

# ROHIT MUKHERJEE

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Github Google Scholar Website LinkedIn

## RESEARCH STATEMENT

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My research sits at the intersection of satellite remote sensing, deep learning, and urban climate science. I develop and apply machine learning methods to improve the quality, resolution, and availability of satellite data, with applications spanning flood mapping, surface water monitoring, urban vegetation dynamics, and urban representation in climate models. My work draws on multi-sensor imagery (Sentinel, Landsat, MODIS, PlanetScope) and is grounded in close collaboration with NASA and national laboratory partners toward societally relevant Earth science.

## TIMELINE

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### Postdoctoral Research Associate

April 2024 – Current

Atmospheric, Climate, and Earth Sciences Division

Pacific Northwest National Laboratory, Richland, WA

*Research: Improving urban representation in climate models using satellite data*

PI: Dr. TC Chakraborty

### Postdoctoral Research Associate I

June 2021 – April 2024

School of Geography, Development, and Environment

The University of Arizona, Tucson, Arizona, USA

*Research: Mapping and Monitoring of Surface Water, Flooding, and Informal Infrastructure using Satellite Remote Sensing and Machine Learning*

PI: Dr. Beth Tellman

### Ph.D. in Geography

July 2016 – December 2020

The Ohio State University, Columbus, OH, USA

*Dissertation: "Improving Satellite Data Quality and Availability: A Deep Learning Approach"*

Advisor: Dr. Desheng Liu

### Programmer Analyst

October 2013 – June 2015

Cognizant Technology Solutions, Kolkata, West Bengal, India

*Duties: Designing and Developing Software based on Client Requirements.*

### M.Sc. in Geo-Informatics

July 2011 – June 2013

Birla Institute of Technology, Mesra, Jharkhand, India

*Thesis: "Extraction of Impervious Features through Artificial Neural Network Using Spectral Indices"*

Advisor: Dr. Nilanchal Patel

**PUBLICATIONS**

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- Diana W. Githu, Zack Guido, Erica A. Goto, Corrie Hannah, James Kamunge, Eligah Mutanda, Tim J. Finan, Padraic Finan, Karyn M. Fox, Suzanne Nelson, Prashanti Sharma, & **Rohit Mukherjee**. (2026). Humanitarian assistance and its expected behavior and land use changes: Insights from Bangladesh and Kenya. *International Journal of Disaster Risk Reduction*, 106036.
- **Mukherjee, Rohit**, & Chakraborty, T. C. (In Review). Background climate and socioeconomic conditions constrain global urban–rural contrasts in vegetation amount, subtype, and structure. *PNAS*.
- **Mukherjee, Rohit** et al. (2024). Globally sampled high-resolution hand-labeled validation dataset for surface water extent maps. *Earth System Science Data*. DOI link.
- Zhang, Zhijie, Giezendanner, Jonathan, **Mukherjee, Rohit**, Tellman, Beth, Melancon, Alexander, Purri, Matt, Gurung, Iksha, Lall, Upmanu, Barnard, Kobus, & Molthan, Andrew. (2025). Assessing inundation semantic segmentation models trained on high-versus low-resolution labels using FloodPlanet, a manually labeled multi-sourced high-resolution flood dataset. *Journal of Remote Sensing*, 5, 0575.
- Magliocca, Nicholas R., Sink, Carter D., Devine, Jennifer A., Fagan, Matthew E., Aguilar-Gonzalez, Bernardo, McSweeney, Kendra, **Mukherjee, Rohit**, Nielsen, Erik A., Sesnie, Steven E., & Tellman, Beth. (2025). A data pedigree system to support geospatial analyses of human-environment interactions in data poor contexts. *International Journal of Geographical Information Science*, 39(6), 1223–1246.
- **Mukherjee, Rohit**, Policelli, Frederick, Wang, Ruixue, Arellano-Thompson, Elise, Tellman, Beth, Sharma, Prashanti, Zhang, Zhijie, & Giezendanner, Jonathan. (2024). A globally sampled high-resolution hand-labeled validation dataset for evaluating surface water extent maps. *Earth System Science Data*, 16(9), 4311–4323.
- **Mukherjee, Rohit**, & Liu, Desheng. (2023). Spatial and spectral translation of Landsat 8 to Sentinel-2 using conditional generative adversarial networks. *Remote Sensing*, 15(23), 5502.
- Giezendanner, Jonathan, **Mukherjee, Rohit**, Purri, Matthew, Thomas, Mitchell, Mauerman, Max, Islam, AKML, & Tellman, Beth. (2023). Inferring the past: A combined CNN-LSTM deep learning framework to fuse satellites for historical inundation mapping. *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*, 2155–2165.
- **Mukherjee, Rohit**, & Liu, Desheng. (2021). Downscaling MODIS spectral bands using deep learning. *GIScience & Remote Sensing*, 58(8), 1300–1315.
- Patel, Nilanchal, & **Mukherjee, Rohit**. (2015). Extraction of impervious features from spectral indices using artificial neural network. *Arabian Journal of Geosciences*, 8(6), 3729–3741.

**GRANTS AND FUNDING**

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- Co-wrote a successful proposal – "Enhancing the Evidence for Humanitarian Action (EEHA) in the Face of Climate Change" – funded by USAID's Bureau for Humanitarian Assistance (BHA). **Total award: \$1,000,000.**

- Collaborated on three internal grants at PNNL (**\$55,000 funded**; two additional proposals awaiting decisions).

