

Dr. Monika Trivedi

Ph.D. (Mathematics). Applied Mathematics & Environmental Modelling

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Date of Birth: 1 October 1993

Nationality: Indian



EDUCATIONAL QUALIFICATIONS

Year	Degree	Institution / Board	Score
2021–2026	Ph.D. (Mathematics)	Harcourt Butler Technical University (HBTU), Kanpur	—
2018–2020	B.Ed.	Dayanand Women's Training College, Kanpur (C.S.J.M. University)	74.6%
2015–2017	M.Sc. (Mathematics)	Motilal Nehru National Institute of Technology, Prayagraj (MNNIT Prayagraj)	88%
2012–2015	B.Sc. (Mathematics)	P.P.N.P.G. Degree College, Kanpur (C.S.J.M. University)	69.9%
2011	Class XII	B.N.S.D. Shiksha Niketan Inter College, Kanpur (U.P. Board)	85.8%
2009	Class X	B.N.S.D. Shiksha Niketan Inter College, Kanpur (U.P. Board)	82.3%

DOCTORAL RESEARCH

Thesis Title: Modeling and Analysis of the Effects of Air Pollutants on the Survival of Biological Species

Supervisor: Prof. Ram Naresh Tripathi, Department of Mathematics, School of Basic and Applied Sciences

Institution: Harcourt Butler Technical University (HBTU), Kanpur, India

Status: Degree awarded, 2026

The thesis develops and analyses a nonlinear dynamical model describing the interaction between atmospheric pollutants and biological populations. It establishes conditions for existence, boundedness and local and global stability of equilibria, and applies optimal control theory to identify effective mitigation strategies, including pollutant removal, acid-rain impact on plant biomass, reforestation-based pollution control in industrial regions, and the effect of indoor air pollution on human populations.

RESEARCH INTERESTS

- Applied Mathematics; Nonlinear Dynamical Systems and Stability Analysis
- Environmental and Ecological Modelling; Air Pollution Modelling
- Optimal Control Theory; Population and Biological Systems
- Mathematical Epidemiology and Numerical Simulation of ODE Systems

PUBLICATIONS

Peer-Reviewed Journal Articles

- Trivedi, M., Sundar, S. and Tripathi, R. N. (2025). *Dynamic modeling of pollution control in industrial areas through reforestation strategies*. International Journal of Dynamics and Control (Springer), 13(6), 1–19. <https://doi.org/10.1007/s40435-025-01696-5>
- Trivedi, M., Sundar, S. and Tripathi, R. N. (2025). *A Mathematical Model to Unravel the Acid Rain Impact on the Growth of Plant Biomass*. Journal of Environmental Informatics Letters, 13(2), 83–94. <https://doi.org/10.3808/jeil.202400147>

3. Trivedi, M., Sundar, S., Tripathi, R. N. and Tripathi, A. (2025). *Stability Analysis of a Model to Study the Effect of Indoor Air Pollution on Human Population with Optimal Control*. In: Sahni, M. et al. (eds), *Mathematical Modeling, Computational Intelligence Techniques and Renewable Energy (MMCITRE 2024)*. Lecture Notes in Networks and Systems, vol. 1192, pp. 577–592. Springer, Singapore. https://doi.org/10.1007/978-981-96-1449-3_45
4. Trivedi, M., Tripathi, R. N. and Sundar, S. (2024). *Modeling the Removal by Rain of Two Interacting Gases Forming Distinct Particulate Matters in the Atmosphere*. In: Singh, J. et al. (eds), *Advances in Mathematical Modelling, Applied Analysis and Computation (ICMMAAC 2023)*. Lecture Notes in Networks and Systems, vol. 953, pp. 126–142. Springer, Cham. https://doi.org/10.1007/978-3-031-56304-1_8

TEACHING INTERESTS & COMPETENCE

Qualified to teach the following at undergraduate and postgraduate level:

- Real Analysis, Complex Analysis, Abstract Algebra, Linear Algebra
- Ordinary and Partial Differential Equations; Dynamical Systems
- Numerical Methods (MATLAB, R)
- Operations Research

Formal training in pedagogy through B.Ed. (2020), covering curriculum design, classroom management, assessment and evaluation.

TEACHING / RESEARCH EXPERIENCE

Assistant Professor of Mathematics (Contractual)- Harcourt Butler Technical University (HBTU, Kanpur)- August 2025- Present

Teaching Experience as a Research Scholar, Department of Mathematics, HBTU Kanpur (2021–2024)

Conducted lectures and laboratory sessions for undergraduate students during doctoral studies, covering:

- Operation Research
- R Programming
- Engineering Mathematics
- Laboratory: Numerical Methods
- Laboratory: R Programming

CONFERENCES, WORKSHOPS & PRESENTATIONS

Faculty Development Programmes & Workshops Attended

- One-week online Faculty Development Programme on “Challenges & Recent Trends in Mathematical Modelling and Scientific Computing”, Department of Mathematics, HBTU Kanpur, 18–22 December 2023
- One-day workshop on “Basic Concepts and Scientific Writing in LaTeX”, Department of Mathematics, HBTU Kanpur, 11 June 2024
- Two-day workshop on “Mathematical and Statistical Methods in Engineering, Science and Management”, Department of Mathematics, HBTU Kanpur, 7–8 July 2025

Webinars Attended

- “Applications of Mathematical Modelling in Sciences, Engineering and Technology”, Department of Mathematics, HBTU Kanpur, 9 October 2021
- “Python with Data Science”, IACSD, Pune, 21 January 2022
- Python Bootcamp, AVENIR Analytics Club, IES Management College and Research Centre, 29 March 2024
- “Water Sustainability – Indian Real Estate Scenario”, Trimurty Group in collaboration with TWSI and IGBC, 22 March 2025
- National Webinar on “Mastering Gunas: Effective Way to Self-Transformation During Covid-19”, Dayanand Women’s Training College, Kanpur, 18 May 2020

Student Organising Committee Roles, Department of Mathematics, HBTU Kanpur

- Four-day online Short-Term Training Programme on “Data Analysis with Python Libraries”, 25–26 & 29–30 October 2021
- Three-day online National Workshop on “R-Programming for Statistical Analysis”, 8–10 November 2021
- One-day online National Workshop on “Gender Sensitization & Prevention of Sexual Harassment at Workplace”, 12 November 2021
- Webinar on “The Contributions of Srinivasa Ramanujan to Mathematics”, National Mathematics Day, 22 December 2021

TECHNICAL SKILLS

Computational: MATLAB, R Programming

Typesetting & Productivity: LaTeX, MS Office (Word, Excel, PowerPoint)

Languages: English, Hindi