID-19 Lockdown on the Fisheries Sector: A Case Study from Three Harbors in Western India. *Remote Sensing*, Vol 13(2), 183, (2021) .
  10. **Misra P.**, Imasu R., Hayashida S., Ardhi A., Takeuchi W.; Mapping Brick Kilns to support Environmental Impact Studies around Delhi using Sentinel-2. *ISPRS International Journal of Geo-Information*, Vol 9(9), 544, (2020).
  11. Dhaka S.K., Chetna, Kumar V., Panwar V., Dimri A.P., Singh N., Patra P.K., Matsumi Y., Takigawa M., Nakayama T., Yamaji K., Kajino M., **Misra P.**, Hayashida S.; PM2.5 diminution and mist events over Delhi during the COVID-19 lockdown period: an interplay between the baseline pollution and meteorology. *Nature Scientific Reports*, 10, 13442, (2020).
  12. Rahman M.M., Avtar R., Yunus A.P., Dou J., **Misra P.**, Takeuchi W., Sahu N., Kumar P., Johnson B.A., Dasgupta R., Kharrazi A., Chakraborty S., Agustiono K.T.; Monitoring Effect of Spatial Growth on Land Surface Temperature in Dhaka. *Remote Sensing*, Vol 12(7), 1191, (2020).
  13. **Misra P.**, Takeuchi W.; Assessing Population Sensitivity to Urban Air Pollution Using Google Trends and Remote Sensing Datasets. *Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci.*, XLII-3/W11, 93-100, (2020).
  14. **Misra P.**, Imasu R., Takeuchi W.; Impact of Urban Growth on Air Quality in Indian Cities Using Hierarchical Bayesian Approach. *Atmosphere*, Vol 10(9), 517, (2019).
  15. Minh H.V.T., Avtar R., Mohan G., **Misra P.**, Kurasaki M.; Monitoring and Mapping of Rice Cropping Pattern in Flooding Area in the Vietnamese Mekong Delta Using Sentinel-1A Data: A Case of An Giang Province. *ISPRS International Journal of Geo-Information*, Vol 8(5), 211, (2019).
  16. **Misra P.**, Avtar R., Takeuchi W.; Comparison of digital building height models extracted from AW3D, TanDEM-X, ASTER and SRTM digital surface model over Yangon city. *Remote Sensing*, Vol 10(12), 2008, (2018).
  17. **Misra P.**, Fujikawa A., Takeuchi W.; Novel Decomposition Scheme for Characterizing Urban Air Quality with MODIS. *Remote Sensing*, Vol 9(8), 812, (2017) .
  18. **Misra P.**, Takeuchi W.; Air Quality Analysis Using Nighttime Light for Indian Urban Regions. *Malaysian Journal of Remote Sensing and GIS*, Vol 5(2), (2016).

### Publications (under review/preparation)

### Patent (applied)

1. Arya A., Pamungkas B., Chavan R., **Misra P.**; Ground Fluctuation Analysis Device and Ground Fluctuation Analysis Method Japan Patent Office Application Number *PCT/JP2022/26506*, 2022
2. Arya A., Pamungkas B., Chavan R., **Misra P.**; Ground Fluctuation Analysis Device and Ground Fluctuation Analysis Method Japan Patent Office Application Number *PCT/JP2022/26508*, 2022

### Publications (conference)

1. Arya A., Pamungkas B., Chavan R., **Misra P.**; Advanced alerting mechanism for slope and ground instability based on spatio-temporal analysis of anomalous land displacement behavior from time-series InSAR. *International Symposium of Remote Sensing*, online, Japan, 2022.
2. **Misra P.**, Takigawa M., Khatri P., Dhaka S.K., Dimri A.P., Yamaji K., Kajino M., Takeuchi W., Imasu R., Patra P.K., Hayashida S.; COVID-19 lockdown impacts on NOx emission: top-down estimation over North India. *29th Institute of Industrial Science Forum Proceedings*, Tokyo, Japan, 2021.
3. **Misra P.**, Takeuchi W.; How well does KBDI compare with soil moisture for agriculture?: A cal/val study in Thailand. *29th Institute of Industrial Science Forum Proceedings*, Tokyo, Japan, 2021.

