KAPIL KUMAR MEENA

PhD IIT Kharagpur | Master's IIT Roorkee
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Travel Behavior Researcher (Emerging Mobility · Discrete Choice Modeling · Sustainable Transitions) with a dual IIT pedigree. I specialize in decoding **behavioral dynamics** related to shared mobility, EV adoption, and the health impacts of transportation. Expert in applying **Hybrid Choice Models (Latent Variables)** and Machine Learning to large-scale travel datasets to evaluate how commuters respond to emerging technologies. My research focuses on bridging **econometric rigor** with **policy-driven solutions** for equitable and decarbonized urban mobility.

Education

Indian Institute of Technology Kharagpur — **West Bengal, India**
PhD in Infrastructure Design & Management — *2022–Present*
Focus: *Travel Behaviour, Micromobility Integration, and Urban Computing* | Advisor: Prof. Arkopal Goswami

Indian Institute of Technology Roorkee — **Uttarakhand, India**
M.Tech in Transportation Engineering — *2019–2021*
Thesis: *Commuter Exposure to Air Pollution* | Advisor: Prof. Amit Agarwal

Rajasthan Technical University — **Kota, India**
B.Tech in Civil Engineering (Honors) — *2015–2019*
Graduated with Honors | Top 5% of class

Research Deployment & Technical Systems

Routing Tool: **Lead Developer, DRUM Platform (Dynamic Routing for Urban Green Mobility):** Designed and deployed a web-based application offering eco-friendly route choices. Integrated **GraphHopper** and **Mapbox** APIs to calculate **Least Exposure to Air Pollution (LEAP)** and **Least Energy Consumption (LECR)** routes, achieving up to 53% exposure reduction in Delhi trials.

AI for Policy: **Hybrid Choice Modeling:** Developed a comparative framework integrating traditional Discrete Choice Models, Machine Learning, and Deep Learning. Addressed the limitations of linear utility functions by leveraging deep neural networks to capture non-linear behavioral heterogeneity in commuter decision-making.

Simulation: **MaaS Demand Simulation:** Led a demand forecasting study for Mobility-as-a-Service in India using **discrete choice experiments** and simulation (2022). Modeled multi-agent interactions to estimate mode shift potential under various pricing scenarios.

Vulnerability: **TUTEM Project (First/Last Mile):** Researcher for ADB-Funded "Technologies for Urban Transit". Led data-driven frameworks for integrating micromobility with public transit, focusing on safety and accessibility for vulnerable road users.

Data Viz: **Urban Visualization Dashboard:** Built a scalable **Streamlit Application** for real-time visualization of urban data, demonstrating capability in rapid data deployment for policy monitoring.

Technical Expertise

Programming & Web:	Python, React JS, Vercel, MongoDB, Git.
Geospatial Tech:	QGIS, Mapbox API, GraphHopper API, Spatial Data Mining.
Analytics & Viz:	Tableau, D3.js, Streamlit, Plotly, SPSS, Minitab.
Modeling & Tools:	Machine Learning, R, Discrete Choice (Biogeme, NLOGIT), VISSIM, LaTeX.

Media & Impact

Featured in The Hindu (June 2025): "IIT-KGP app helps commuters pick 'greener' routes on the road."
Feature article on the DRUM web application, highlighting its contribution to sustainable urban mobility and public health. [Read Full Article]

Experience

World Resources Institute (WRI) India **Remote**

Research Consultant | Electric Mobility *Nov 2021 – Mar 2022*

- Conducted comparative analysis of inhaled pollution dose for commuters (EV vs. ICE), contributing to data-driven policy frameworks.
- Developed recommendations for deploying electric mobility solutions in Tier-2 cities, bridging research and public sector implementation.

IIT Kharagpur & IIT Roorkee **India**

Teaching Assistant *2019–2023*

- **Courses:** Multimodal Urban Transport (NPTEL), Intersection Design (CEN 662), Engineering Drawing (CE13001).
- Mentored students in laboratory sessions, simulation tools (VISSIM), and geospatial analysis (QGIS).

Publications

Journal Articles

2026: **Meena, K. K.**, A.K. Goswami. "Not all travellers think alike: Segmenting travel behaviour under air pollution exposure using a hybrid latent class and discrete choice approach." *Transportation Research Record* (TRR). (In 2nd Review stage)

2025 (Submitted): **Meena, K. K.**, A.K. Goswami. "Beyond choice modelling: Bridging Econometric Theory and Deep Learning for Robust Mode Choice Prediction." *Transportation Research Part A: Policy and Practice*.

2025: **Meena, K. K.**, A.K. Singh, A.K. Goswami. "Dynamic Route Planning for Urban Green Mobility: Development of a Web Application Offering Sustainable Route Options to Commuters." *Transportation Research Record*. (Published May 2025) [DOI]

2025: B.S. Manoj, **Meena, K. K.**, H. Panchal, G. Sharma, A.K. Goswami. "Modeling bicycle choice behavior and its potential health impact: Case of first/last mile access to suburban rail." *International Journal of Sustainable Transportation*, pp. 1-21. (Published Oct 2025) [DOI]

2025: B.S. Manoj, **Meena, K. K.**, A.K. Goswami. "A prioritization framework to identify key attributes of transit-oriented development (TOD) using multi-criteria decision-making (MCDM) approach: an Indian context." *Sustainable Transport and Livability*, vol. 2. (Published Jul 2025) [DOI]

2024: **Meena, K. K.**, A.K. Goswami. "A review of air pollution exposure impacts on travel behaviour and way forward." *Transport Policy*, Elsevier. (Published Aug 2024) [DOI]

