Dr. Mounika Manne, Ph.D.

GIS & Water Resources Engineer

Ph.D. in Remote Sensing and GIS | M.E. in Irrigation and Water Management | B.Tech. in Civil Engineering

+91 94908 20114 | dr.mounika.manne@gmail.com

SUMMARY

Dr. Mounika Manne is a GIS and Water Resources Engineer with over 9 years of experience, specializing in remote sensing, GIS analysis, and ecological modeling. She holds a Ph.D. in Remote Sensing and GIS, with demonstrated expertise in satellite-derived data processing and analyzing ecosystem dynamics. Skilled in ecological modeling, she excels at investigating relationships between vegetation indices and ecosystem productivity. Dr. Manne is also proficient in statistical analysis, handling large datasets, and applying advanced geospatial techniques. Her strong Python coding skills enable her to automate workflows, perform spatial analysis, and develop custom geospatial solutions. She has successfully applied these skills to projects in watershed management, hydrological modeling, and environmental planning, leveraging tools such as ArcGIS, QGIS, and Google Earth Engine to deliver innovative environmental solutions.

AREAS OF INTEREST

- Application of Remote sensing and GIS in environmental management
- Water resources planning and management using Geo-spatial technologies
- Application of GIS in Transportation
- Watershed management using RS & GIS
- Hydrological modelling
- Flood analysis in 1D and 2D models

KEY SKILLS

Software		Programming Languages	Languages Known
• ArcGIS • QGIS • Google Earth Engine • SNAP • ENVI • ERDAS IMAGINE • AutoCAD	• PCSWMM • HEC-RAS • Power BI • STAAD/Pro • SAP2 • SPSS • STRUDS	• Python • MATLAB & R • C & C++ • SQL	• English • Hindi • Telugu

Communication: Sharing and presenting ideas in a way that is effortlessly comprehensible.

EMPLOYMENT RECORD & EDUCATION

Employment Record			
Sr. No.	**Period**	**Employer**	**Designation**
1	September 2022 to January 2023	Clear-water dynamics Pvt Ltd	GIS & Water Resources Engineer
2	From January 2016 to October 2024	BITS Pilani, Hyderabad Campus	Research Fellow
3	August 2015 to December 2015	CIET, Guntur, Andhra Pradesh	Assistant Professor

Education			
Sr. No.	**Degree Obtained**	**Name of Institute**	**Year**
1	Ph.D. in Remote Sensing and GIS	BITS – Pilani, Hyderabad Campus	**2016-2024**
2	M. E in Irrigation and Water Management	Maharaja Sayajirao University, Baroda	**2013-2015**
3	B. Tech - Civil Engineering	Chalapathi Institute of Engineering & Technology, Acharya Nagarjuna University	**2009-2013**

DETAILS OF WORKS/ASSIGNMENTS HANDLED

➢ **September 2022– January 2023: GIS & Water Resources Engineer, Clear Water Dynamics Pvt Ltd.**

Assignment Name	• GIS & Water Resources Engineer
Activities Performed:	❖ ORCHID NIRVANA 2.0 (Goyal & Co) project: (Completed) • **Watershed delineation** using digital elevation model (DEM) using **PCSWMM**. • Creation of hyetographs for a design storm of 50-year and 100-Year return period **rainfall** for the entire catchment to calculate **runoff** parameters. • **Flood analysis** for 50-year and 100-year design storms in **1D and 2D models using PCSWMM**. ❖ Jal Jeevan Mission (Government) project: (Ongoing) • **Surge analysis** for pipe networks of various villages using **SAP2.** • **Automation** of generating reports for n number of villages using **Python**. • **Bulk conversions** of Word and Excel files to PDF and merging PDF filesof each village at a time for n number of villages using **Python**. ❖ Digital water systems (US project): (ongoing) • Extraction of Rainfall and Temperature data using **Google Earth Engine (GEE).** • Creation of a dashboard using **Power BI.**

➢ January 2016 – October 2024: Ph.D. Research Scholar, BITS Pilani, Hyderabad Campus.