4. **Misra P.**, Takigawa M., Khatri P., Dhaka S.K., Dimri A.P., Yamaji K., Kajino M., Takeuchi W., Imasu R., Patra P.K., Hayashida S.; Detection of significant change in nitrogen oxides concentration and emission during COVID-19 lockdown in North India. *2020 AGU Fall Meeting*, San Francisco, USA, 2020.
5. Hayashida S., **Misra P.**, Nitta K., Nguyen T.H., Patra P.K., Takigawa M., Khatri P., Dhaka S.K., Dimri A.P., Yamaji K., Takeuchi W.; Reduction of air pollutants over North-West India observed from space during the Covid-19 lockdown period. *2020 AGU Fall Meeting*, San Francisco, USA, 2020.
6. Nguyen T.H., Hayashida S., **Misra P.**, Matsumi Y., Nakayama T., Dhaka S.K., Dimri A.P.; Detection of Change in the Aerosol distribution over North-West India during the Covid-19 Lockdown period. *2020 AGU Fall Meeting*, San Francisco, USA, 2020.
7. **Misra P.**, Takeuchi W., Imasu R.; Brick Kiln Detection in North India with Sentinel imagery using Deep Learning of Small Datasets. *40<sup>th</sup> Asian Conference of Remote Sensing*, Daejeon, South Korea, 2019.
8. **Misra P.**, Takeuchi W.; Assessing population sensitivity to urban air pollution using Google Trends and remote sensing datasets. *Pecora21/ISRSE38*, Baltimore, Maryland, USA, 2019.
9. Sovisoth E., Thakur V.B., Nagai K., **Misra P.**, Takeuchi W.; Estimation of the bridge construction year in Cambodia by the analysis of LANDSAT satellite data. *3<sup>rd</sup> ACF Symposium*, Sapporo, Japan, 2019.
10. **Misra P.**, Takeuchi W.; Use of Google Trends for Assessing Sensitivity of Population to Urban Air Pollution. *26<sup>th</sup> International Symposium on Remote Sensing*, Taipei, Taiwan, 2019.
11. Arbain A., Imasu R., **Misra P.**, Takeuchi W.; Estimating PM<sub>2.5</sub> Emission from Brick Kiln Industry over Northern India with Numerical Model and Remote Sensing Observation. *EGU General Assembly*, Vienna, Austria, 2019.
12. **Misra P.**, Takeuchi W.; Analyzing perception of urban air pollution using Google Trends and satellite datasets. *27<sup>th</sup> Institute of Industrial Science Forum Proceedings*, Tokyo, Japan, 2019.
13. **Misra P.**, Takeuchi W.; A Novel Technique for Estimating Expansion of Residential, Commercial and Industrial Regions in Indian Megacities. *17<sup>th</sup> International Symposium on Urban Safety Of Mega Cities In Asia*, Hyderabad, India, 2018.
14. **Best Paper Award Finalist Misra P.**, Imasu R., Takeuchi W.; Land-use Change Impacts on Urban Air Quality in India using Hierarchical Bayesian Approach. *39<sup>th</sup> Asian Conference of Remote Sensing*, Kuala Lumpur, Malaysia, 2018.
15. Ochi S., **Misra P.**, Takeuchi W.; Spatiotemporal Distribution Of Hotspot / Wildfire In Southeast Asia Using Remote Sensing Data. *39<sup>th</sup> Asian Conference of Remote Sensing*, Kuala Lumpur, Malaysia, 2018.
16. **Best Paper Award Misra P.**, Takeuchi W.; Hierarchical Bayesian approach to estimate land-use change impacts on urban air pollution in India. *26<sup>th</sup> Institute of Industrial Science Forum Proceedings*, Tokyo, Japan, 2018.
17. **Misra P.**, Takeuchi W.; Digital Surface Model (DSM) datasets for built-height estimation over Indian cities. *24<sup>th</sup> International Symposium on Remote Sensing*, Nagoya, Japan, 2017.
18. **Misra P.**, Takeuchi W.; Comparison of ASTER and AW3D derived Digital Surface Model datasets for built structure height estimation over Yangon city, Myanmar. *25<sup>th</sup> Institute of Industrial Science Forum Proceedings*, Tokyo, Japan, 2017.
19. **Misra P.**, Takeuchi W.; Assessing Impact of Economic Activities on Urban Air Quality in India by Nightlight and Atmospheric Measurement Datasets. *37<sup>th</sup> Asian Conference of Remote Sensing*, Colombo, Sri Lanka, 2016.
20. **Misra P.**, Takeuchi W.; Air Quality Analysis Using Nighttime Light for Indian Urban Regions. *8<sup>th</sup> IGRSM International Conference and Exhibition on Geospatial & Remote Sensing*, Kuala Lumpur, Malaysia, 2016.
21. **Misra P.**, Takeuchi W.; Analysis Of Air Quality In Indian Cities Using Remote Sensing And Economic Growth Parameters. *36<sup>th</sup> Asian Conference on Remote Sensing*, Manila, Philippines, 2015.

