Dr. Tinesh Pathania — Curriculum Vitae

Contact Information

Assistant Professor
Department of Environmental Science and Engineering
Indian Institute of Technology (Indian School of Mines) Dhanbad
Dhanbad, 826004, Jharkhand, India
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Research Interests

Surface Water Hydrology, Groundwater Hydrology, Hydrological Modeling, Groundwater Remediation, Simulation-Optimization Modeling, Artificial Intelligence, and Machine Learning

Education

Indian Institute of Technology Bombay, Mumbai, India
Department of Civil Engineering

PhD (July 2015 - Feb 2021)

- Thesis Title: Simulation-Optimization Models Based on Meshless Method and Metaheuristic Algorithms for In-situ Bioremediation of Groundwater Contamination
- Supervisor: Prof. T.I. Eldho
- CPI 10

Indian Institute of Technology Guwahati, Assam, India
Department of Civil Engineering

MTech, July 2013 - July 2015

- Thesis Title: Simulation of Advective-Dispersive Transport in a Porous Medium using the Operator Splitting Technique
- CPI 9.51

National Institute of Technology Hamirpur, Himachal Pradesh, India
Department of Civil Engineering

BTech, 2007 - 2011

- CGPI 8.15

Scholarships and Awards

Prof. U.C. Kothyari - ISH Best PhD Thesis Award 2021, The Indian Society for Hydraulics
Commonwealth Split-site PhD Scholarship 2017
PhD Scholarship from the Ministry of Education for 5 years
M.Tech. Scholarship from the Ministry of Education for 2 years

Research Experience

University of Manchester, Manchester, United Kingdom
Department of Mechanical, Aerospace and Civil Engineering

Postgraduate Research (PGR) Visiting Scholar, Sep 2017 - Sep 2018

- Supervisor: Dr. Andrea Bottacin-Busolin

Indian Institute of Technology Bombay, Mumbai, India
Department of Civil Engineering

Research Associate, Nov 2020 - Feb 2021

- Supervisor: Prof. T.I. Eldho

Professional Experience

Indian Institute of Technology (ISM) Dhanbad, Jharkhand, India
Assistant Professor, Department of Environmental Science and Engineering — **April, 2021 - Present**

National Institute of Technology Hamirpur, Himachal Pradesh, India
Lecturer (on contract), Civil Engineering Department — **August, 2012 - July, 2013**

Gammon India Limited, Mumbai, India

Civil Engineer **June, 2011 - August, 2012**

Software Skills MATLAB, Python, QGIS, LaTeX, and Groundwater Modeling System (GMS) Software (MODFLOW, MT3DMS, and RT3D)

Teaching

Undergraduate Courses

- ESI101: Environmental Sciences
- ESD404/NESD403: Water Resource Planning and Management
- ESC251: Water Pollution Practical

Postgraduate Courses

- NESC508: Numerical Methods for Environmental Application
- NESD502: Groundwater Flow and Contaminant Transport Modelling
- NESC511: Environmental Computational Lab
- ESC503: MATLAB Programming for Numerical Computation
- ESD501: Environmental Geology and Resource Management

Supervision

Indian Institute of Technology (ISM) Dhanbad

PhD (Ongoing)

Supervisor

- **Kunwar Gaurav Singh** (22DR0109), Prime Minister Research Fellowship (PMRF)
- **Ankita Kumari** (23DR0024), Institute Fellowship
- **Anket Pathak** (23DR0223), Institute Fellowship
- **Manish Kumar** (24DR0299), Institute Fellowship
- **Swastika Saha** (24DR0310), Institute Fellowship
- **Amul Patwal** (24DP0123), Deputy Manager (Env), CMPDI Ranchi (Part Time PhD)

Co-Supervisor

- **Ravi Kumar Mishra** (22DR0275), ICCR Scholarship (International Scholar)
  Topic- Sustainable Sediment Mining
- **Arjita Deb** (24DR0040), Institute Fellowship

M.Tech (Completed)

Deepak Kumar (23MT0120)

- Thesis Title: Simulation-Optimization Modeling to Investigate the Release History of Heavy Metals Pollution in Groundwater Through Landfill Site at Jhiri, Ranchi, Jharkhand

Ishan Jee Dhruv (23MT0165)

- Thesis Title: Groundwater Modeling of Heavy Metal Pollution Near Non-Engineered Landfill Site at Jhiri, Ranchi, Jharkhand

Gaurav Dumoga (22MT0135)

- Thesis Title: Estimating the Spatio-Temporal Variation in the Groundwater Table of Damodar River Basin using Coupled SWAT-MODFLOW Model

Sahil Tomar (22MT0309)

- Thesis Title: Identification of Groundwater Depletion Areas in Ganga River Basin using GRACE Satellite Data

