IST LAB ANNUAL REPORT 2024

CONVENOR: PROF. ASHISH VERMA,
DEPARTMENT OF CIVIL ENGINEERING,
INDIAN INSTITUTE OF SCIENCE (IISc),
BANGALORE-560012, KARNATAKA,
INDIA

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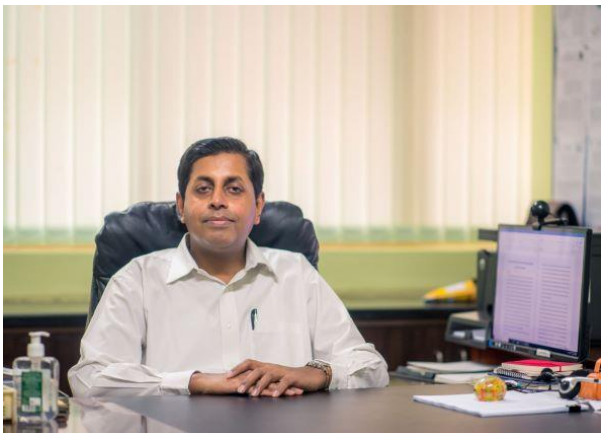

Dear IST Lab Collaborators and Members,

The year 2024 has been a remarkable journey of milestones and meaningful reflections for us. This year, we proudly celebrated 15 years since the establishment of the IISc Sustainable Transportation Lab, recognizing its impactful contributions to advancing sustainable transport and mobility.

This significant milestone aligns with 15 years of the Transportation Group within the Department of Civil Engineering, IISc. Adding to the celebrations, the department commemorates its 75th anniversary, making 2024 a truly momentous year.

As we reflect on the achievements and learnings of this remarkable year, I am delighted to share with you the IST Lab Annual Report. This report captures the highlights and progress made by our lab over the past year, serving as a testament to our collective efforts and dedication.

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INTRODUCTION

The IISc Sustainable Transportation Lab was constituted by Prof. (Dr.) Ashish Verma in the year 2009 when he joined IISc's Civil Engineering Department. Over the years, he changed the lab's identity to make it what it is today, a research group contributing to sustainable transport and mobility. With its alumni network spanning worldwide, the first-ever IST Lab Alumni Meet was organized on the 9th of January 2021, marking the inception of the IST Lab Alumni Group.

The IST Lab Alumni Group was created as a platform for information exchange and fostering potential collaborations among alumni and current lab members. Since its establishment, the group has organized various engaging activities, including panel discussions, webinars, and informal coffee catchups, fostering a strong sense of community.

Since 2021, the IST Lab Alumni Group has successfully conducted four alumni meetings. During these meetings, the current convenors update attendees on the achievements and milestones of the past year, and a new committee is elected. Each year, the IST Lab Alumni Group also prepares an annual report that details various activities and achievements of the IST Lab and its members, including research contributions, events, and accolades.

The IST Lab 2024 committee, comprising convenors Mr Ashutosh Dumka, Mr Saqib Gulzar, and lab coordinators Ms Almas Siddiqui and Ms Maneesha B., will see changes in 2025. The reconstituted committee for 2025 will include convenors Dr Ubaid Illahi and Mr Saransh Sahu, with Ms Ann Das as the lab coordinator.

15 YEARS OF IST LAB

Established in 2009, the IISc Sustainable Transportation Lab (IST Lab) has been a cornerstone of innovation and research in sustainable mobility. Over the years, the lab has earned acclaim for its groundbreaking contributions, such as studies on crowd risk behavior during the Kumbh Mela, collaborative projects like CLIMATRANS, and transformative initiatives like the pedestrianization of Church Street in Bengaluru. These endeavours have significantly advanced the discourse on sustainable urban mobility.

In 2024, the IISc Sustainable Transportation Lab (IST Lab) celebrated 15 years of impactful work with a commemorative event on July 3rd. Held at the Ramanujan-Newton Sabhagriha, ITES Centre, IISc Bengaluru, the program reflected on the lab's journey and its pivotal contributions to research and innovation in sustainable mobility. The event featured a poster session where researchers showcased the lab's achievements over the past 15 years, emphasizing its role in addressing urban mobility challenges. Panel discussions brought

together diverse stakeholders to exchange ideas and discuss the future of sustainable transportation. Informal networking opportunities throughout the day provided a platform for attendees to connect, share ideas, and foster collaboration. Dignitaries and stakeholders from the transportation sector, including representatives from KRIDE, Urban MORPH, WRI, and B-PAC, added significance to the occasion. Heartfelt testimonials from IST Lab alumni worldwide further enriched the celebration.

Moderated by Mr. Sathya Sankaran, the Bicycle Mayor of Bengaluru, the panel discussion explored the challenges and opportunities in transforming mobility research into actionable urban solutions. The session included rapporteurs Mr. Aitichya Chandra and Mr. Furqan Bhat and revolved around the following agenda points:

- The relevance of mobility research for actionable solutions in the Indian context.
- Addressing gaps in the current ecosystem to enhance stakeholder collaboration.
- Strategies to strengthen this ecosystem.
- Actionable steps for achieving measurable results within 2-3 years.

Key insights from the panel discussion include:

Democratizing Science: Promoting public understanding of science, especially among younger generations, is vital. This involves making scientific knowledge more accessible and fostering a culture of scientific literacy.

Effective Science Communication: Engaging and relatable communication is essential. Leveraging clear language, social media platforms, and compelling storytelling can bridge the gap between research and the public, inspiring greater interest and support.

Bridging the Research-to-Action Gap: A multi-faceted approach is needed to ensure research translates into real-world impact. This includes launching pilot projects, fostering active industry collaborations, involving users in the research process, and engaging policymakers at every stage.

Strengthening Collaborative Ecosystems: Creating a robust ecosystem around research is crucial. Establishing a dedicated research solutions group and nurturing partnerships with stakeholders and incubators can significantly enhance the development and implementation of sustainable mobility solutions.

IST Lab as a Data Hub: Envisioning IST Lab as a central repository for data-driven research, it can serve as a critical resource for developing actionable solutions that address urban mobility challenges effectively. The event concluded with lunch, allowing participants to network and discuss the day’s insights.

The celebration emphasized the lab's pivotal role as a research powerhouse, bridging the gap between academic research and practical solutions to make Indian cities more sustainable and livable. The discussions underscored the importance of collaboration, communication, and actionable research in addressing urban challenges.

