Shubham Tiwari

Senior Hydrologist at Environment Agency
Marie Curie Early Stage Researcher at Durham University

PhD, MS, Dryland Ecohydrolgy and Complex Network Theory
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▷ EDUCATION

- [2020 -2025] **PhD** - Early Stage Researcher in the Marie Skłodowska Curie ITN i-CONN project
  School of Geography, Durham University, Durham, UK.

  PhD project: "Patterns of connectivity in ecogeomorphic systems: land degradation in dryland ecosystems"
  Supervisors: **Dr. Laura Turnbull-Lloyd, Prof. John Wainwright**, Department of Geography, Durham University, UK

- [2014 -2019] **BS-MS** - Major in Earth and Environmental Sciences at the Indian Institute of Science Education and Research (IISER) Bhopal, India

  Master's thesis: "Reconstruction of daily rainfall data using network theory"
  Supervisor: **Dr. Sanjeev Kumar Jha**, Department of Earth and Environmental Sciences, IISER Bhopal

▷ RELEVANT EXPERIENCE

- [Jan 2024 -Present] **Senior Hydrologist**
  Environment Agency, UK

  - Lead hydrological assessments for flood risk and water resilience in chalk catchments.
  - Provide technical assurance and QA to ensure compliance with statutory standards.
  - Partner with Affinity Water on AMP8 WINEP delivery.
  - Produce monthly water situation reports for South East England, analysing 30+ hydrological datasets.

- [June 2020 - Dec 2023] **Early Stage Researcher**
  i-CONN project, Durham University, UK

  - Developed network-science models to quantify land-degradation in the southwestern United states.
  - Led technical work packages, tutored BSc students and presented results to international stakeholder.
  - Secondment: University of Arizona (dryland restoration), BOKU Vienna (aquatic habitat connectivity).

- [May 2019 - May 2020] **Junior Hydrologist**
  Science and Engineering Research Board, India

  - Developed rainfall–runoff models to enhance flood early warning systems for the Narmada river basin.
  - Delivered actionable recommendations adopted by government agencies for disaster risk reduction.

▷ SELECTED PUBLICATIONS

- **Tiwari, S.**, Turnbull, L., & Wainwright, J. (in preparation). Changes in the spatiotemporal patterns of daily rainfall in the United Kingdom between 1960 and 2019. Target journal: Hydrology and Earth System Sciences.

- **Tiwari, S.**, Turnbull, L., & Wainwright, J. (2025). From theory to action: Using connectivity to inform adaptive grazing in drylands. Submitted to Earth's Future.

- **Tiwari, S.** et. al. (2025). "The role of connectivity in Understanding grassland-shrubland regime shifts: impacts of aridity, grazing and wind dynamics", under review in Nature Communications.

- Ali, S. H.; **Tiwari, S.** et al. (2025). "Understanding patterns of soil erosion: a minimal model approach", under review in Nature Communications Earth & Environment.

- **Tiwari, S.** et. al. (2025). "Local- and global- scale hydrological and sediment connectivity over grassland and shrubland hillslopes", Journal of Hydrology, 655, 132896. link here

- **Tiwari, S.** et. al. (2024). "Water-controlled ecosystems as complex networks: Evaluation of network-based approaches to quantify patterns of connectivity", Ecohydrology, 17(7), e2690. link here

- Karittevlis, C., Papadopoulos, M., Lima, V., Orphanides, G.A., **Tiwari, S.**, Antonakakis, M., Papadopoulou Lesta, V., & Ioannides, A.A. (2024). First activity and interactions in thalamus and cortex using raw single-trial EEG and MEG elicited by somatosensory stimulation. Frontiers in Systems Neuroscience, 17, 1305022. link here

- Recinos, S **Tiwari, S.** et. al. (2023). "Multilayer Networks in Landscape Ecology: A Case Study to assess changes in aquatic habitat connectivity for flying and non-flying benthic macroinvertebrates in a Danube floodplain", under review in Landscape Ecology. link here

- Singh, A., **Tiwari, S.**, Jha, S. K. (2021). "Evaluation of quantitative precipitation forecast in five Indian river basins", Hydrological Sciences Journal, 66(15), p. 2216-2231. link here

- Vousta, V. and others (2021). "Two classes of functional connectivity in dynamical processes in networks", Journal of the Royal Society Interface, 18(183). link here

- **Tiwari, S.** et. al. (2020). "Quantification of node importance in rain gauge network: influence of temporal resolution and rain gauge density", Scientific Reports, 10 (1). p. 9761. link here

- **Tiwari, S.** et. al. (2019). "Reconstruction of daily rainfall data using the concepts of networks: accounting for spatial connections in neighborhood selection", Journal of Hydrology, 579. link here

▷ FELLOWSHIPS & DISTINCTIONS

- [Apr 2023] **British Geomorphological Society's** travel grant to attend "Low-Tech Riverscape Restoration Workshop" in Penrith, United Kingdom (accepted).

- [June 2022] **Best Start-Up Pitch Award** at the "PhD to Entrepreneur Competition" organised at Jacobs University in Bremen, Germany.

- [June 2020] **Marie Sklodowska Curie Actions doctoral scholarship** by European Union at Durham University, United Kingdom (accepted).

- [Apr 2020] Japanese Government **MEXT scholarship** to pursue doctoral research in Japan (declined).

- [May 2017] Nominated for the **Indian Youth Exchange program** to China in recognition of exceptional performance in both academics and sports.