2024: **Meena, K. K.**, D. Bairwa, A. Agarwal. "A machine learning approach for unraveling the influence of air quality awareness on travel behavior." *Decision Analytics Journal*, vol. 11, 100459. Elsevier. (Published Jun 2024) [DOI]

2024: **Meena, K. K.**, R. Taneja, A. Agarwal. "Impact of air pollution on informed decision-making for choice of a travel mode." *16th International Conference on COMmunication Systems & NETworkS (COMSNETS)*. IEEE. [DOI]

2023: **Meena, K. K.**, V. Singh, A. Agarwal. "Perception of commuters towards air quality in Delhi." *Journal of Transport & Health*, vol. 31, 101643. Elsevier. (Published Jun 2023) [DOI]

2021: V. Singh, **Meena, K. K.**, A. Agarwal. "Travellers' exposure to air pollution: A systematic review and future directions." *Urban Climate*, vol. 38, 100901. Elsevier. (Published Jul 2021) [DOI]

Conference Proceedings (Refereed)

2026: **Meena, K. K.**, A.K. Goswami. "Not all travellers think alike: Segmenting travel behaviour under air pollution exposure." *Transportation Research Board (TRB) 2026 Annual Meeting*, Washington, DC.

2026: C. Gupta, A. Amitabh, **Meena, K. K.**, A.K. Goswami. "A Hybrid Geostatistical and Deep Learning Framework for Urban Pollutant Concentration Prediction from Sparse Data." *18th International Conference on COMmunication Systems & NETworkS (COMSNETS)*.

2026: A. Singh, **Meena, K. K.**, G. Sharma, A.K. Goswami, S. Mishra. "Developing an integrated walkability score using image-based feature extraction and user preferences." *Transportation Research Board (TRB) 2026 Annual Meeting*, Washington, DC.

2025: **Meena, K. K.**, A.K. Singh, A.K. Goswami. "Dynamic route planning for urban green mobility." *7th International Conference of Transportation Research Group of India (CTRG-2023)*, SVNIT Surat, India.

2025: A. Sumbhate, **Meena, K. K.**, A.K. Goswami. "Assessing the air pollution exposure to school children in different modes of transport while commuting to school: A case of Kharagpur, India." *Proceedings of the Eastern*

Asia Society for Transportation Studies (EASTS).

2025: B.S. Manoj, **Meena, K. K.**, A.K. Goswami. "A prioritization framework to identify key attributes of transit-oriented development (TOD)." *1st World Symposium on Sustainable Transport and Livability (WSSTL-2025)*, IISc Bengaluru.

2025: R. Kodukulla, **Meena, K. K.**, G. Sharma, A.K. Goswami. "Accessibility assessment of urban public transit to key facilities through spatial analysis a case study of Delhi." *Transportation Infrastructure Projects: Conception to Execution (TIPCE)*, IIT Roorkee.

2025: S. Dasgupta, **Meena, K. K.**, D. Majumdar, A.K. Goswami. "Air pollution exposure among Kolkata's auto-rickshaw drivers: Pm variability, health risks, and predictive modeling." *Energies, AEEE India*.

2024: A. Sumbhate, **Meena, K. K.**, A.K. Goswami. "Breathable modes to school: Assessing the air pollution exposure of travel choices for school children in urban environments." *52nd Urban Affairs Association (UAA) Annual Meeting*, Nashville, USA.

2024: P. Mohanty, **Meena, K. K.**, A.K. Goswami. "Analysing user behaviour along dedicated bicycle facilities in an urban environment." *52nd Urban Affairs Association (UAA) Annual Meeting*, Nashville, USA.

2024: B.S. Manoj, **Meena, K. K.**, H. Panchal, G. Sharma, A.K. Goswami. "Assessing the willingness to bicycle for the first mile to the Mumbai suburban rail." *17th International Association for Travel Behaviour Research (IATBR)*, Vienna, Austria.

2023: **Meena, K. K.**, A.K. Goswami. "A review of air pollution exposure impacts on travel behaviour and way forward." *16th World Conference on Transport Research (WCTR)*, Montréal, Canada.

2022: **Meena, K. K.**, R. Kumar, A.K. Goswami. "On-road pollution exposure in multiple transport micro-environments: A case study of tier-2 and tier-3 cities in India." *14th TPMDC*, IIT Bombay, India.

Patent

Patent (In Process): **Meena, K. K. and Arkopal Kishore Goswami. "Personalized dynamic route planning system for sustainable urban mobility."** (Filed 2025)

Leadership & Service

Session Chair: **Technical Session Chair**, Eastern Asia Society for Transportation Studies (EASTS) Conference, 2025.

Coordinator: **Overall Coordinator**, Annual Conference on Infrastructure (IBSR), IIT Kharagpur (2023 & 2024).

Reviewer: Transport Policy, Transportation Research Part A & D, Research in Transportation Business & Management (RTBM), Transport Research Record (SAGE), Transportation in Developing Economies.

Memberships: ASCE T&DI, TRG India, WCTR Society, IATBR.

Awards

- **Best Presentation Award**, Research Scholar Day, IIT Kharagpur.
- **Best Poster Presentation**, Cyber-Physical System Summit (CyPhySS 2023).
- **Institute Travel Grant**, awarded for presenting at the TRB Annual Meeting, Washington D.C., USA. and IATBR conference, Vienna
- **International Research Exchange Grant**, University of Leeds, UK.
- **GATE Qualified** (Rank 559), Civil Engineering, 2019.
- **MHRD Fellowship** for PhD Research.
- Winner at Regional level in National Children Science Congress (DST, Govt of India).

Referees

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