

# Abhinav Wadhwa

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## Work Experience

Since 08/2023	Post-Doctoral Fellow, Discovery Partners Institute, University of Illinois Urbana Champaign, Supervisor: Dr. Ashish Sharma, Lead Climate and Sustainability
10/2021 - 07/2023	Research Associate, Indian Institute of Science (IISc), Bengaluru India, Supervisor: Prof. Pradeep P Mujumdar, Professor at IISc Bengaluru
07/2016 - 09/2021	PhD student and Research Assistant, Vellore Institute of Technology, Supervisor: Prof. K Pavan Kumar, Associate Professor at Madan Mohan Malaviya University of Technology, Gorakhpur

## Professional Community Services

**AGU Thriving Earth Exchange:** Community Scientist (Hydrologist) - Assessing Environmental Vulnerabilities in the City of Cicero, IL: An Environmental Justice Map, [🔗](#)

## Scientific Education

Jul 2016 – Sept 2021	DOCTOR OF PHILOSOPHY IN CIVIL ENGINEERING, Vellore Institute of Technology, Tamilnadu, India CGPA: 8.0/10 <b>Thesis:</b> A study on the impact of climate change and landuse change on the performance of storm control measures
Jun 2014 – May 2016	MASTER OF TECHNOLOGY IN CONSTRUCTION ENGINEERING AND MANAGEMENT SRM University, Chennai India CGPA: 9.7/10 <b>Research thesis:</b> An experimental investigation for comparison in strength of concrete with partial removal of charcoal powder and quarry dust with fine aggregates performance of storm control measures
Jul 2010 – May 2014	BACHELOR OF TECHNOLOGY IN CIVIL ENGINEERING Jaypee University of Information Technology, Solan India CGPA: 7.9/10 <b>Thesis:</b> Efficacy assessment of a storage tank and a water distribution system

## Honors and Awards

Most Downloaded Paper Award, Placed 2nd: Research article - Land use/land cover and land surface temperature analysis in Wayanad district, India, using satellite imagery <a href="#">🔗</a>	2021
Outstanding research performance award in Vellore Institute of Technology	2020
Travel funding from National Supercomputing Mission funded by the Department of Science and Technology (DST) and Ministry of Electronics and IT (MeitY)	2022

## Funding

NASA: Building resilient cities through next-generation flood intelligence; PI Ashish Sharma, Co-I Abhinav Wadhwa; Co-I Kuldip Kumar; Co-I Reza Khanbilvardi; \$1,000,000 (Under Review)

National Wildlife Federation: Quad Cities Ecological Corridors Mapping; PI Ashish Sharma, Co-PI: Abhinav Wadhwa; duration: 01/01/2025– 07/31/2025; \$30,000

Metropolitan Planning Council (MPC): Climate-driven Green Stormwater Infrastructure (GSI) tool adaptation

for Right Infrastructure Right; PI: Ashish Sharma, Co-PI: Abhinav Wadhwa; duration: 12/01/2024– 06/30/2027; \$100,000

National Wildlife Federation: QUAD Cities Climate Assessment; PI: Ashish Sharma, Co-PI: Abhinav Wadhwa, Facilitator: Sam Miller; Duration: 10/01/2023– 11/31/2023; \$30,000

Walder Foundation: Harnessing Biodiversity for Flood Protection: Green Twins to Enhance Ecosystem Resilience; PI: Abhinav Wadhwa, Supervisor: Ashish Sharma; Duration: 01/07/2025– 01/07/2028; \$267,000 (Under Review)

Government of Bihar: Review of the Flood Model for the Kosi Basin; PI: Pradeep P Mujumdar, Co-PI: Abhinav Wadhwa; Co-PI: Kennagatti Bhargav Kumar (Rs 18,00,000)

Divyasree developers Pvt. Ltd.: Review of Flood Control Measures at DivyaSree Developers, 77 Town Centre, Shaughnessy Road, Bengaluru; PI: Pradeep P Mujumdar, Co-PI: Abhinav Wadhwa; Co-PI: Kennagatti Bhargav Kumar duration: 04/2023 - 11/2023 (Rs 16,00,000)