Devvrat Yadav (21MT0134)

- Thesis Title: Aquifer Vulnerability to Fluoride Contamination by Coupling the GIS Based DRASTIC Model and Machine Learning Algorithm

Naved Hasan (21MT0241)

- Thesis Title: Modelling of Groundwater Contamination Caused by Pharmaceutical Waste in Musi River, Hyderabad

B.Tech: Guided 9 Students

Affiliations

Life Member, Indian Society of Hydraulics (ISH)
Life Member, Association of Global Groundwater Scientists (AGGS)
Life Member, Indian Water Resources Society (IWRS)

Administrative Roles

Current Positions

- Departmental Under Graduate Committee (DUGC) Member
- Library Advisory Committee (LAC) Member, ESE Department
- Warden, Aquamarine Hostel
- Vice-President, Society of Environmental Science and Engineering (SESE)
- Timetable Coordinator, ESE Department

Past Positions

- Departmental Faculty Screening Committee (DFSC) Member
- Reporting Centre (RC) Officer, Joint Seat Allocation Authority (JoSAA, 2021)

Editorial & Reviewer Activities

Guest Editor of the Special Issue on *Meshless Methods and Its Applications in Porous Media Problems* in the Journal of ***Computer Modeling in Engineering & Sciences***, Tech Science Press.

Manuscript Reviewer: Journal of Hydrology, Software X, Earth Surface Processes and Landforms, Journal of Earth System Science, Journal of The Institution of Engineers (India): Series A (IEIA).

Journal Publications

Kunwar Gaurav Singh and **Tinesh Pathania**. Development and Real Field Application of Meshless Generalized Finite Difference Method for Unconfined Groundwater Flow Modelling. ***Mathematics and Computers in Simulation***.

Tinesh Pathania (2025). BIOEFGM II: Two-dimensional meshless model to simulate the aerobic and anaerobic biodegradation of BTEX contaminant through multiple electron acceptors in groundwater. ***Engineering Analysis with Boundary Elements***, 171,106089.

Ravi Kumar Mishra, Bandita Barman and **Tinesh Pathania** (2024). Three-dimensional modeling of hydromorphodynamic characteristics of mining affected alluvial channel using TELEMAC and GAIA. ***Physics of Fluids***, 36(10).

Ganaraj Dalal, **Tinesh Pathania**, Akash Koppa and Vittal Hari (2024). Drivers and mechanisms of heatwaves in South West India. ***Climate Dynamics***, 1-15.

Tinesh Pathania, Andrea Bottacin-Busolin and T.I. Eldho (2023). Evaluating the effect of aquifer heterogeneity on multiobjective optimization of in-situ groundwater bioremediation. ***Engineering Analysis with Boundary Elements***, 148:336-350.

Tinesh Pathania, T.I. Eldho and Andrea Bottacin-Busolin (2020). Optimal design of in-situ bioremediation system using the meshless element-free Galerkin method and particle swarm optimization. ***Advances in Water Resources***,144:103707.

Tinesh Pathania, T.I. Eldho and Andrea Bottacin-Busolin (2020). Coupled simulation of groundwater flow and multispecies reactive transport in an unconfined aquifer using the element-free Galerkin method. ***Engineering Analysis with Boundary Elements***, 121:31–49.

Tinesh Pathania and T.I. Eldho (2020). A moving least squares based meshless element-free Galerkin method for the coupled simulation of groundwater flow and contaminant transport in an aquifer. ***Water Resources Management***, 34: 4773–4794.

Tinesh Pathania, Andrea Bottacin-Busolin, A.K. Rastogi and T.I. Eldho (2019). Simulation of groundwater flow in an unconfined sloping aquifer using the element-free Galerkin method. ***Water Resources Management***, 33: 2827-2845.

Book Chapters

Tinesh Pathania and T.I. Eldho (2023). Groundwater Flow Modeling in a Heterogeneous Porous Medium Using Meshless Method. In: Timbadiya, P.V., Patel, P.L., Singh, V.P., Sharma, P.J. (eds) Hydrology and

Hydrologic Modelling. HYDRO 2021. Lecture Notes in Civil Engineering, Vol 312. Springer, Singapore.

Conference Papers

Kunwar Gaurav Singh and Tinesh Pathania (2025). Optimization of groundwater pumping rates using meshless simulation-based optimization model. *EGU General Assembly 2025*, 27 April–2 May 2025.

Kunwar Gaurav Singh and Tinesh Pathania (2024). Modeling groundwater flow in a confined aquifer by using a strong-form meshless method. *HYDRO International Conference 2024*, 18–20 December 2024.

Ravi Kumar Mishra, Bandita Barman and Tinesh Pathania (2024). Estimating bathymetry of a mining affected straight alluvial Channel. *HYDRO International Conference 2024*, 18–20 December 2024.