IST Lab members at the celebrations

Attendees at the 15-year celebrations

Prof. Ashish Verma cutting the cake at the anniversary celebration

Prof. Ashish Verma explaining about IST Lab in the Inaugural Session

Poster Session and interaction

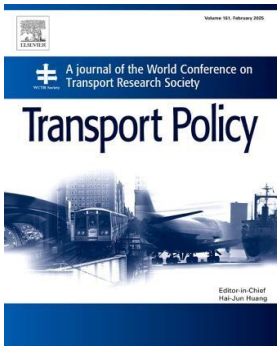
Roundtable session at the 15 years celebration

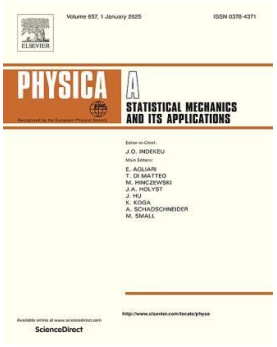
Testimonials of IST Lab alumni

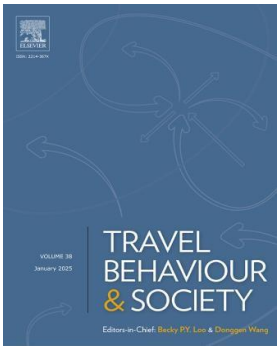
IST LAB. RESEARCH CONTRIBUTIONS

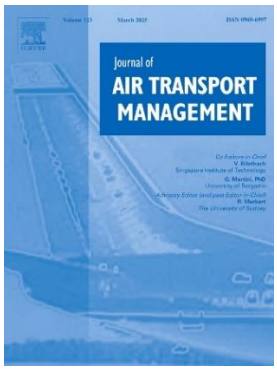
JOURNAL publications in 2024

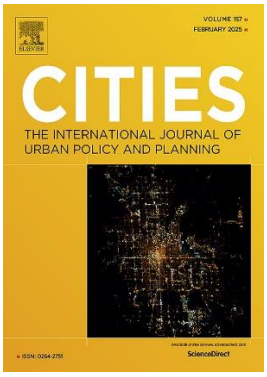
In 2024, as the IST Lab celebrates 15 years of impactful research, its members have published several notable papers in prestigious transportation journals. These include Transport Policy, Transportation Research Record, Physica A: Statistical Mechanics and Its Applications, Travel Behaviour and Society, Journal of Air Transport Research Society, Case Studies on Transport Policy, and Transportation Research Part D. These publications reflect the lab's comprehensive approach to addressing critical transportation challenges through innovative and interdisciplinary research. A full list of the lab's journal publications is available in the appendix.

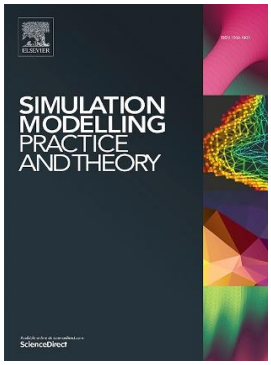


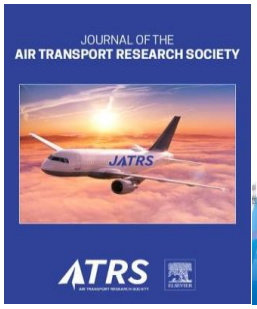






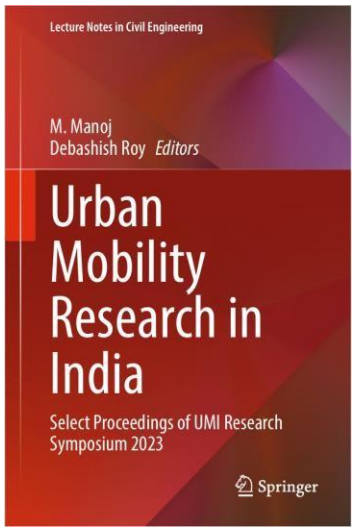






CONFERENCE/ SYMPOSIUM acceptance & participation in 2024

In 2024, IST Lab members made notable contributions to several prestigious national and international conferences, underscoring their dedication to advancing sustainable transportation research and fostering meaningful knowledge exchange within academic and professional communities. Over the course of the year, sevaral papers were presented, addressing diverse and critical topics in the field. Highlights include participation in the 17th International Conference on Travel Behavior Research (IATBR 2024) in Vienna, Austria; the Asia-Pacific Conference on Transport and Environment (APTE 2024) in Singapore; the World Symposium on Transport and Land Use Research (WSTLUR 2024) in Bogotá, Colombia; and Urban Mobility India (UMI 2024) in Gandhinagar, India. These conferences offered an invaluable platform for lab members to present their research, connect with global experts, and actively engage with the international transportation research community. A full list of the presented and published conference papers is included in the appendix.



Singapore 2024 13th APTE

17th Urban Mobility India Conference & Expo 2024

International Association for Travel Behaviour Research

WSTLUR 2024

IST LAB PhD GRADUATES

2024 has been a remarkable year academically for the IISc Sustainable Transportation Lab, as four of our members successfully defended their PhD theses and earned their well-deserved doctoral degrees. Their unwavering commitment, perseverance, and dedication to their research are evident in this outstanding achievement.

- **Dr. Karthika P S**

Ms. Karthika P S successfully defended her thesis titled “Investigating and Modelling the Microscopic Pedestrian Behavioural Dynamics in Mass Religious Gatherings” on April 5, 2024, at 11:30 AM. Her research delves into understanding pedestrian behaviour in crowded scenarios to improve safety and crowd management. She explored the impacts of geometry, flow conditions,

and sociodemographics through empirical studies, controlled experiments, and agent-based modelling. Congratulations, Dr. Karthika.

Prof. Ashish Verma felicitating Dr. Karthika P. S.

- **Dr. Furqan Bhat**

Mr. Furqan Ahmad Bhat successfully defended his thesis on the topic “Developing Decision Support for Electric Vehicle (EV) Adoption and Charging Infrastructure Planning” on September 12, 2024, at 11:30 AM. Through developing a comprehensive modelling framework, he explored the factors influencing electric vehicle adoption, including environmental enthusiasm, perceived benefits, and infrastructure readiness. He also proposed an optimization model for placing charging stations in Bangalore, aiming to support widespread EV adoption in India and other developing economies. Congratulations, Dr. Furqan!

Prof. Ashish Verma felicitating Dr. Furqan Bhat.

- **Dr. Aitichya Chandra**

Mr. Aitichya Chandra successfully defended his thesis titled “Analysis, Modelling, and Optimization of Gate-to-Gate Aircraft Operation for Enhanced Air Traffic Management” on September 26, 2024, at 4:00 PM. His research addresses the growing challenges of air traffic management (ATM) amidst increasing global and domestic aviation demand. He explored terminal airspace dynamics, departure and arrival scheduling, and enroute route management by developing data-driven frameworks, statistical models, and optimisation techniques. Congratulations, Dr. Aitichya!

Prof. Ashish Verma felicitating Dr. Aitichya Chandra

- **Dr. Hemanthini Allirani**

Ms Hemanthini Allirani successfully defended her thesis titled “Developing Frameworks for Evaluating Sustainable Transportation Measures in Terms of Quality of Life” on Monday, January 6th, 2025, at 11.30 AM. This thesis developed multi-dimensional frameworks to assess the impacts of sustainable transportation measures on Quality of Life (QOL) at local and network levels. Using pedestrianization in Bengaluru as a case study, it evaluates pedestrian service quality, air quality, and QOL outcomes, proposing tools like the Local QOL Index and Transportation QOL Index (TQOLI) to guide planners in implementing effective interventions. Congratulations, Dr. Hemanthini!