## Publications and Reports

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1. Jessica A K, Thakur C., Balasubramanian A., Raju S R, Devaraj S., **Wadhwa A.\***, Gupta S., Seenipandi K., Jayaseelan S., Soundarajan A., Ahamed K., Centenary Patterns of Soil Erosion and Future Trends in Godavari River Basin: Insights into Climate-Driven Risks and Vegetation Dynamics. *Quaternary International (Decision Pending)*; Manuscript ID: QUATINT-D-25-00390
2. **Wadhwa, A.\***, Xia, X., Kumar N., Sharma A., Improvement in flood forecasting using GPU-accelerated Synxflow model compared to CPU-based traditional hydrodynamic models, *Natural Hazards (Under Review)* Mandal, D., Zou, L., & Wadhwa, A. (2025). Strengthening Resilience in 4D: Geospatial Digital Twins for Navigating Urban Flood Dynamics. *Abstracts of the ICA*, 10, 187 [🔗](#)
3. Devaraj S, Deepthi Bidare Phalanetra, Vishwanth Kotigaanahalli Nanjundegowda, Harikeerthan Mysore Keshava Rao, Supraja Irukumati, **Wadhwa A**, Loganathan P. An Event based Analysis of Extreme Rainfall and Historical Trend in Southern Tamil Nadu. *Scientific Reports* [🔗](#)
4. **Wadhwa A\***, Vohra K, Zholdubaeva E, Li P, Wu S, Bloss W, Sharma A. Integrating satellite data, modeling, and citizen science to derive critical insights into urban dynamics, *Springer Book Series*, 2025
5. Mandal D., Lee Z., **Wadhwa, A.**, Wilkho R., Cai Z., Zhou B., Ye X., Newman G., Gharaibeh N., Güneralp B., Sustainable Cities and Society FlowsDT: A Geospatial Digital Twin for Navigating Urban Flood Dynamics, *Sustainable Cities and Society (Under Review)* [🔗](#)
6. **Wadhwa, A.\***, Sharma, A.\* Li, P., Hamlet A. F., Li P., Nature-based solutions: an effective approach for flood mitigation and resilience in Quad Cities in future climate, *Hydrological Sciences Journal* [🔗](#)
7. **Wadhwa, A.\***, Pathak A., Struss N., Bagherzadeh M., Sharma, A., Harnessing Community Science to Address Flood Risks and Build Climate Resilience with Nature-based Solutions (NbS) - A case study from the Quad Cities region, *AGU Community Science (Accepted)*.
8. Lee J.\*, Park S. Y.\* **Wadhwa, A.\***, Packman A., Stephen W. N., Sharma A., Berkelhammer M., García M. H., Kotamarthi V. R., Hence D., Miller W., Triangulating Urban Flooding: Integrating Satellite, Simulated, and Citizen Science Data for Improved Monitoring, *Environmental Letters: Water*. [🔗](#)
9. Sharma, A., Li, P., **Wadhwa, A.**, Wu, S., Veiga, C. 2025. Chapter: Urban Science to Solutions: Bridging Knowledge and Practice for Sustainable Cities. *Pathways to Sustainability: Collaborative Solutions for a Resilient Future*. University of Illinois Press [🔗](#)
10. Sharma, A., Kumar, K., **Wadhwa, A.**, Mijic, A., Ignace, V., Negri. C., Marcus, F., Cherrier, J., Matthews, T., Deroubaix, J.F., Deutsch, JC., Juran, I. 2025. Advancing Urban Water Resilience: Co-Producing Knowledge Through Civic-Academic Global Partnerships on Water and Climate. *Bull. Am. Meteorol. Soc.*, [🔗](#)

