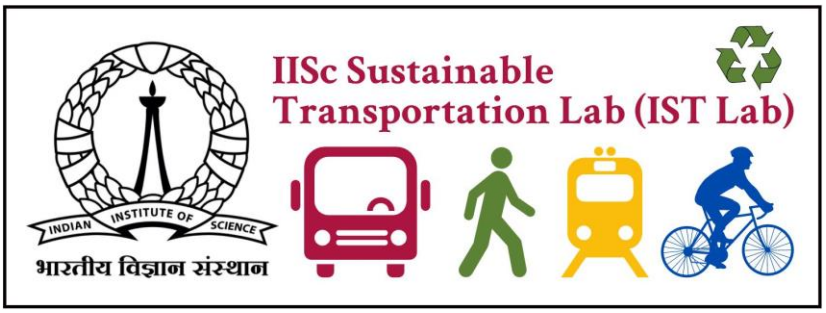
ANNUAL REPORT

2021



Convenor: Prof. Ashish Verma,

Dept. of Civil Engg., Indian Institute of Science (IISc),

Bangalore-560012, Karnataka, India

TABLE OF CONTENTS

MESSAGE FROM IST LAB CONVENOR

Dear IST Lab Collaborators and Friends

In the new year 2022, it is good time to reflect into 2021 and see how our IST Lab productivity was during the whole year and in these challenging times of pandemic. In this regard, I am happy to present to you all, the annual activity report of IST Lab.

Thanks

--

****
Ashish Verma, Ph.D.
Professor, Transportation Systems Engg. (TSE)
Convenor, IISc Sustainable Transportation Lab. (IST Lab.)
Dept. of Civil Engg., Indian Institute of Science (IISc),
Bangalore-560012, Karnataka, India.
Phone-Office: +91-80-22932329/ 23609223/ Lab.-22932939
E-mail: ashishv@iisc.ac.in, rsashu74@gmail.com
Homepage: http://civil.iisc.ac.in/~ashishv/beta/index.php
****

Introduction

Dr. Ashish Verma after joining IISc Bangalore in 2009 as Assistant Professor in the department of Civil Engineering established the Transportation Systems Engineering (TSE) lab. With almost twelve years of impactful research work he revamped the lab's image with a new name and an official website. The lab is now named IISc Sustainable Transportation Lab (IST Lab). With this new image Prof Ashish Verma announced the first ever alumni meet on 9th January 2021 and created the 'IST Lab Alumni Group'. In this meeting Prof Ashish described his views about the upcoming year 2021 and to start various alumni activities that benefit, both professionally and personally, all the current IST Lab members as well as all the Alumni. He gave the role of alumni group convenor to Mr. Siddhartha Gulhare and co-convenors to Mr. Varun Raturi and Ms. Prithvi Bhat. He assigned the role of coordinator to one of his lab student Mr. Rohit Singh Nitwal.

The purpose of the report is to give the details of various activities and work done by the lab members and the achievements procured by the IST Lab in 2021. The report also showcases details about the alumni activities such as IST Lab alumni webinars and interviews, along with the publication of first IST Lab alumni group newsletter.

IST Lab Research Contribution

Research Contributions

In the year 2021, IST Lab members published their work in various reputed journals and presented in different conferences. A total of 15 journal papers are published and/or accepted in Transportation Research Record, Case Studies on Transport Policy, Transportation in Developing Economies, International Journal of Disaster Risk Reduction etc., and 15 papers are presented in different conferences such as 10th conference on Pedestrian and Evacuation Dynamics, 6th Conference of Transportation Research Group of India (CTRG), and 14th Urban Mobility India Conference 2021.

Projects

In 2021, the lab worked in two projects Clean Air Street - Church Street First Project and Innovative for Clean Air (IfCA). Two other projects have been accepted. Project titled "Pedestrian flow and risk modelling" has been accepted in under Accelerate Vigyan scheme in Karyashala (High-end Workshops) theme offered by SERB. Another project titled "Crowd parameter estimation and modelling in mass religious gatherings" is accepted under the same scheme in Vritika (Training and Skill Internships) theme.