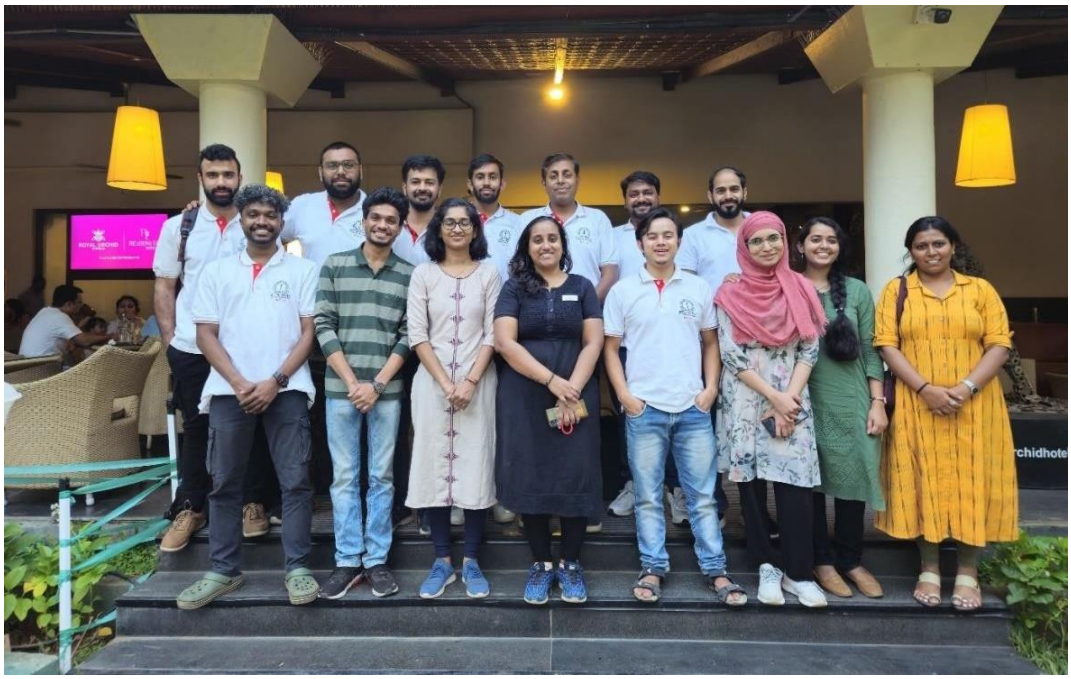
Prof. Ashish Verma felicitating Dr. Hemanthini Allirani

IST LAB ACTIVITIES IN 2024

With a focus on addressing critical challenges in mobility, resilience, and urban planning, the lab engaged in various activities, including impactful publications, active participation in global conferences, and collaborative projects in 2024. These endeavours reflect the lab's commitment to advancing knowledge, fostering interdisciplinary collaboration, and contributing to developing sustainable and equitable transportation systems.

- **Half-yearly review meeting of IST Lab**

The fourth half-yearly meeting of IST Lab was held on 27th April 2024 at the Royal Orchid Resort and Convention Centre in Bengaluru. These half-yearly retreats are integral to the lab's culture, fostering professional collaborations and personal friendships among members. The group, led by Prof. Ashish Verma and accompanied by Prof. Satyavati Komaragiri, Ambika, and other lab members, departed from the institute at 8:00 AM and arrived at the venue around 8:45 AM. After a refreshing breakfast, the members presented their research updates. Each technical session consisting of presentations from three or more members was followed by group bonding activities, including indoor games like air hockey, chess, and foosball games, as well as outdoor options such as archery, badminton, and a snake-and-ladder game. The second break featured group games, including dumb charades and Pictionary. The day concluded with a presentation by Prof. Satyavati Komaragiri, who shared insights about her work and background. After high tea, the group departed from the resort at 6:00 PM, marking the end of a productive and invigorating day.



Pictures from the fourth half-yearly review meeting at the Royal Orchid Convention Centre

- **IST Lab at IISc Open Day on 24th February 2024**

The IISc Open Day 2024 was a dynamic showcase of research and innovation, drawing thousands of visitors to the campus to explore the cutting-edge science and engineering work being conducted. IISc Sustainable Transportation Lab (IST Lab.), presented a wide range of activities and demonstrations focusing on addressing global transportation challenges with societal implications. The lab's exhibits covered topics such as climate mitigation, sustainable mobility, road safety, disaster resilience, and quality of life, all aimed at fostering a more sustainable and resilient future.

Simulation Work and Demonstrations: One of the major attractions was the simulation videos, which sparked significant interest. Visitors were keen to understand the data collection methods and the parameters involved in the Kumbh Mela Experiment (KME) simulations, particularly in crowd management and traffic congestion solutions.

Electric Vehicles (EV) and Infrastructure: Furqan's work on electric vehicles (EVs) demonstrated their vital role in sustainable urban mobility. His research, presented through detailed posters and discussions, focused on strategies for the optimal placement of EV charging stations and featured a live EV infrastructure dashboard. This tool, showcasing traffic patterns and grid capacity, was presented as a valuable resource for urban planners and policymakers in Bengaluru.

Kumbh Mela and Crowd Management Research: Alvin presented research from the Kumbh Mela experiment, which aimed to model crowd dynamics at one of the world's largest religious

gatherings. The project focused on developing crowd risk models and management strategies using various sensors like video cameras. The insights from this research were eagerly discussed by visitors, focusing on pedestrian movement patterns and the software tools used for analysis.

Air Traffic Management: Aitichya showcased India's first air traffic simulation software, the ATMA, which is designed to optimize air transport operations. His presentation highlighted the integration of real-time data processing through an ADS-B antenna-dump setup and explored how his research could enhance air traffic control and management.

Quality of Life (QoL) Research: Hemanthini's work on the relationship between sustainable transportation and quality of life was another key presentation. The study combined subjective and objective indicators and explored the impact of pedestrianization and sustainable transport measures on urban and regional quality of life. A public poll on transportation preferences revealed strong support for underground metro systems, with suggestions for improved mass transit and last-mile connectivity.

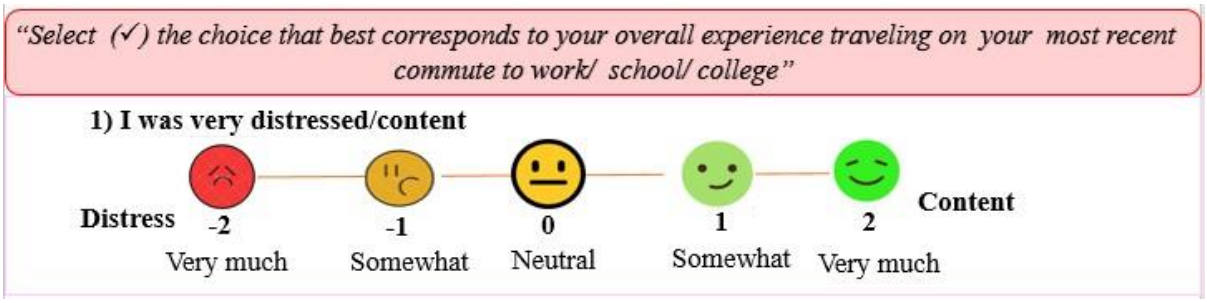
Punyabeet highlighted ITES's role in promoting EV infrastructure and clean air through pedestrianization projects like Church Street. His presentation also explored future innovations such as replacing lithium-ion batteries with alternative fuel cells.

Rohit's work on sustainable transportation and its connection to the United Nations' Sustainable Development Goals (SDGs) engaged the audience with insights into Bengaluru's transport emissions and flooding issues, offering solutions for sustainable mobility.

Road Safety and Vulnerable Road Users (VRUs): Harendra presented road safety research, emphasizing immediate safety measures such as seatbelt use, helmet wearing, and mobile phone avoidance. His work also addressed the safety of vulnerable road users (VRUs), utilizing advanced driver assistance systems (ADAS) to reduce accidents and improve safety.