11. Sharma, A., Kumar, K., Ignace, V., **Wadhwa, A.**, Marcus, F., Cherrier, J., Matthews, T., 2025. Report on the Megacity Alliance for Water and Climate Europe and North America Region (MAWAC-ENAR) Working Group — 2nd Water Research and Innovation Workshop. [\[2\]](#)
12. **Wadhwa A.**, Sharma A., Hamlet A. F., Li P. 2025. Effectiveness of nature-based solutions to reduce flooding in Quad Cities Metro Area (QCMA) using SWMM-HEC-based flood model, *Frontiers in Earth Science* [\[2\]](#).
13. Likhitha P., **Wadhwa A.**, Mujumdar, Pradeep P., Das Bhowmik R. 2025. A Coupled High-Resolution Forecasting Model for Urban Floods. *Urban Water Journal* (In Press).
14. Shaddick, G., Topping, D., Hales, T. C., Kadri, U., Patterson, J., Pickett, J., Petri, I., Taylor, S., Li, P., Sharma, A., Venkatkrishnan, V., **Wadhwa, A.**, Ding, J., Bowyer, R., & Rana, O.. Data Science and AI for Sustainable Futures: Opportunities and Challenges. *Sustainability*, 17(5). 2025; [\[2\]](#)
15. Mandal D., Wilkho R., **Wadhwa A.**, and Zou L. (2024). “Strengthening Resilience in 4D: Geospatial Digital Twins for Navigating Urban Flood Dynamics.” *Proceedings of the IGUIDE Forum* (Accepted)
16. Pathak A., Bagherzadeh M., Struss N., **Wadhwa A.**, Sharma A.. Navigating Climate Challenges in the Quad Cities: A Comprehensive Assessment and Paths to Resilience. 2024 April. [\[2\]](#)
17. Budamala V, **Wadhwa A**, Das Bhowmik R, Mahindrakar A, Satyaji Rao Yellamelli R, Kasiviswanathan K. Multi-temporal downscaling of daily to sub-daily streamflow for flash flood watersheds at ungauged stations using a hybrid framework. *Journal of Hydrology*. 2023; 625:130110. [\[2\]](#)
18. **Wadhwa A\***, Budamala V, Kummamuru P, Kasiviswanathan K, B S. Low-impact development (LID) control feasibility in a small-scale urban catchment for altered climate change scenarios. *Hydrological Sciences Journal*. 2023; 68(13):1881-1894. [\[2\]](#)
19. **Wadhwa A\***, Kummamuru P. A study on the effectiveness of percolation ponds as a stormwater harvesting alternative for a semi-urban catchment. *Journal of Water Supply: Research and Technology-Aqua*. 2021; 70(2):184-201. [\[2\]](#)
20. **Wadhwa A\***, Pavan Kumar K. Selection of best stormwater management alternative based on storm control measures (SCM) efficiency indices. *Water Policy*, 22(4):702-715. 2020; [\[2\]](#)
21. Devaraj S, Yarrakula K, Martha T, Murugesan G, Vaka D, Surampudi S, **Wadhwa A**, Loganathan P, Budamala V. Time series SAR interferometry approach for landslide identification in mountainous areas of Western Ghats, India. *Journal of Earth System Science*, 131(2). 2022; [\[2\]](#)
22. **Wadhwa A.**, B. Srimuruganandam and K. Pavan Kumar., 2022. Application of densely stacked satellite image classification and multinomial logistic regression analysis in predicting urban sprawl, In: John G Lyon (eds) *Geospatial Information Handbook for Water Resources and Watershed Management*, Volume 2, CRC Press, Routledge-Taylor and Francis, Boca Raton, USA. [\[2\]](#)
23. Budamala V., **Wadhwa A.**, Mahindrakar A. and B. Srimuruganandam., 2022. Temporal downscaling of daily to minute interval precipitation by emulator modelling based genetic optimization, In: John G Lyon (eds) *Geospatial Information Handbook for Water Resources and Watershed Management*, Volume 1, CRC Press, Routledge-Taylor and Francis, Boca Raton, [\[2\]](#)
24. John J, Bindu G, Srimuruganandam B, **Wadhwa A.**, Rajan P. Land use/land cover and land surface temperature analysis in Wayanad district, India, using satellite imagery. *Annals of GIS*, 26(4):343-360. 2020; [\[2\]](#)  
**Editor's award: Special award for most downloadable journal for 2020**
25. **Wadhwa A.\***, Kummamuru P. Analyzing Temporal Changes in an Urbanized Area Using Densely Staked Image Classification and Multinomial Logistic Regression (MLR) Technique. 2020; [\[2\]](#)
26. **Wadhwa A.\***, Santhi K., Kumar K.P., Jose J. Identify suitable classification algorithm for water pixel count extraction - A case study of puzhal lake. *Indian Journal of Ecology*, 45(4):697-703. 2018; [\[2\]](#)
27. **Wadhwa A.**, Thamilarasu V, Rajprasad K. An Experimental investigation on physical, chemical and mechanical properties of concrete blocks mixed partially with burnt coconut shell powder”, *International journal of Chemical Sciences*, 14(S1), 353-358, 2016; [\[2\]](#)

