

Mohd Musahib

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Research Interests

Environmental biogeochemistry of groundwater systems under anthropogenic stress. Primary focus on contaminant fate and transport, redox-driven processes, and coupled water–sediment–microbe interactions relevant to public and environmental health. Experienced in integrating field observations, laboratory experimentation, and quantitative data analysis to understand subsurface controls on contaminant mobility and speciation.

Educational Qualifications

2023 - Present	M.S. (Environmental Engineering) at Indian Institute of Technology, Kanpur Department of Civil Engineering	(CGPA: 8.88/10)
2020 - 2022	M.Sc. (Applied Geology) at Indian Institute of Technology, Roorkee Department of Earth Sciences	(CGPA: 8.65/10)
2017 - 2020	B.Sc. Hons. (Geology) at Aligarh Muslim University, Aligarh Department of Geology	(CGPA: 8.24/10)

Research and Field Experience

M.S. Candidate, Indian Institute of Technology Kanpur

Thesis Topic: Physicochemical Parameters Driving Arsenic Mobilization in Groundwater Under Anthropogenic Influences

Advisor: Associate Prof. Abhas Singh

- Pursuing research on coupled surface–groundwater interactions and solid–water interfacial processes controlling arsenic speciation and mobility in aquifers under anthropogenic stress. Research involves temporal and spatial field surveys, advanced laboratory characterisation of waters and solids/colloids, and collaborative experimental work including batch, column, and flow-cell studies. Acquired experience with a broad suite of analytical tools and interdisciplinary collaboration across hydrogeology, stable isotopes, materials characterisation, and geoinformatics (GNSS survey). Interpreting groundwater geochemistry in relation to anthropogenic inputs (sanitation, polluted surface water infiltration, land use) and their implications for biogeochemical conditions relevant to the activity of gut microbes mobilising arsenic.

M.Sc. Candidate, Indian Institute of Technology Roorkee

Thesis Topic: Hydrochemical Characterization, Mechanisms of Mobilization, and Natural Background Level Assessment of Arsenic in Groundwater of Moradabad District, Upper Gangetic Plain, India

Advisor: Associate Prof. Nachiketa Rai

- Conducted field-based and laboratory investigations on arsenic occurrence and mobilisation in alluvial aquifers of the Upper Gangetic Plain. Designed and executed groundwater sampling campaigns and performed hydrochemical analyses using ICP-MS, ion chromatography, and titrimetric methods. Applied multivariate statistics and geochemical modelling to interpret large datasets and identify redox-driven contaminant release mechanisms and geochemical conditions influencing microbial processes in alluvial aquifers. This work resulted in a peer-reviewed publication in *Geochemistry*.

Geological Fieldwork Experience

M.Sc., Applied Geology: Worked as a geological field surveyor and sampler during two field campaigns

carried out as mandatory M.Sc. training in and around Rishikesh (Dec 2021) and the Dehradun–Mussoorie sector (Mar 2022), involving geological mapping, lithological characterization, structural observations, mineral identification and systematic sample collection.

B.Sc., Geology: Participated in a week long geological field training during my B.Sc. program in the Chittorgarh region, Rajasthan (Feb 2020). The training involved systematic geological mapping, stratigraphic logging, and identification of lithological units.

Publications

- M.U. Khan; N. Rai; M. Shahwaar; **M. Musahib**; A. Rahman (2024). *Understanding arsenic and manganese enrichment in the aquifers of the Ghaghara River basin, Middle Gangetic Plain, India: A multivariate statistical, compositional data analysis (CoDa), and receptor model approach*. **Journal of Geochemical Exploration**, GEXPLO-D-23-484. <https://doi.org/10.1016/j.gexplo.2024.107838>
- M.U. Khan; **M. Musahib**; N. Rai; R. Vishwakarma; A. Jahan (2023). *Hydrochemical characterization, mechanism of mobilization, and natural background level evaluation of arsenic in the aquifers of upper Gangetic plain, India*. **Geochemistry**, 125952. <https://doi.org/10.1016/j.chemer.2023.125952>
- **M. Musahib**; A. Singh; *Processes Controlling Arsenic Mobilization and Speciation in Mixed-Oxic State Aquifers Under Anthropogenic Influences*. [In Preparation]

Conference Presentations

- **M. Musahib**; A. Singh; (2025). *Physicochemical parameters driving arsenic mobilization in groundwater under anthropogenic influence*. Poster Presentation at International Conference on "Sustainability, Circularity, Outreach and Policy for Environment", IIT Kanpur, India. [Link to Abstract](#)
- **M. Musahib**; A. Singh; (2026). *Decadal Monitoring of Arsenic in Groundwater and its Implications on the Sustainability of Aquifers*. **Abstract accepted** for oral presentation at International Conference on "Desalination, Water Treatment and Management, Urban Water Planning, and Sustainable Development" and Annual Congress of InDA (InDacon – 2026), MNIT Jaipur, India.