Transport Resilience and Adaptation to Urban Flooding: Maneesha's presentation focused on the role of adaptive transportation policies in mitigating the effects of urban flooding in Bengaluru. Her research used travel demand modeling to evaluate adaptation policies and their impact on traffic metrics like vehicle kilometers traveled (VKT) and canceled trips. A social survey on community resilience during floods also contributed valuable insights into how society adapts to such events.

Travel Satisfaction Survey: Ms. Ann Das conducted a survey to explore how different transport modes impact commuters' mental health. The survey, available both online and offline, consisted of two parts: the first gathered socio-demographic and travel data, and the second assessed the emotional well-being of commuters using the Satisfaction with Travel Scale. A total of 205 respondents participated, providing valuable insights into travel-related quality of life.



Engagement Activities: To further engage the public, IST Lab. organized interactive activities such as the Transportation Bingo and a Traffic Scenario game. These games encouraged participants, including children, to learn about traffic signs, rules, and the importance of safe behavior on the roads. The Bingo game, which involved searching for keywords in the research posters, fostered deeper engagement with the lab's research and promoted active exploration of the ongoing projects. An interactive traffic game of "Roll and Travel" aimed to educate participants on traffic signs and sustainable transport. Modeled after "Snakes and Ladders," the game involved rolling a dice and moving along a mat with traffic signs, reinforcing the importance of road safety and eco-friendly transport. About 500-600 participants, particularly children, enjoyed the game, and gifts were awarded to encourage their involvement.

IST Lab pictures from Open Day 2024

- **World Symposium on Transport and Land Use Research (WSTLUR) 2024**

The World Society for Transport and Land Use Research is a society that promotes the understanding and analysis of the interdisciplinary interactions of transport and land use. The society organizes the world symposium on transport and land use research. In 2024, its fifth triennial symposium was organised in Bogotá, Colombia, from June 17th -20th, 2024. The WSTLUR-2024 International Conference brought together scholars and policymakers in transportation and land use research to share insights and ideas on how innovation and technology transform urban landscapes and transportation systems in our post-

Pandemic world. Ms. Almas Siddiqui presented her paper “Does Spatial Effects of Patterns of Road Network Influence their Connectivity?" co-authored by Veera Manikanda Prabhu and Prof. Ashish Verma.

Almas Siddiqui at the WSTLUR 2024 Conference at Bogota, Columbia

- **Asia Pacific Conference on Transport and Environment (APTE) 2024**

The 13th Asia-Pacific Conference on Transportation and the Environment (APTE), held from July 8-10, 2024, at the National University of Singapore (NUS), brought together experts and practitioners to discuss the intersection of transportation and environmental sustainability. Organized by the Centre for Transportation Research at NUS, in collaboration with the NUS Environmental Research Institute and the Energy Studies Institute, the conference covered a broad spectrum of topics. Key themes included the economic, social, and environmental challenges in transportation, the impact of climate change on land, sea, and air transport, and strategies for integrating sustainability into transport infrastructure design and construction. Additionally, the conference explored advancements in electric and autonomous vehicles, as well as intelligent transportation systems, sustainable freight transportation, and green technologies in the aviation and maritime sectors.

Three members from IST Lab presented at the conference this year on themes of safety and resilience:

- Almas Siddiqui
- Harendra Pratap Singh
- Maneesha B


From the Asia Pacific Conference on Transport and Environment

- **International Conference on Travel Behavior Research (IATBR) 2024**

The International Association for Travel Behaviour Research (IATBR) conference is a premier event that gathers experts worldwide to discuss the latest research and developments in travel behavior. The conference provides a platform for scholars, policymakers, and practitioners to explore various topics related to how various factors, including societal trends, technological advancements, environmental changes, and public policies shape travel patterns. The 17th IATBR (2024) conference from July 14th -18th at the University of Vienna focused on the challenges posed by post-pandemic travel behaviour changes and the urgent need for sustainable, climate-neutral cities. This year, Furqan Bhat represented IST Lab at the conference with his paper on “Electromobility in India: Unravelling the determinants of Electric Two-Wheeler Adoption in India using Discrete Choice Modelling Approach”. The paper looked at the crucial role of government interventions to usher in widespread adoption of electric vehicles in India.

From the IATBR Conference in Vienna, Austria

- **Urban Mobility India (UMI) 2024**

The 17th Urban Mobility India (UMI) Conference & Exhibition 2024 was held in Gandhinagar, Gujarat, from October 25th to 27th . Organized by the Institute of Urban Transport (India) under the Ministry of Housing and Urban Affairs, in collaboration with the Gujarat government and Gujarat Metro Rail Corporation Ltd., the event focused on the theme "Standardisation and Optimisation of Urban Transport Solutions." The UMI conference, a flagship initiative inspired by the National Urban Transport Policy (NUTP) of 2006, aims to enhance state and city-level capabilities in urban transport and promote sustainable transport systems. It provides a platform for policymakers, professionals, academia, and industry stakeholders to exchange ideas and explore best practices.

A key highlight of UMI is its Research Symposium, which recognizes cutting-edge research in urban transport conducted by young scholars. In 2024, three researchers from IISc showcased their work at the symposium.

- Rohit Singh Nitwal
- Harendra Pratap Singh
- Ann Das

A notable achievement at this year's UMI for IST Lab was the recognition of Ann Das and Harendra Pratap Singh, who received the prestigious Best Paper Awards for their contributions. The event successfully fostered knowledge exchange, collaboration, and the advancement of sustainable urban mobility solutions.

IST Lab members at Urban Mobility India Symposium 2024

- **Farewell to Manjula V, Commissioner, DULT (25th May 2024)**

The IST Lab and the Directorate of Urban Land Transport (DULT) have a long-standing history of fruitful collaborations, largely made possible by the initiatives of Mrs. Manjula V, Commissioner of DULT. To honour her upcoming retirement, members of the IST Lab, along with Prof. Ashish Verma, Prof. Meghna Verma, and Mr. Sathya Sankaran met with Mrs Manjula V on Saturday, May 25, 2024, for an intimate gathering to share experiences, followed by lunch. During the gathering, Prof. Ashish Verma, Prof. Meghna Verma and Mr. Sathya Sankaran shared heartfelt reflections on their work with Mrs. Manjula V and expressed their deep gratitude for her invaluable contributions.

IST Lab Members with Mrs.Manjula V., IAS and Mr.Sathya Sankaran

- **Active Mobility Centre of Excellence**

One of the major achievements of 2024 for the IISc Sustainable Transportation Lab (IST Lab) is the establishment of the Center of Excellence (CoE) for Active Mobility in collaboration with Urban Morph, Bengaluru. This strategic partnership formalized through a Memorandum of Understanding, aims to promote human-powered transportation modes such as walking and cycling to address urban transportation challenges, improve first/last-mile connectivity, and enhance overall city livability. The CoE will focus on creating inclusive, equitable mobility solutions, ensuring access for all genders, age groups, and abilities. It will serve as a hub for research, planning, capacity building, and collaboration among government bodies, academic institutions, industry, and civil society, contributing to health, transportation, and climate goals. This initiative marks a significant step toward sustainable and green urban mobility in Bengaluru and beyond.