\*Corresponding author or Equal contribution

## Conferences

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- Hales T., Zhuo L., Liu A., Funk C., **Wadhwa A.**, Shaddick G., Panel discussion: Building Better Solutions for Climate-Induced Multi-Hazards in the Global South, SRI Congress at Chicago, 2025 [🔗](#).
- **Wadhwa A.**, Vega C., Sharma A, Building Flood-Resilient Cities: A Scientific Toolkit for Urban Planning Decisions, SRI Congress at Chicago, 2025 [🔗](#).
- **Wadhwa A.**, Sharma A, Hamlet AF, Nature-Based Solutions: An Effective Approach for Flood Mitigation and Resilience over Urban Areas, 105th AMS Annual Meeting, 2025. [🔗](#)
- Debayan M, Wilkho RS, **Wadhwa A.**, Zou L, Strengthening Resilience in 4D: Geospatial Digital Twins for Navigating Urban Flood Dynamics, I-GUIDE 2024, [🔗](#)
- Srivastava, S., Liu, L., **Wadhwa, A.**, Reghunath, G., Budamala, V., Dobson, B., Kumar Dasika, N., Mijic, A., Catchment Classification-Based Comparison of Hydrological Models to Inform Water Systems Analysis, EGU General Assembly 2024, Vienna, Austria, 14–19 Apr 2024, EGU24-3850, 2024. [🔗](#)
- **Wadhwa A.**, Ashish Sharma, Arsum Pathak, “Flood Control Alternatives for Rapidly Evolving UrbanLandscapes with a Focus on Low Impact Development (LID) Approaches”, AGU Fall Meeting, Chicago, Illinois, Dec 2023, [🔗](#)
- Gaddam N, Kishore N, **Wadhwa A.**, Pentakota L, High-Resolution Urban Rainfall and Flood Forecasts Using Improved Landuse Datasets in a Coupled Hydromet Model, AGU Fall Meeting, Chicago, Illinois, Dec 2023. [🔗](#)
- Budamala, V., **Wadhwa, A.**, and Bhowmik, R. D.: Multi-Temporal Downscaling of Streamflow for Un-gaugedStations/ Sub-Basins from Daily to Sub-Daily Interval Using Hybrid Framework – A Case Study on Flash Flood Watershed, EGU General Assembly 2023, Vienna, Austria, 24–28 Apr 2023, EGU23-1855, 2023. [🔗](#)
- Harini, V., **Wadhwa, A.**, and P. Mujumdar, P.: Impact of Spatio-Temporal Disaggregation of Rainfall on Hydrological Modelling, EGU General Assembly 2023, Vienna, Austria, 24–28 Apr 2023, EGU23-2705. [🔗](#)
- Kishan Rastogi, N., **Wadhwa, A.**, and P. Mujumdar, P.: Impact of Climate Change on Non-stationary IDF Curves for Urban Areas, EGU General Assembly 2023, Vienna, Austria, 24–28 Apr 2023, EGU23-2673. [🔗](#)
- Gaddam, N., **Wadhwa, A.**, Pentakota, L., Reghunath, G., and P Mujumdar, P.: Integration of the WRF Model with Fine-Scale Land Use Data to Simulate Extreme Rainfall Events, EGU General Assembly 2023, Vienna, Austria, 24–28 Apr 2023, EGU23-3183. [🔗](#)
- Gavali, P., Gavhale, S., Niyaz, M., Islam, S., kedia, S., Pokale, S., Dwivedi, A., Kadam, G., Kaginalkar, A., Khare,M., and **Wadhwa, A.**: Integrated Reservoir Operations using coupled Hydro-Met Multi-Model system for flood forecasting and mitigation for Pune, India, EGU General Assembly 2023, Vienna, Austria, 24–28 Apr 2023, EGU23-15342, [🔗](#).
- Likhitha P., **Wadhwa A.**, Avinash S., Gaddam N.: Low Impact Development (LID) as Flood Control Alternativesfor Rapidly Changing Urban Landscape, AGU Fall Meeting, Chicago, Illinois, Dec 2022. [🔗](#)
- Gaddam N; Avinash S, **Wadhwa A.**, Likhitha P, Mujumdar P: WRF- SWMM Coupled Model Performance Assessment with LCZ Classifications, Chicago, Illinois, Dec 2022. [🔗](#)
- Devaraj S, Yarrakula K, Johnny C, **Wadhwa A.**: Comparative analysis of INSAT-3D derived precipitation data with IMD data products over Indian Sub-continent, Sixth International Soil and Water Assessment Tool, Southeast and East Asia Conference. [🔗](#)
- **Wadhwa A.**, K Pavan Kumar, Generating intensity distribution frequency curves for Vellore under different climate change models, Innovative trends in hydrological and environmental systems (ITHES), National Institute of Technology, Warangal, 2021. [🔗](#)
- **Wadhwa A.**, K Pavan Kumar, Modelling runoff hydrograph from urbanized and pre-urbanized catchments using SWMM, XI World AQUA Congress 2017, Delhi. [🔗](#)