## Reports

- **Misra P.**; Clean Air and Imagined Sustainability: The case of India. *Aakash Newsletter*, Vol. 1(1) 2020.
- **Misra P.**, Sharma R.; India's GAGAN (GPS-aided GEO augmented navigation) adds a new dimension to navigation. *GIM International*, Vol. 27(2) 2013.

## Presentation and seminars

1. **(invited)** Impact of COVID-19 lockdown on NO<sub>x</sub> concentrations and emissions in North India *Knowledge Sharing Symposium on Machine Learning and Deep Learning in Geoinformatics, Hokkaido University*, online. (2020/11/30)
2. **(invited)** Remote Sensing for Air Quality Management *Remote Sensing Application on Contemporary Environ-*

- mental Issues, Pabna University of Science & Technology, Bangladesh, online. (2020/11/24)*
3. **(invited)** Impact of Urban Growth on Air Quality in Indian Cities *FTSP New Normal Webinar, Institut Teknologi Nasional, Bandung, online. (2020/06/25)*
  4. Public interest in air quality and its impact varies with baseline exposure: Google Trends and Remote Sensing based analysis *22<sup>nd</sup> CEReS Symposium on Environment Remote Sensing, Chiba University, Chiba, Japan. (2020/02/20)*
  5. **(invited)** Remote Sensing for Urban Studies Mapping Land-use for Emission Inventories in Developing Countries *Young Sustainability Symposium, Hokkaido University, Sapporo, Japan. (2020/02/03)*
  6. **(invited)** Mapping Drivers of Urban Air-pollution in Indian Cities using Remote Sensing *Sakura Science Exchange Program, Shibaura Institute of Technology, Tokyo, Japan. (2019/11/20)*
  7. Monitoring Land-use Drivers of Urban Air Pollution and its Response using Remote Sensing and Social Sensing *Data-based Society Creation Symposium 2019, Tokyo, Japan. (2019/09/01)*
  8. Brick kiln detection around New Delhi using Sentinel 2 with Deep Learning: Distribution and Drivers *NASA LCLUC SARI International Regional Science Meeting, Johor Bahru, Malaysia. (2019/07/24)*
  9. Comparison of Remote Sensing derived KBDI with in-site Soil-moisture in Thailand. *JAXA-GISTDA mini workshop on drought monitoring, Bangkok, Thailand. (2019/05/17)*
  10. Observations from Mapping PM<sub>2.5</sub> in Indian Cities using Low-cost sensor. *1st IITK-UTokyo Workshop on PM<sub>2.5</sub> Mapping using Low-cost Sensors, Kanpur, India. (2019/02/06)*
  11. Role of satellite for monitoring urban air quality. *1st IITK-UTokyo Workshop on PM<sub>2.5</sub> Mapping using Low-cost Sensors, Kanpur, India. (2019/02/07)*
  12. GEE as educational tool in Civil Engineering. *Google Earth Engine Year-end Meetup in Tokyo, Tokyo, Japan. (2018/12/26)*
  13. Impact assessment of socio economic development on urban air quality in Indian megacities *NASA LCLUC SARI International Regional Science Meeting, Chiang Mai, Thailand. (2017/07/17)*