As part of this initiative, a brainstorming session was organized on October 4, 2024, by the IISc Sustainable Transportation Lab (IST Lab) in collaboration with Urban Morph, Bengaluru. The session brought together a diverse group of stakeholders, including researchers, urban planners, government officials, and activists, to co-create the vision and mission of the CoE. Participants discussed key strategies to enhance walking and cycling infrastructure, promote sustainable mobility, and ensure equitable access for all segments of society.

The event also provided an opportunity to explore funding avenues, share insights, and collaborate on real-world implementation of active mobility solutions. This session played a crucial role in shaping the future direction of the CoE, driving collective efforts towards achieving sustainable transportation goals in Indian cities.

Brainstorming session for active mobility Centre of Excellence

- **Toyota Hackathon 2024**

Prof. Ashish Verma was invited as one of the jury members for the Toyota Hackathon 2024, an event focused on fostering new ideas and innovations in road safety within the Indian context. For one of the winning teams, Prof. Ashish Verma and his PhD student, Harendra Pratap Singh,

provided mentorship as Technical Support Partners for a period of three months. They guided the students to enhance their understanding of road safety and transportation research. The initiative was a collaborative effort involving stakeholders such as Toyota Kirloskar Motors Pvt Ltd, KPMG Assurance and Consulting Services, and Sparsha Trust.

Toyota Hackathon 2024

- **Capacity Building programme on Living Lab methodology**

As part of the Indo-German collaboration under the Green Urban Mobility Partnership (GUMP), the GUMILL and SUM-ACA projects organised a two-day capacity-building program. The program aimed to equip participants with the knowledge and skills to establish and manage Living Labs, focusing on sustainable, inclusive, and climate-friendly urban mobility. Delivered by global experts, including ENoLL, CERTH/HIT, and Deloitte India, the training emphasized the principles of the Living Lab approach and its role in implementing scalable mobility

innovations.

Held in two sessions, from 14th–15th October and 16th–17th October 2024, the program saw active participation from five IST Lab members:

- Hemanthini Allirani
- Rohit Singh Nitwal
- Almas Siddiqui
- Maneesha B
- Ann Das

From the capacity building programme on Living Lab methodology

- **Trialogue Days – Planetary Health**

Ms. Hemanthini Allirani participated in Trialogue Days—Planetary Health from Different Perspectives: Mind the Gap organized by Swissnex in India and the Consulate General of Switzerland at the Indian Institute of Science (IISc). This event brought together experts from India, Switzerland, and Uganda to develop unconventional and innovative solutions for the complex modern challenges stemming from environmental degradation.

Ms.Hemanthini at the Trialogue Days

- **World Symposium on Sustainable Transport and Livability**

The First World Symposium on Sustainable Transport and Livability was announced on 30th September 2024. Organized by the Special Interest Group (SIG-F4) of the World Conference on Transport Research Society (WCTRS) in collaboration with the Department of Civil Engineering at IISc. The IISc Sustainable Transportation Lab (IST Lab) will act as the secretariat for the event. The symposium will occur at the J N Tata Auditorium, Indian Institute of Science (IISc) from 25th to 27th June 2025. Designed as a biennial event, it will serve as a global platform to foster knowledge exchange and advance discussions on sustainable transport and livability. The event will bring together experts, policymakers, urban planners, researchers, industry leaders and community leaders to tackle critical challenges and innovative solutions.

Key themes will include Transport and Well-being, Transport and Health and Happiness, Transport and Livability/Quality of Life (QoL), Transport and Equity and Accessibility, and

Transport and Environmental Quality and Disaster Resiliency, among other aspects of transport related to livability and quality of life.

Partnering with the Sustainable Transport and Livability journal published by Taylor and Francis, the First World Symposium on Sustainable Transport and Livability is expected to spearhead key dialogues in transport and livability.

WSSTL -2025 Symposium website

Further information about the symposium can be found at the WSSTL-2025 Website (https://wsstl2025.iisc.ac.in/)

- **Green Urban Mobility Innovation Living Lab (GUMILL)**

GUMILLL discussions and visit

The Global Urban Mobility Innovation Leadership Lab (GUMILL) is a prestigious initiative focused on advancing cutting-edge research, innovation, and leadership in urban mobility. It brings together researchers, policymakers, and industry leaders to address pressing challenges in sustainable transportation. Through collaborative projects, workshops, and knowledge-sharing, GUMILL aims to develop innovative solutions to enhance urban mobility systems globally, fostering sustainability, equity, and resilience. In an exciting development, IST Lab has been named the new host of GUMILL. This transition marks a significant milestone for IST Lab, reflecting its growing reputation as a sustainable transportation and mobility research leader.

As a part of this initiative, a meeting was organised with GUMILL representatives at IST Lab on 28th November 2024. Prof Ashish Verma also visited the Thessaloniki Smart Mobility Living Lab at the Hellenic Institute of Transport, Greece one of Europe's Largest Living Lab in December 2024 to prepare for the role.

- **Scenario Evaluation of BBMP Transportation Projects**

The IST Lab contributed to a study evaluating the proposed suburban and metro rail networks in the Bengaluru Metropolitan Region (BMR), focusing on sustainable mobility solutions to address traffic congestion and pollution. Using a four-stage travel demand model for the base year 2022, the study analyzed various network configurations, including Metro-only, Suburban-only, and integrated MRTS, for three milestone years. It also explored the impact of proposed double-decker roads and a North-South tunnel corridor. The study identified the effects of these new transportation infrastructures on MRTS ridership and highlighted potential issues with the proposed infrastructure, such as increased private vehicle use. The results of the analysis were presented to KRIDE and BMRCL authorities and during a discussion on "Misplaced priorities of BBMP's infrastructure projects" on 20th December 2024. For more details, the report can be accessed here: Scenario Evaluation Report.pdf - Google Drive

- **IISc Traffic Management Survey**

The IST Lab contributed to the efforts of the IISc Traffic Management Committee, which was formed to make recommendations on improving traffic management within the campus. As part of this initiative, an online survey was conducted between 9th May 2024 and 17th May 2024 to gather input from faculty, staff, and students. The survey collected demographic data, along with information on respondents' modes of transport and the issues they face, such as challenges with active modes on campus, commuting to and from the campus, and safety concerns. Suggestions for enhancing the Transvahan services, improving connectivity to nearby areas, and increasing overall mobility were also gathered. The IST Lab contributed to analysing survey responses and proposed solutions to address the identified issues.

- **Sustainable Mobility as public health measure initiative**

A collaborative initiative was launched to address the under-researched impact of sustainable mobility on public health, featuring a brainstorming session organized by the Bengaluru Science and Technology Cluster (BeST) and IST Lab. This cross-disciplinary event brought together transportation, urban planning, public health, and sustainability experts to foster collaboration, share knowledge, and identify critical gaps, best practices, and priority areas. The session emphasized the urgent need for India-specific research on health impacts in diverse urban contexts, integrating mental and physical health into transport policies, and resolving challenges such as financial constraints, skilled labor shortages, and interdepartmental coordination to ensure effective policy execution.

For more information, the comprehensive report can be accessed at Understanding Sustainable Mobility as a Public Health Measures.pdf - Google Drive

IST Lab members with other participants of the brainstorming session

- **Visits of International faculties, collaborators, etc. to IST Lab in 2024**
    - **Srikant Srinivasan, Director, Dixon IoT Lab, Plaksha University**

On 10th June 2024, Srikant Srinivasan, Director of the Dixon IoT Lab at Plaksha University, delivered a talk on "IoT Systems for Road Safety and Monitoring." The presentation focused on the use of smartphones to assess road conditions, enhance vehicle monitoring, and explore the potential for developing a network capable of tracking vehicles for improved road safety.