Skills and Methods

Field and Laboratory Skills	Water and sediment sampling Low flow-cell sampling Grab sampling Passive sampling Batch, column and flow-cell experiments
Analytical Techniques	UV-Vis spectrophotometer IC Freeze Dryer Zeta Potential Analyzer TOC-L analyzer ICP-MS IC-ICP-MS XRD SEM-EDS
Modelling Software	Visual MINTEQ 4.0 Geochemist's Workbench Origin Software IBM SPSS Statistics MDI JADE Python (basic)
Communication Languages	Urdu Hindi (native) English (fluent)

Awards and Achievements

Nov 2025	Best Poster Presentation Award — International Conference on Sustainability, Circularity, Outreach and Policy for Environment, IIT Kanpur, India
2022 - 2023	Dr. A.P.J. Abdul Kalam Young Research Fellowship —TERRE Policy Centre
2021 - 2022	First Division with Distinction in Master of Science: IIT Roorkee
2020 - 2021	The Oil and Natural Gas Corporation (ONGC) Scholarship to Meritorious Students
2019 - 2020	First Division with Distinction in Bachelor of Science: AMU Aligarh
2017 - 2018	Faculty of Science University Merit Scholarship in Bachelor of Science: AMU, Aligarh

Standardized Tests

- Graduate Aptitude Test in Engineering (GATE) [Feb 2023]: Secured All India Rank 984
- CSIR-NET (Earth and Atmospheric Sciences) [June 2023]: Secured All India Rank 58
- CSIR-NET (Earth and Atmospheric Sciences) [June 2022]: Secured All India Rank 68
- IIT-Joint Admission test for Masters (Geology) [Feb 2020]: Secured All India Rank 59

Courses, Projects and Term Papers

Relevant Courses	Ecological and Biological Principles and Processes Environmental Quality and Pollution Monitoring Techniques Solid-Water Interfacial Processes Physicochemical Principles and Processes Surface Water Quality Modeling Subsurface Pollutant Fate and Transport Geochemistry Igneous Petrology and Geodynamics Advanced Geomorphology Sedimentology and Stratigraphy Numerical Methods for Civil Engineers Probability and Statistics for Civil Engineers (MS Courses details)
Term Papers	A critical review on the sorption behavior of arsenic species at the iron oxide–water interface using surface complexation models in Visual MINTEQ 4.0 (Jan–Apr 2024, Instructor: Dr. Abhas Singh) Modeling phosphorus dynamics in Shagawa Lake, Minnesota as a response to external load reductions and internal sediment loading (Jan–Apr 2025, Instructor: Dr. Abhas Singh) Health risk assessment of arsenic contamination in groundwater using Monte Carlo simulation technique (Sep–Nov 2024, Instructor: Prof. Mukesh Sharma)
Course Projects	Sampling and analysis of groundwater, river water, and wastewater treatment plant influent and effluent (Jan–Apr 2024, Instructor: Prof. Vinod Tare)

Online Courses/Certifications/Presentations

Aug - 2025	Attended HWTS Network India Chapter, 2 days Annual Learning Exchange Event themed on Water for Health, Equity, and Resilience : Scaling Up HWTS
Dec - 2024	Participated in 2 days webinar conducted by American Chemical Society on theme Navigating PhD and Beyond
2022 - 2023	Best presentation: Award for impactful research work in the field of Hydrogeology by TERRE Policy in the form of Dr. A.P.J. Abdul Kalam Young Research Fellowship
July - 2022	8 week online certification course by NPTEL on Remote Sensing and GIS

References

Prof. Abhas Singh | M.S. Thesis Supervisor

Associate Professor, Department of Civil Engineering, IIT Kanpur

Email: abhas@iitk.ac.in

Webpage: <https://www.iitk.ac.in/new/abhas-singh>

Prof. Nachiketa Rai | M.Sc. Thesis Supervisor

Associate Professor, Department of Earth Sciences, IIT Roorkee

Email: n.rai@es.iitr.ac.in

Webpage: <https://www.iitr.ac.in/ES/NachiketaRai>

Prof. Tarique Siddique | B.Sc. Fieldwork Mentor

Assistant Professor, Department of Geology, AMU Aligarh

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