## Workshops organized

- 2021 **3rd Global Land Programme Asia Conference 2021, Hokkaido University** Geospatial Data for Terrestrial Ecosystem Monitoring & Hands-on-Training Session on Extraction of Building Phenotype (9/17)
- 2020 **(invited) Knowledge Sharing Symposium on Machine Learning and Deep Learning in Geoinformatics, Hokkaido University** Multi-temporal land-cover Classification using Cloud Platform (12/1)
- 2019 **(invited) NASA SARI Remote Sensing Land Use change and Climate Impacts in Coastal Zone Regional Science Training, Phuket, Thailand** Blue Carbon Mapping and Coastal Zone studies using GEE (12/17)
- 2019 **(invited) 5<sup>th</sup> International Conferences of Indonesian Society for Remote Sensing (ICOIRS), Bandung, Indonesia** Cloud based satellite image processing: Introduction to GEE (09/17)
- 2019 **(invited) Suranaree University of Technology, Nakhon Ratchaseema, Thailand** Air quality monitoring and mapping with portable devices (05/15)
- 2019 **4<sup>th</sup> Open Science Meeting, Global Land Program, Bern, Switzerland** Hands-on-training session on evaluating three-dimensional urban expansion in mega cities in Asia (04/27)
- 2019 **(invited) 26<sup>th</sup> International Symposium on Remote Sensing - ISPRS TC-W/8 Tutorial, Taipei, Taiwan** Remote Sensing Applications using Google Earth Engine (04/18)
- 2019 **1<sup>st</sup> IITK-UTokyo Workshop on PM<sub>2.5</sub> Mapping using Low-cost Sensors, IIT Kanpur, India** Citizen science workshop for mapping geolocated individual exposure to PM<sub>2.5</sub> using low-cost devices. (02/05–02/07)
- 2019 **(invited) 27<sup>th</sup> IIS Forum, The University of Tokyo, Tokyo, Japan** Classifying Landsat8 imagery using Google Earth Engine (03/07–03/08)
- 2018 **Indian Institute of Technology-BHU, Varanasi, India** Classifying Landsat8 imagery using Google Earth Engine and demonstration of portable PM<sub>2.5</sub> sensors (06/04)

2018 (invited) 26<sup>th</sup> IIS Forum, The University of Tokyo, Tokyo, Japan  
for Landsat imagery classification (03/07–03/08)

Google Earth Engine

## Teaching

(\*team-teaching, +teaching-assistant )

2021/09 **Environmental Science for Atmosphere and Hydrosphere\***, Nara Women's University, Japan.

2019, '18, '17 **Remote sensing (3713-089)\***, The University of Tokyo, Tokyo, Japan.

2019/01 **Satellite Image Processing for Remote Sensing Applications\***, Seoul National University, South Korea.

2013/01 **Precision Remote Sensing (CE676)<sup>+</sup>**, IIT Kanpur, India.

2012/08 **Environmental Quality and Pollution (CE361)<sup>+</sup>**, IIT Kanpur, India.

## Fellowship, Grants and Awards

2022 2<sup>nd</sup> prize, NEDO Supply Chain Challenge, USD 40,000

2021 Most Valuable Player (twice), Synspective, Inc.

2019 Tateishi Science and Technology Foundation, USD 4000

2019 International research meeting dispatch grant (IIS), USD 3500; (declined)

2015 Japanese Government (MEXT) Scholarship; tuition and stipend

2014 'Star Performer', 'Best Team of Year' at EXL Inductis

2010 Awarded 1<sup>st</sup>, 3<sup>rd</sup> prize for Birla White Cement National Innovative Design Competition

2009 Incentive Scheme for Meritorious Children by the State Bank of India; stipend

2006 National Talent Search (NTSE) Scholarship by Government of India; stipend

## Technical skills

Programming Python, R, JavaScript, C, SQL, VBA, SAS

Tools Google Earth Engine, QGIS, SNAP, ArcGIS, ENVI, TerraScan, GDAL

## Professional service

Reviewer T&F International Journal of Remote Sensing, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, Elsevier Resources Conservation and Recycling; Nature Elsevier Scientific Reports, Springer Sustainability Science, MDPI Remote Sensing; MDPI Atmosphere;

Member IEEE Geoscience and Remote Sensing Society (GRSS), American Geophysical Union (AGU), American Society of Photogrammetry and Remote Sensing (ASPRS), Remote Sensing Society of Japan (RSSJ) (applied), Integrated Land Ecosystem-Atmosphere Processes Study Early Career Scientist Network (iLeaps), Global Land Program (GLP)

## Social service

2016-'17 Vice-president, University of Tokyo Indian Students' Association

2016/07 Global Health Entrepreneurship Program for improving health in Onagawa, Miyagi

2015/05 Student volunteer, Empowerment Program Ibaraki High School, Mito City

2014-'15 SPOC, NGO for underprivileged Udayan Care, Gurgaon, India

2009-'10 Student guide, Institute Counselling Service, IIT Kanpur

## References

Prof. Sachiko HAYASHIDA  
Nara Women's University, Nara  
Research Institute of Humanity and Nature, Kyoto  
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