Mr.Srikant Srinivasan at IST Lab

- **Meeting with Dutch delegates**

On 29th July 2024, Prof. Ashish Verma, along with Ms. Hemanthini Allirani, Mr. Aitichya Chandra, Mr. Rohit Singh Nitwal, Ms. Almas Siddiqui, and Ms. Maneesha B., met with Dutch delegates to explore potential collaborations with the Technical University of Delft.

During the meeting, the delegates were introduced to the diverse range of research activities the lab members undertook, providing an overview of ongoing projects and areas of expertise.

IST Lab members with Dutch delegates

- **Prof. Aruna Sivakumar, Professor, Centre for Transport Engineering and Modelling, Imperial College London**

Prof. Aruna Sivakumar, a professor at the Centre for Transport Engineering and Modelling, Imperial College London, and the Director of the Urban Systems Lab, served as the Satish Dhawan Visiting Professor in the Department of Civil Engineering. During her tenure at the department, a joint research group interaction meeting was organized between her research group in London and the IST Lab on 17th September 2024 in hybrid mode. Each presenter provided a concise overview of their objectives, methodologies, and expected outcomes, facilitating in-depth discussions and exploring potential collaborations.

Pictures from the research group discussion

IST LAB ALUMNI ACTIVITIES

2024 Alumni activities included webinars, interviews and panel discussions. Details of the same are given below:

- **Alumni Webinar Series:**

S. No.	Speaker	Date	Speaker's name & affiliation	Title of the webinar
1		29-06-2024	**Ms. Sajitha Sasidharan**, Transport decarbonization specialist with the UK Mobility team at WSP	Carbon Reduction in Local Transport Planning
2		01 -06 -2024	**Dr. Prithvi Bhat Beeramoole,** Post-doctoral fellow at Queensland University of Technology (QUT) in Brisbane, Australia	A multi-objective framework for extensive hypothesis testing during the estimation of discrete outcome models

- **Alumni Interview Series**

S. No.	Alumni Interviewee	Date	Interviewee's name & affiliation
1		20-04-2024	**Mr. Saransh Sahu** PhD Student Queensland University of Technology, Brisbane, Australia

○ Alumni Panel Discussion Series

A panel discussion on '**Unlocking the Potential of AI Tools'** was held on **9th March 2024.**

Sl.No.	Panel Members	Alumni Panel member's name & affiliation
1		**Mr. Pragun Vinayak** Data Science Manager and Senior Associate Consultant Cambridge Systematics Inc.
2		**Dr. Chetan Doddamani** Post Doctoral Fellow Nagoya University
3		**Mr. Vivek Yadav** Travel Demand Modeller Cambridge Systematics

A panel discussion on the topic **'Education at Crossroads: The Future of Traditional Engineering Education'** was held on **28th September 2024**

Sl.No.	Panel Members	Alumni Panel member's name & affiliation
1		**Dr. Rahul T M** Assistant Professor IIT Ropar
2		**Dr. Ubaid Illahi** Assistant Lecturer Atlantic Technological University Sligo

Alumni Meet-up at IATBR

During the IATBR conference held in Vienna from 14th to 17th July 2024, Prof. Ashish Verma and Furqan Bhat had the pleasure of reconnecting with several IST Lab alumi. Dr. Manoj M, Dr. Rahul T. M, Dr. Divyakant Tahlyan and Ms. Poonam joined them for refreshments during the conference week. The gathering was marked by lighthearted discussions about the IST Lab, career achievements, and personal updates, making it a delightful and memorable reunion.

IST Lab meet up at IATBR

FESTIVAL CELEBRATIONS IN 2024

For IST Lab members, festivals are a time of togetherness and cultural exchange. Every year, festivals from across India are celebrated in the Lab with great joy and enthusiasm. These celebrations provide a wonderful opportunity for everyone to learn more about the diverse cultures of different regions of the country. In 2024, various festivals were celebrated in the Lab, and glimpses of these vibrant moments are shared below.

- ## Holi Celebration (25th March 2024)

Holi, the festival of colours and joy, was celebrated with vibrant enthusiasm at the IISc Sustainable Transportation Lab on 25th March 2024. The celebration brought lab members together to revel in the spirit of unity and festivity. The event featured a lively exchange of colours, symbolizing harmony and new beginnings.

Holi Celebrations at IST Lab

- ## Onam and Ganesh Chaturthi Celebrations (16th September 2024)

Onam and Ganesha Chaturthi, two vibrant Indian festivals, celebrate the essence of culture, devotion, and community. This year, the IISc Sustainable Transportation Lab celebrated these festivals together on 16th September 2024, embodying the spirit of diversity and shared traditions. As part of the Onam celebrations, lab members created a traditional floral carpet (pookkalam), while Ms. Aswathy Rajeev shared insights into the cultural significance and stories associated with the festival. For Ganesha Chaturthi, Mr. Rohit Singh Nitwal performed the Ganpati Puja, followed by Visarjan, and Mr. Vishwapriya delivered an engaging presentation about the festival's traditions and significance.

IST Lab members at the celebration

- **Dussehra and Ayudha Pooja Festival (11th October 2024)**

Dussehra and Ayudha Pooja, festivals symbolising the triumph of good over evil and the reverence of tools and instruments, were joyously celebrated at the IISc Sustainable Transportation Lab on Friday, 11th October 2024. This year, Dr Meghna Verma joined IST Lab as part of the celebrations. The festivities began with a traditional pooja, followed by an insightful presentation by Mr Santhosh Kumar on the significance of these festivals. The event concluded with distributing sweets and prasad, creating a warm and celebratory atmosphere. Lab members embraced the occasion in traditional attire, reflecting the cultural richness and unity of the celebration.

Mr. Santhosh Kumar presented about Dussehra

IST Lab members and Dr. Meghna Verma at the celebration

- **Christmas Celebrations (23rd December 2024)**

Christmas, a joy, love, and togetherness festival, was celebrated enthusiastically at the IISc Sustainable Transportation Lab on 23rd December 2024. The event brought the holiday spirit alive as lab members gathered to share the festive cheer. The celebration's highlights included sharing cake, gift distribution, and an insightful presentation about the significance of Christmas by Ms. Ann Das. The celebration also provided a moment of reflection as lab members reflected on their achievements and the past year's milestones.