- [2014 -2019] **INSPIRE Scholarship, Govt. of India:** merit-based national award during BS-MS at IISER Bhopal.

▷ TEACHING & SUPERVISION

- [Jan 2025 - present] Supervising two junior hydrologists at the Environment Agency; weekly mentoring on methods, analysis and reporting.

- [Jun 2024 - Aug 2024] Supervised an undergraduate summer research project.

- [Jun 2024] Delivered AI/ML training at Enviornment Agency, focused on practical applications in team workflows.

- [Sep 2023 -Dec 2023]   Graduate Tutor, GEOG2661: Climate Change: Geographical Perspectives.
- [Apr 2022]   Designed and delivered Using MATLAB for Data Science for the i-CONN PhD network (9 PhD students from multiple European countries).

▷ FIELD WORK

- High resolution land survey of a semiarid rangeland, Altar Valley, Arizona, United States
- Groundwater-flood emergence survey, source-spring surveys & spot flow gauging, Hertfordshire, UK
- Water sample collection for examining pharmaceutical pollutants, Aire Catchment, Leeds, UK
- Advanced limnology at WasserCluster Lunz, Austria
- ADCP measurements at the banks of Narmada River, India

▷ TECHNICAL SKILLS

- **Hydrological Analysis:** Statistical & ReFH methods, hydrograph separation, flood frequency analysis
- **Hydrological Modelling:** HEC-RAS, SWAT, CATCHMOD, MAHLERAN, VIC (NASA)
- **Geospatial Analysis:** ArcGIS Pro, QGIS, Google Earth Engine, LiDAR, terrain modelling
- **Programming:** Python, MATLAB, R (data processing, model automation, environmental data analysis)
- **Field Technologies:** UK Civil Aviation certified drone pilot, Terrestrial LiDAR, ADCP

▷ INVITED & CONTRIBUTED TALKS

- 08/2025 : *Gaps in rain-gauge network distribution across Hertfordshire and North London* in the **BHS Peter Wolf Symposium** at University of Liverpool, United Kingdom
- 08/2024 : *Evolution of the spatio-temporal pattern of daily rainfall over the UK* in the **British Hydrological Society (BHS) Annual Conference** at University of Oxford, United Kingdom
- 09/2023 : *Weighted networks as improved representations of connectivity* in the **British Society for Geomorphology (BSG) Annual Conference** at University of Edinburgh, United Kingdom
- 03/2023 : *Patterns of connectivity in ecogeomorphic systems* in the **Workshop: Exploring applications of Connectivity Science to understand, adapt to and manage complex systems** at Durham University, United Kingdom
- 01/2023 : *Complex-network metrics as early-warning signals of grass–shrub regime shifts* in the **PhD Seminar Series** at Durham University, United Kingdom
- 06/2022 : *Connectivity metrics as ecosystem-restoration measures* in the **Seminar Series** at Jacobs University Bremen, Germany
- 05/2022 : *Lightning talk: Understanding & Managing Connectivity* in the **British Society for Geomorphology specialist meeting** at United Kingdom
- 04/2022 : *Weighted directed networks to quantify hydrological and sediment connectivity on dryland hillslopes* in the **Advanced Course: Novel approaches to collecting high-resolution data in connectivity science** at Nicosia, Cyprus
- 02/2022 : *The role of critical nodes in ecogeomorphic systems* in the **Advanced Course: Connectivity in Environmental Science** at University of Vienna, Austria
- 10/2021 : *Ecological and geomorphic perspectives on water-mediated connectivity* in the **Institute of Hydrobiology and Aquatic Ecosystem Management Seminar** (BOKU) at Vienna, Austria
- 09/2021 : *Interdisciplinary connectivity: lessons so far* in the **Interdisciplinary Datathon (Centre International de Rencontres Mathématiques)** at Marseille, France
- 01/2020 : *Critical nodes in rain-gauge networks* in **The Fourth Paradigm: From Data to Discovery: Artificial Intelligence in Scientific Research** at IISER Bhopal, India

▷ COMMUNITY ENGAGEMENT & OUTREACH

- [Mar 2024 - Oct 2024]   EDI Committee Representative, British Geomorphological Society

- [Sep 2022] Peases West Primary School Outreach: "How to Become a Scientist" event

- [Apr 2021 - Sep 2021] ECO2 Schools Climate Conference Volunteer

▷ ADMINISTRATIVE DUTIES

- [Mar 2024 - Oct 2024] **ESR Representative** : Working Group "Creating transdisciplinary capacity and up-take of research outcomes" (Lead: Durham University); contributed to planning the final network conference (2023) and final project report write-up.

- [2024 - Present] **Member**, Environment Agency, National Hydrology Outreach Group.

- [2024 – Present] **Data Management Lead**, Environment Agency, Groundwater and Hydrology team.

- [2024] **Acting Team Manager (cover)**, Environment Agency, Groundwater and Hydrology team.

- [2017 - 2018] **Class Representative**, IISER Bhopal.

- [2017 - 2019] **Lawn Tennis Club Coordinator**, IISER Bhopal.

- [Ongoing] **Peer Reviewer** : Journal of Hydrology; Ecohydrology; Earth Surface Processes and Landforms.

Note: I have received extensive training in various aspects of a career in academia and industry through the i-CONN project, including workshops on academic writing, project management, lightning talks, entrepreneurship, dealing with media and conflict resolution. More information can be found here.