- **Wadhwa A.**, K Pavan Kumar, A Study on storm water management by Flow regime management: its advantages and limitations, Water Resources Management in Coastal Regions, held at National institute of Hydrology, Kakinada 2016. [🔗](#)

## Invited Talks

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Unveiling the Quad Cities Flood Map: A Tool for Climate Change and Community Resilience, Feb 19, 2025; [Recording](#) [🔗](#)

Chicago Water Week, Discovery Partners Institute Panel: The Future of Water Innovation , May 9, 2024; [🔗](#)

Navigating Climate Challenges in the Quad Cities, Apr 16, 2024; [🔗](#)

Metropolitan Water Reclamation District of Greater Chicago (MMWRD) Seminar series. Near to Real-Time Flood Forecasting: Towards Digital Twins at Urban Scales, Chicago, Oct 27, 2023 [🔗](#)

Public Input session on Quad cities climate vulnerability assessment, Oct 20, 2023 [🔗](#)

Introduction to urban flood modeling using physics derived models, CDD India Oct 2022

## Toolkits Developed

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Flood Risks on Fuel Stations for the State of Illinois [🔗](#)

Ecological Corridor Mapping of Bi-CAN Region [🔗](#)

The Chicago community area of Cicero [🔗](#)

Mapping flood reductions with nature-based solutions in QUAD cities [🔗](#)

HiTaB: Height mapping of Trees and Buildings for Chicago [🔗](#)

## Journal Review Activity

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Anthropocene, Journal of Hydrology, PLOS ONE, Natural Hazards, Discover Cities, Scientific Reports, Journal of Water and Climate Change

## News and Media Coverage

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KWQC News, New QC climate assessment report forecasts warmer, wetter future - Apr. 17, 2024; [🔗](#)

WQAD News 8, A new climate change report predicts warmer, wetter future for Quad Cities region. What solutions can lower the impact?; [🔗](#)

Dispatch Argus, Report says more flooding expected for Quad-Cities in future [🔗](#)

OurQuadCities, Editorial: Davenport's commitment to flood protection will pay off for generations, [🔗](#)

River Action, Read how climate change affects QC area [🔗](#)

Thegazette, Report: Quad Cities will be 'warmer and wetter' in future decades because of climate change, [🔗](#)

KLJB Fox18, Researchers find floods more likely in QCA [🔗](#)

## Advising Students/Interns

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Elima Zholdubaeva, Harper College

Caroline Feng, University of Illinois Urbana Champaign

Carissa Chen, Illinois Mathematics and Science Academy

Piyush Garg, Vellore Institute of Technology

## Professional Services

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Member, American Meteorological Society (2024-present)

Community Scientist, AGU Thriving Exchange for Cicero and Berwyn (2024-present)

Member, American Geophysical Union (2021-present)

Member, European Geophysical Union (2022-present)

## **Workshops and Training**

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Sathyabama Institute of Science and Technology - Strengthening Resilience: Geospatial Digital Twins for Navigating Urban Flood Dynamics; July 3, 2025 (Participants: 12)

DST and NSM - Monsoon School on Urban Floods; 07 – 12 Aug 2023 (Participants: 39)

ACIWRM, Bangalore - Training Program on Engineering Hydrology; 06 – 17 Feb 2023 (Participants: 25)

NWA - Advanced Technologies for Water Resources Management; 18 – 22 Apr 2022 (Participants: 25)

## **Miscellaneous**

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Coordinator, Technical Team, Civil Engineering Consortium, Department of Civil Engineering, Jaypee University of Information Technology, Solan.

Deputy Coordinator, Technical Team, Civil Engineering Consortium, Department of Civil Engineering, Jaypee University of Information Technology, Solan.

Member - Technical and Event Team, Civil Engineering Consortium, Department of Civil Engineering, Jaypee University of Information Technology, Solan.

Special recognition certificate from Civil Engineering Consortium, Department of Civil Engineering, Jaypee University of Information Technology.

In-Plant Training in NSL Tidong-1 hydroelectric power project, to study the design of Weir/barrage, headrace tunnel, surge shaft, pressure shaft, and powerhouse.

In-Plant Training in UHEL stage III, hydroelectric power project, to study the cascade inlet system, barrage, and spillway, transmission system, detailed design of HRT and TRT, GIS Mapping of streamline distribution.

In-Plant Training in Himachal Pradesh Power Corporation Ltd. to study the design of Intake Structures - design of stilling basin, calculation of coordinates, and hydrology of Sainj area.

## **Languages**

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Native speaker of English, Hindi, Punjabi and Kannada.