## WORKSHOPS, CONFERENCES, AND TALKS

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### *Workshops*

- Geospatial AI/ML at ACES, PNNL
- AI Tool Use for Research at ACES, PNNL

### *Recent Presentations*

- Weak Labels, Strong Learning, PNNL TechFest 2025.
- Global urban–rural contrasts in vegetation structure and dynamics modulated by background climate, American Association of Geographers Annual Meeting (2025).
- Global Satellite Analysis Reveals Higher Local Flooding Tendency in Major Cities, AGU Fall Meeting (2024).
- Mapping Urban floods using multi-sensor satellite imagery and deep learning, IGARSS (2023), Pasadena. [Link to slides](#).
- Mapping urban floods using PlanetScope and deep learning, Machine Learning Meets Flood Forecasting Workshop by Google (2023), Virtual. [Link to poster](#).
- Towards Mapping Clandestine Infrastructure in Central America’s Protected Areas Affected By Narco-trafficking Using Multi-sensor Data Fusion and Deep Learning, CLAG (2023), Tucson, AZ. [Link to slides](#).

### *Invited Talks*

- Invited to talk on Mapping Clandestine Roads in Central America at the Machine Learning for Remote Sensing Talk Series (2022). [Link to slides](#).
- Invited to talk on Spatial and Spectral Harmonization between Landsat 8 and Sentinel-2 at Flood-Base (2021). [Link to slides](#).

## MENTORSHIP AND SUPERVISION

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Provided research mentorship and co-supervision to the following PhD candidates at the University of Arizona:

- Elise Arellano-Thompson (Ph.D. Candidate, University of Arizona)
- Ruixue Wang (Ph.D. Candidate, University of Arizona)
- Hannah Friedrich (Ph.D. Candidate, University of Arizona)
- Prashanti Sharma (Ph.D. Candidate, University of Arizona)

## ACADEMIC SERVICE

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- **Peer Reviewer** – *npj Climate and Atmospheric Science*; *ISPRS Journal of Photogrammetry and Remote Sensing*; *Water Security*.

- **NASA Peer Review Panel (2023)**: Invited to review multiple proposals for potential funding.
- **College of Arts and Sciences Dean's Student Advisory Board (2019–20)**: Provided feedback to the Dean of Arts and Sciences on graduate student issues and concerns.
- **Health, Wellness, and Safety Committee (2019–20)**
- **Delegate – Council of Graduate Students (2018–20)**
- **Judge – Career Development Grant (2019), Ray Travel Award (2018–19)**.
- **Geography Department Spring Panel Committee (2018)**: Organized a panel on Environmental Data Justice, involving professionals from the local community.

## PREVIOUS WORK EXPERIENCE

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### Teaching Assistant and Instructor

2016 – 2020

Ohio State University, Columbus, OH, USA

- Taught graduate and undergraduate courses including Fundamentals of GIS, Remote Sensing, Spatial Data Analysis, and Cartography; fully transitioned an in-person GIS course to online during COVID-19.
- Consistently received Student Evaluation of Instruction (SEIs) above department and university mean across classes of up to 144 students.

### Programmer Analyst

2013 – 2015

Cognizant Technology Solutions, Kolkata, India

- Developed a VBA script to automate data scraping from a DOS application for ESCROW, reducing manual data entry time by 85%.
- Constructed a website as an interface for ServiceNow ticket processing using C# and ASP.NET.

## PHD DISSERTATION

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### *“Improving Satellite Data Quality and Availability: A Deep Learning Approach”*

This research involved improving the quality (spatial, spectral resolutions) and availability (temporal resolution) of existing satellite image products using deep learning models. The study focused on utilizing techniques such as **deep residual encoder-decoder networks** and **generative adversarial networks** to enhance satellite images from sources like **MODIS**, **Sentinel-2**, and **Landsat 8**. The work aimed to advance **satellite image fusion methodologies** for various applications. Investigated several aspects of applying convolution networks and generative adversarial learning on satellite imagery, exploring questions on optimal loss functions, adversarial learning, and the advantages of fine-tuning on specific regions of interest. Keywords: MODIS, Sentinel-2, Landsat 8, deep residual encoder-decoder network, generative adversarial network, satellite image fusion. [Link to slides.](#)

## AWARDS AND ACHIEVEMENTS

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- **Lakshmanan Chatterjee Fellowship for Outstanding PhD Student** – Department of Geography, Ohio State University, 2019

- **First Place in Academics, M.Sc. Geo-Informatics** – Birla Institute of Technology, Mesra, India, 2011–2013

## FIELD WORK

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Travelled to Costa Rica as part of a NASA LCLUC grant to map informal roads and land use/land cover in May 2023. Collected training and validation data to evaluate and retrain road and land use/land cover classification models.

## TECHNICAL EXPERTISE

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- **Geospatial Technologies:** Google Earth Engine, rasterio, geopandas, GDAL, etc.
- **Machine Learning Tools:** PyTorch, Fastai, HuggingFace. Developed and trained U-Nets, SegFormers, GANs, and fine-tuned geospatial foundation models.
- **Large Language Models:** Basic training and fine-tuning of large language models.
- **Development Environments:** Visual Studio Code with Claude Code and ChatGPT; Jupyter Notebooks for exploratory analysis.
- **Computational Platforms:** Google Colab, HPC, Docker.
- **Image Annotation Tools:** Labelbox and NASA ImageLabeler.