Assignment Name	• Investigations on **mangrove dynamics, phenology, and Gross Primary Productivity (GPP)** estimations using **satellite-derived parameters.**
Activities Performed:	• **Devised** a method for estimating metrics of mangrove **phenology** combining climatic factors and Satellite-derived vegetation index. • **Modelled** the **Gross Primary productivity (GPP)** of mangroves through **path analysis** using climate data and optical indices. • Downloading and pre-processing of SAR (Sentinel-1) and Optical(Sentinel-2 and Landsat) data. • Deriving SAR and Optical parameters using **SNAP** and **Google Earth Engine.** • Map making of wetlands using **ArcGIS** • Assisted in **GIS works** for contour mapping and **watershed management**. • **LULC classification** of wetlands of Sundarbans mangrove forest using **ERDAS** • Estimated the phenological parameters using harmonic analysis for the Pichavaram mangrove forest using **MATLAB** and **Google Earth Engine**. • Estimated Gross Primary Productivity (GPP) through **Process Models** of the mangrove species and validated it with the eddy covariance flux tower data.

➢ January 2016–December 2020: Teaching fellow, BITS Pilani, Hyderabad Campus.

Assignment Name	• Teaching Assistant
Activities Performed:	• Assisted in teaching undergraduate courses ranging in size from 70-80 students. Topics include **Water and wastewater treatment, Engineering Graphics,** and **Surveying**. • Prepared course material including laboratory experiments, exams, homework, and practice problems. • Led weekly laboratory, problem-solving, and discussion sessions for groups of 10-30 students at a time.

➢ August 2015 – December 2015: Assistant Professor, CIET, Guntur, Andhra Pradesh.

Assignment Name	• Assistant Professor
Activities Performed:	• Courses taught: **Fluid Mechanics**, **Engineering Graphics** and **Environmental Studies**. • Undertaken laboratory sessions: Fluid Mechanics. • Section coordinator in size ranging from 25 to 40 students. • Organized technical quizzes and career awareness events for undergraduate students.

EDUCATION AND QUALIFICATION

Ph.D. in Remote Sensing and GIS from Birla Institute of Technology and Science (BITS)-Pilani, Hyderabad (2016-24)

Research Title: **Investigations on mangrove dynamics, phenology, and Gross Primary Productivity (GPP) estimations using satellite-derived parameters.**

My Ph.D. research area comprised a comprehensive study of mangrove ecosystems which involved aiming at four critical objectives such as unraveling their spatial dynamics, phenological patterns, climate impacts, and productivity. As a first step, I applied landscape metrics techniques to discover spatial dynamics and find the areas of non-stationarity inside the protected mangrove habitat of Pichavaram, using satellite imagery to reveal their complex geometry. Following on, I invented a novel algorithm to estimate the phenological metrics, accounting for the climatic factors by using the satellite-derived vegetation indices in the analysis. The goal of this approach was to uncover the temporal patterns of mangrove growth, and the development of life cycle events at different ages, thus facilitating our understanding of mangrove phenology and its ecological implications. Along with that, I also determined spectral indices that are the most suitable for total Gross Primary Productivity (GPP) estimation by taking into account climatic factors and using path analysis methods to reveal their effects on GPP variability.

On the other hand, the research is used to improve the Vegetation Photosynthesis Model, estimating mangrove GPP, through the incorporation of phenology (seasonality) and PAR (photosynthetically active radiation) scales to improve the model performance. These interconnected goals were aimed at bridging the knowledge gap concerning mangrove ecosystems. This was made possible by the application of sophisticated remote sensing techniques and analytical methods that provided the scientific community with many new insights. These discoveries might be the key to guiding conservation strategies and ecological management methods that are specifically targeted to mangrove ecosystems and therefore contribute to the long-term preservation of these essential coastal areas.

M.E in Irrigation and Water Management from Maharaja Sayajirao University, Baroda with 66% aggregate (2013-15)

Dissertation Title: **Determination and Analysis of Missing Meteorological Data**

The rainfall data from 2001 to 2005 years was collected from the Limkheda rain gauge of the Panam catchment area. Five percent of rainfall data and ten percent of rainfall data have been hidden for evaluation of series mean, mean of nearby points, median of nearby points, linear interpolation, and linear trend at point methods in SPSS software. By using these five methods, hidden rainfall data was determined. As hidden values are known, analysis is done by determining the Root Mean Square Error (RMSE) so that the precision ofeach method can be studied. By observing the accuracy of each method in ten and five percent hidden missing data, the best method that is helpful for replacing the missing data was obtained.