Tinesh Pathania and T.I. Eldho (2022). Effect of hydraulic gradient on the optimal cost of in-situ groundwater bioremediation. *EGU General Assembly 2022*, 23–27 May 2022.

Tinesh Pathania, T.I. Eldho and Andrea Bottacin-Busolin (2021). Effect of soil heterogeneity on the optimal design of in-situ groundwater bioremediation systems. *EGU General Assembly 2021*, online, 19–30 April 2021.

Tinesh Pathania and T.I. Eldho (2021). Groundwater flow modeling in a heterogeneous porous medium using meshless method. *HYDRO International Conference 2021*, online, 23–25 December 2021.

Tinesh Pathania and T.I. Eldho (2020). Optimal in-situ bioremediation system design for contaminated groundwater using meshless EFGM simulation and PSO. *World Environmental and Water Resources Congress, ASCE*.

Tinesh Pathania and T.I. Eldho (2019). Simulation of aerobic biodegradation of a hydrocarbon contaminant in the groundwater using the element-free Galerkin method. *ISH - HYDRO 2019 International Conference*. Osmania University, Hyderabad, India, 18-20 December 2019.

Tinesh Pathania and T.I. Eldho (2019). Meshless simulation of multispecies reactive transport in a porous medium using the element-free Galerkin method. *International Groundwater Conference (IGWC-2019)*. IIT Roorkee, Roorkee, India, 21-24 October 2019.

Tinesh Pathania, Andrea Bottacin-Busolin and A.K Rastogi (2018). Simulation of coupled groundwater flow and contaminant transport in a confined aquifer using the meshless element free Galerkin method. *EGU General Assembly*. Vienna, Austria, Vienna, 8-13 April 2018.

Tinesh Pathania and A.K Rastogi (2017). Groundwater flow simulation in confined aquifer by meshless element free Galerkin method. *10th World Congress of EWRA on Water Resources and Management*. Athens, Greece, 5-9 July 2017.

Tinesh Pathania (2016). Simulation of advective-dispersive transport in a porous medium using the operator splitting technique. *Sixth International Congress on Computational Mechanics and Simulation (ICCMS 2016)*. IIT Bombay, Mumbai, India, 27 June-1 July 2016.

Training Program

Organized a Three Days Hands-on Training Program on *Groundwater Flow and Contaminant Transport Modeling in GMS Software* for UG/PG students of IIT(ISM) Dhanbad, 7-9 June 2022.

Co-Organizing Committee Member in the Three Days Workshop on *Technological Advances in Hydrodynamic Modelling & Measurement: Application in Flood & Stream Flow Studies* organized by the Civil Engineering Department of IIT(ISM) Dhanbad during 3-5 April 2025.

Invited Lectures & Other Activities

Delivered a lecture on *Water and Energy Conservation* to the Officials of Damodar Valley Corporation (DVC), Panchet Dam, Panchet (2 June 2022).

Visited National Hydroelectric Power Corporation (NHPC), Prabati Hydroelectric Project, Kullu (H.P.) in Faculty Mobility Program of IIT(ISM) Dhanbad, 24-31 July 2022.

Participated in the HYDRO International Conference 2024 organized by the Central Water and Power Re-

search Station (CWPRS), Pune, 18–20 December 2024.

Delivered a lecture on *Multiobjective Optimization of In-situ Bioremediation of Groundwater Contamination* in a One-Day Seminar on Future of Bioremediation in Civil Engineering: Opportunities and Challenges organized by the Department of Civil Engineering, BIT Sindri, 1 February 2025.

Participated in the First UNCCRD (UN Convention for Conserving River Deltas) Delta Summit 2025 held at the Asian Institute of Technology, Thailand, on 17-20 March 2025.

R& D Projects

Simulation of Aerobic and Anaerobic Biodegradation of BTEX Hydrocarbons in Groundwater Using the Meshless Element-Free Galerkin Method. Sponsored by IIT(ISM) Dhanbad, Project Cost: Rs 13.54 Lakhs, Role: PI. (Completed, 2021-2024)

Impact of Climate Change on Vulnerable Aquifer Systems in and around Industrial and Mining Areas of Damodar River Basin (Eastern India) using GIS based Modified DRASTIC Model and Global Climate Model. Sponsored by the Department of Water Resources, River Development and Ganga Rejuvenation, Ministry of Jal Shakti, New Delhi. Project Cost: Rs 78.79 Lakhs, Role: Co-PI. (Ongoing, 2024-2027)

Consultancy

Environmental Audit of JSW Odisha Mines. Sponsored by JSW Steel Ltd, Mines Division, Odisha, Cost: Rs 20 Lakhs, Role: Co-CI.