IST Lab Christmas celebrations

IST LAB ACHIEVEMENTS IN 2024

2024 has been a remarkable year for IST Lab members and alumni, marked by significant career achievements and prestigious postdoctoral awards. Details of these accomplishments are provided below:

- **Prof. Ashish Verma** appointed as Editorial Board Member of "Journal of Transport and Sustainability" (2024 onwards).
- **Prof. Ashish Verma** was elected as Vice President of Governing Council of IUT (Institute of Urban Transport India) for a period of 2 years w.e.f. 01.09.2024 to 31.08.2026 duly approved by the Secretary, Ministry of Housing & Urban Affairs, Govt. of India.
- **Prof. Ashish Verma** appointed as Editorial Board Member of "Journal of the Air Transport Research Society", Elsevier. (2024 onwards)

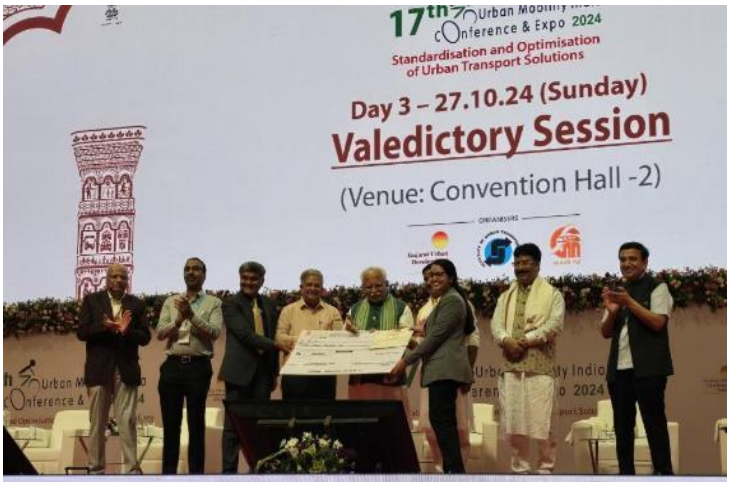
- **Dr. Punyabeet Sarangi** has been appointed as Assistant Professor in the Department of Civil Engineering at IIT (ISM) Dhanbad, India.
- **Dr. Aitichya Chandra** has joined the University of Cambridge as a Research Associate under the guidance of Prof. Ajith Parlikad.

Best Paper Awards:

At the Urban Mobility India Conference 2024 held in Gandhinagar, India, from 25th to 27th October 2024, IST Lab members Ann Das and Harendra Pratap Singh received the First and Third Best Paper Awards, respectively. Hon. Minister of Housing and Urban Affairs Sri Manohar Lal Khattar presented the awards to the winners.

Authors: Ann Das, Ashish Verma

Title: "Exploring the Hedonic Dimension of Mental Well-Being in Commute Experiences: Insights from the Satisfaction with Travel Scale in the Indian Context"



Authors: Harendra Pratap Singh, Ashish Verma

Title: "Identification of VRU Fatality Hotspots in Traffic Analysis Zones Using Point Kernel Density Estimation Method "

Sports Achievements:

IISM (Inter-IISER Sports Meet), 2024:

IISM is held as a sports tournament among science universities across India. This sports meet is attended by seven IISERs, IISc, NISER and CBS. Mr. Rohit Singh Nitwal was selected to represent IISc in the Basketball Men's tournament at IISM 2024, held at IISER Pune. He again Won Gold in the Men's Basketball Tournament, and the IISc Basketball Team became the first to win the Championship Cup in the Inter-University IISM Basketball Tournament for consecutive years since its inception.

Gandhi Jayanti Sports Meet at IISc Bangalore 2024:

Deputy Registrar Gymkhana organised a sports meet for the Gandhi Jayanti 2024. Numerous sport events were organised in which all members of IISc can participate. Mr. Rohit Singh Nitwal won medals at various events at this sports meet. Gold in Football, Hockey, Kho-Kho Tournaments and Silver in Basketball Tournament. All these tournaments were part of the overall Gandhi Jayanti Sports Meet.

IISc Spectrum 2024:

Spectrum is the Annual inter-departmental sports meet of IISc Bengaluru, where all departments compete in various sports events. This year, the Civil Engineering Department clinched the title of Overall Champion, marking a momentous achievement.

In addition to this collective triumph, members of the IST Lab showcased outstanding individual performances, securing multiple accolades:

- Mr. Furqan Bhat: Silver Medal in Badminton
- Mr. Rohit Singh Nitwal:
    - Gold Medals in Basketball and Handball
    - Silver Medals in Kho Kho and Volleyball
- Ms Almas Siddiqui: Bronze Medal in Snooker Women's Double
- Mr. Sital Kumar Sahu:
    - Gold Medals in Volleyball and Handball
    - Silver Medal in Kho Kho
    - Bronze Medal in Box Cricket
    - Honored as the Most Valuable Player (MVP) of Box Cricket in the overall Spectrum
- Mr. Alvin Joshua:
    - Gold Medal in Volleyball
    - Bronze Medal in Box Cricket

REPORT SUMMARY

The 2024 IST Lab Annual Report highlights the lab's significant activities and accomplishments over the past year, organised into three main sections: an overview of the lab’s activities, alum engagement, and a detailed summary of key achievements in 2024.

This year marks a milestone for IST Lab, celebrating 15 years of impactful research in sustainable transportation and mobility. The lab has continued to achieve notable success through the dedicated efforts of its members and alums, whose innovative contributions have garnered numerous accolades. Over the years, IST Lab has been fortunate to collaborate with esteemed institutions, researchers, and partners whose expertise and support have played an integral role in shaping our work and driving progress. We acknowledge and extend our deepest gratitude to these collaborators for their continued support in advancing our shared mission.

We thank all alums and current members for their unwavering commitment and collaboration. The sense and strength of the community developed within the Lab by you all contributed to these 15 years of excellence. Looking ahead, IST Lab remains focused on its mission to research and drive sustainable, equitable advancements in transportation systems, creating lasting benefits for society.

APPENDIX

List of Journal Publications

1. Chandra, A.,Verma, A.,(2024) "To delay or not to delay? A hybrid relationship between departure delay, en-route conflict probability, and number of conflicts", Elsevier, Journal of the Air Transport Research Society, Volume 4, DOI:https://doi.org/10.1016/j.jatrs.2024.100053.
2. Choubey, N.,Verma, A.,Chakraborty A (2024) "An unsupervised group detection method for understanding group dynamics in crowds Physica A:Statistical Mechanics and its Applications", Elsevier,Volume 655, DOI:https://doi.org/10.1016/j.physa.2024.130195.
3. Chandra, A., Hazra, S and Verma, A.,(2024) "The integration of En route flow optimization, complex network clustering, and rule-based approach to airspace sub-sectorization for enhanced air traffic monitoring" Journal of the Air Transport Research Society, Elsevier,Volume 3,DOI: https://doi.org/10.1016/j.jatrs.2024.100036.
4. Chandra, A., Hazra, S., Verma, A., & Sooraj, K. P. (2024) "On the Possibilities of Efficient Air Traffic Monitoring through Complex Network Clustering Based Airspace Sub-Sectorization: A Multi-Objective Discrete Particle Swarm Optimization Approach" *Transportation Research Record*, Sage Journals, DOI:https://doi.org/10.1177/03611981241263829.
5. Hemanthini Allirani, Ashish Verma (2024) "Modeling traffic fatalities to assess the significance of gender in road safety" Case Studies on Transport Policy, Elsevier, Volume 17, DOI: https://doi.org/10.1016/j.cstp.2024.101254.
6. Furqan A. Bhat, Ashish Verma (2024) "Electric two-wheeler adoption in India – A discrete choice analysis of motivators and barriers affecting the potential electric two-wheeler buyers", Transport Policy, Elsevier,Volume 152, Pages 118-131,DOI: https://doi.org/10.1016/j.tranpol.2024.05.004.
7. Furqan A. Bhat, Yash Seth, Ashish Verma (2024) "Beyond conventional: Analysing the factors affecting the adoption of electric four-wheelers in an Indian metropolis", Transportation Research Part D: Transport and Environment,Elsevier,Volume 131, No:104200, DOI:https://doi.org/10.1016/j.trd.2024.104200.
8. Chandra, A., Choubey, N., Verma, A., & Sooraj, K.(2024) "Quasi-Stochastic Departure Metering Model Considering Non-Deterministic Taxi Time, Standard Instrument Departure Track Time, and a New Delay–Conflict Relationship.,Transportation Research Record: Journal of the Transportation Research Board, Sage Journals,DOI: https://doi.org/10.1177/03611981241240761.
9. Marsden,G., Reardon,L.,Campbell,M.,Gupta,S., & Verma, A. (2024) "Tightly Bound, Loosely Interpreted: Meta-Governance and Local Institutional Adaptation in the Implementation of the Smart Cities Mission India", Administration & Society, Sage, DOI: https://doi.org/10.1177/00953997241237531.
10. Furqan A. Bhat, Gaurav Yash Tiwari, Ashish Verma (2024) "Preferences for public electric vehicle charging infrastructure locations: A discrete choice analysis", Transport Policy, Elsevier, Volume-149, pp.177-197, DOI: https://doi.org/10.1016/j.tranpol.2024.02.004.