B.Tech in Civil Engineering from CIET, Guntur, Andhra Pradesh with 82% aggregate (2009-13)

Major Project: **Design of residential apartment building by using STRUDS.**

A five-storied apartment was analyzed and designed by using STRUDS software. The design and corresponding reinforcement details of slabs, beams, columns, and footings are presented in the form of reports obtained from STRUDS software.

PUBLICATIONS/ ACHIEVEMENTS / HONOURS

- **Manne Mounika,** and Rajitha K. "***An inflection point-based method for estimating metrics of mangrove phenology combining climatic factors and Landsat NDVI time series***." *Journal of Water and Climate Change* (2024): jwc2024463. **https://doi.org/10.2166/wcc.2024.463**
- **Manne Mounika**, K. Rajitha, Supriyo Chakraborty, and Palingamoorthy Gnanamoorthy. "***A path analysis approach to model the gross primary productivity of mangroves using climate data and optical indices***." *Modeling Earth Systems and Environment* (2023): 1-14. **https://doi.org/10.1007/s40808-023-01783-6**
- Challagulla, Surya Prakash, Ashok Kumar Suluguru, Ehsan Noroozinejad Farsangi, and **Mounika Manne**. "*Application of metaheuristic algorithms in prediction of earthquake peak ground acceleration*." The Journal of Engineering 2023, no. 5 (2023): e12269. **https://doi.org/10.1049/tje2.12269**
- Bhavani, B. Durga, Surya Prakash Challagulla, Ehsan Noroozinejad Farsangi, Ismail Hossain, and **Mounika Manne**. "*Enhancing Seismic Design of Non-structural Components Implementing Artificial Intelligence Approach: Predicting Component Dynamic Amplification Factors*." International Journal of Engineering 36, no. 7 (2023): 1211-1218. **10.5829/IJE.2023.36.07A.02**
- **Institute Research Fellowship** by BITS-Pilani, Hyderabad during Doctoral Program (January 2016-July 2020)
- T.M.V. Suryanarayana, Mounika M, "**Determination and Analysis of Missing Rainfall Data**", In Proceedings of National Conference on Transportation and Water Resources Engineering (NCTWE – 2015), ISBN: 978-93-85056-39-0.
- Received **outstanding performance** in the four-year B. Tech degree in Civil Engineering certificate from 2009 to 2013 at CIET, Guntur
- Received **Certificate of Merit** for standing **First** in the technical paper presentation in the Civil Engineering Department held on September 15, 2011, CIET, Lam, Guntur.

TRAININGS & WORKSHOPS

- Workshop on **NISAR-SMAP training**, February 7-9, 2018 at SAC, Ahmadabad.
- Short Course on **Eddy Covariance and GHG Flux Estimation**, November 7-12, 2016 at Indian Institute of Tropical Meteorology (IITM), Pune.
- One day National Seminar on **Advances in Water Resources Engineering (AWARE-2015)**, September 26, 2015, at R.V.R. & J.C. College of Engineering and Indian Geotechnical Society, Guntur Chapter.
- Training course on **Fundamentals of Remote Sensing & GIS**, April 5-11, 2014 at The Maharaja Sayajirao University of Baroda and Indian Society of Geomatics, Vadodara Chapter.
- Attended National Environment Awareness Campaign 2013-2014 on **recycling and reuse of wastewater to preserve aquatic life**, March 16, 2014, at GSFC, Vadodara.
- Diploma in Civil CADD on **AutoCAD and STAAD/Pro,** June – August 2012 at CADD I TECHNOLOGIES.

PERSONAL DETAILS

DOB	:	28.04.1992
Gender	:	Female
Present Address	:	3B, Flat No:502, Kul Ecoloch, Nunde-Mahalunge Road, Mahalunge, Pune, Maharastra, 411045
Passport No.	:	M38538