11. Furqan A. Bhat, Yash Seth, Ashish Verma (2024) "Motivators and barriers to the widespread adoption of electric four-wheelers in India – A discrete choice analysis of potential electric four-wheeler buyers", Travel Behaviour and Society, Elsevier, Volume-35, No-100748, DOI: https://doi.org/10.1016/j.tbs.2024.100748.
12. Furqan A. Bhat, Meghna Verma, Ashish Verma (2024) "Who will buy electric vehicles? Segmenting the young Indian buyers using cluster analysis", Case Studies on Transport Policy, Elsevier, Volume-15, No-101147, DOI: https://doi.org/10.1016/j.cstp.2024.101147.
13. Aitichya Chandra, Nipun Choubey, Ashish Verma, K.P. Sooraj (2024) "Quasi-stochastic optimization model for time-based arrival scheduling considering Standard Terminal Arrival (STAR) track time and a new delay-conflict relationship", Journal of Air Transport Management, Elsevier, Volume-115, No-102527, DOI: https://doi.org/10.1016/j.jairtraman.2023.102527.
14. Milan Mathew Thomas, Ashish Verma, Sai Kiran Mayakuntla, Aitichya Chandra (2024) "A novel simulation based approach for user-based redistribution in bike-sharing system", Simulation Modelling Practice and Theory, Elsevier, Volume-131,No-102871, DOI: https://doi.org/10.1016/j.simpat.2023.102871.
15. Hemanthini Allirani, Ashutosh Dumka, Ashish Verma (2024) "A framework for assessment of pedestrianization impacts on quality of life: Combining subjective and objective measures", Cities, Elsevier, Volume-145, No-104688, DOI: https://doi.org/10.1016/j.cities.2023.104688.

List of Conference Proceedings and Presentations

1. Chandra, A.,Choubey, N.,Verma, A.,(2025) "Some Comments on the Aircraft Landing Problem: How Optimal is the First Come First Serve Policy?",World Conference on Transport Research - WCTR 2023 Montreal 17-21 July 2023, Transportation Research Procedia, Elsevier, Volume:82, Pages 923-937 DOI:https://doi.org/10.1016/j.trpro.2024.12.244
2. Choubey,N., Patil, V., Verma, A. (2024). Private SUV or Carpooling?—Investigating Impact of Choices on Indian Roads. In: Manoj, M., Roy, D. (eds) Urban Mobility Research in India. UMI 2023. Lecture Notes in Civil Engineering, vol 551. Springer, Singapore.https://doi.org/10.1007/978-981-97-8116-4_14
3. Rai, A., Subramanian, G.H., Verma, A.(2024).Crowd Dynamics of a Rural Group in a Mass Religious Gathering: A Case Study of Kumbh Mela - 2016, India. In: Rao, K.R., Seyfried , A., Schadschneider, A. (eds) Traffic and Granular Flow '22 . TGF 2022. Lecture Notes in Civil Engineering, vol 443. Springer, Singapore. DOI: https://doi.org/10.1007/978-981-99-7976-9_11
4. Subramanian, G.H., Rai, A., Verma, A. (2024). Understanding the Difference in Social Group Behaviour of a Spiritually Motivated Crowd and a General Crowd. In: Rao, K.R., Seyfried , A., Schadschneider, A. (eds) Traffic and Granular Flow '22 . TGF 2022. Lecture Notes in Civil Engineering, vol 443. Springer, Singapore. https://doi.org/10.1007/978-981-99-7976-9_8
5. Naik, K., Subramanian, G.H., Verma, A. (2024). A Review of Entropy-Based Studies on Crowd Behavior and Risk Analysis. In: Rao, K.R., Seyfried , A., Schadschneider, A. (eds) Traffic and Granular Flow '22 .TGF 2022.Lecture Notes in Civil Engineering, vol 443. Springer, Singapore. https://doi.org/10.1007/978-981-99-7976-9_7

6. Maneesha, B., & Verma, A. (2024). Resilience of Transportation Infrastructure in India: Are We There Yet?. In: Manoj, M., Roy, D. (eds) Urban Mobility Research in India. UMI 2023. Lecture Notes in Civil Engineering, vol 551. Springer, Singapore.https://doi.org/10.1007/978-981-97-8116-4_14
7. A. Siddiqui., Veera Prabhu S & Verma A. (2024). Does Spatial Effects of Patterns of Road networks influence their connectivity? 5th World Symposium on Transport and Land use Research (WSTLUR), June 17th – 20th, 2024.
8. H.P. Singh & Verma A. (2024). Review of Reactive and Proactive Aspects of Accident Studies and Variables for Vulnerable Road Users. 13th Asia Pacific Conference on Transportation and the Environment (APTE), July 8th – 10th, 2024.
9. A. Siddiqui., N. Nizar & Verma A. (2024). International Review of Transport Policy Instruments of Different Cities through the Equity Lens. 13th Asia Pacific Conference on Transportation and the Environment (APTE), July 8th – 10th, 2024.
10. Maneesha. B & Verma A. (2024). Exploring Transportation Resilience: A Review of Research in Asian Countries. 13th Asia Pacific Conference on Transportation and the Environment (APTE), July 8th – 10th, 2024.
11. Furqan. A. Bhat & Verma A. (2024). Electromobility in India: Unveiling the determinants of Electric Two-Wheelere Adoption in India using Discrete Choice Modelling Approach. 17TH International Conference on Travel Behavior Research (IATBR), July 14th – 18th, 2024.
12. H.P. Singh & Verma A. (2024). Identification of VRU Fatality Hotspots in Traffic Analysis Zones Using Point Kernel Density Estimation Method. 17th Urban Mobility India Conference and Expo (UMI), October 25th – 27th, 2024.
13. R. S. Nitwal & Verma A. (2024). The composite index for assessing the Sustainability of Urban Transport Interventions. 17th Urban Mobility India Conference and Expo (UMI), October 25th – 27th, 2024.
14. Ann Das & Verma A. (2024). Exploring the Hedonic Dimension of Mental Well-Being in Commute Experiences: Insights from the Satisfaction with Travel Scale in the Indian Context. 17th Urban Mobility India Conference and Expo (UMI), October 25th – 27th, 2024.