Details about the IfCA programme and Clean Air Street initiative is given below:

The IfCA programme is a joint initiative between India and UK to pilot air quality improvement initiatives in Bengaluru. Launched in May 2019, the IfCA programme ran for 22 months and was funded by the UK government's Newton Fund. The goal of the programme was to work with innovative businesses, local authorities, academics, and civil society organizations to develop interventions, which have the potential to improve air quality.

One of the program's key objectives is Clean Air Street (CAS), i.e., promoting pedestrian-only streets in the Central Business District (CBD) of Bengaluru. This initiative evaluated the benefits of pedestrianizing a busy street, focusing on all three main pillars of sustainability: environment, social, and economy. It was necessary to evaluate the impacts before and after the closure of the road to traffic to measure the effects of pedestrianization. Thus, for quantitative data, QoL was assessed in

terms of pedestrian level of service, pedestrian footfall, air quality, and economic indicators. Further, qualitative impacts were measured in QoL based on an individual's perception and attitude towards new interventions.

The programme also focused on supporting the government of India's FAME scheme to accelerate the adoption of electric vehicles. The IfCA programme commenced with extensive engagement activities and workshops with Indian stakeholders to identify some of the critical EV and air quality challenge areas for Bengaluru. Following identification of these challenge areas, Indian and British SMEs who could deliver innovative solutions and were willing to be part of an urban "testbed was invited. The aim of the Clean Air Testbed was to enable the introduction and early adoption of the selected EV and air quality products and services by deploying them in real-life environments for up to 6 months from October 2020 to March 2021. For the selected innovators, the testbed formed a safe space to test interventions in real life conditions, understand their impact, and interact with stakeholders to further develop their products and services – as well as showcase the efficacy of the solution to prospective partners and customers.

The primary beneficiaries of the proposed project are the planning organizations like the BESCOM and the BBMP who have long been planning to help increase the adoption rate of electric vehicles but are finding it difficult to materialize it on ground. Even though Karnataka was the first state in India to introduce its own electric vehicle policy, the transformation towards electric mobility in the state is very slow. The major roadblock to this transformation is the lack of charging infrastructure. As the purchase of electric vehicles is already subsidized, policies should now target city-wide charging infrastructure. BESCOM recently set up 126 charging points in the city for electric vehicles in the city of Bengaluru under a plan to add 678 charging stations in the state of Karnataka. But considering the high costs involved in setting up these charging stations, it is important to optimally plan these infrastructure facilities in terms of siting, sizing, and pricing. The tool is proposed to help BBMP and BESCOM to optimally plan the charging infrastructure with consideration given to the resource constraints keeping in perspective the requirements and demands as well as analyzing the impacts on the grid.

This project is aimed to benefit the people of Bengaluru especially the poorest third of the society who contribute the least to the transportation pollution but bear the utmost brunt of it. Electrifying mobility will not solve all the problems of our transportation system, but it will help protect our vulnerable society from its

negative impacts. Apart from environmental impacts, it has financial implications as well. For example, the transportation sector contributes to one-third of the global energy demand (mostly fossil-based fuels) which leads to an increase in fuel prices and again has its worst impacts on the poorest third of the society.

This project will develop a tool that helps stakeholders like BESCOM in Bengaluru, India to better plan for the infrastructural requirements of electric vehicles, thereby facilitating their adoption and leading to a more sustainable transportation system for the city with reduced greenhouse gas emissions and improvements in air quality.

Clean Air Street initiative

The IfCA programme is a joint initiative between India and the UK to pilot air quality improvement initiatives in Bengaluru. Under the Clean Air Street initiative, Church Street in Bengaluru was closed for vehicular traffic every Saturday and Sunday from 10:00 am to midnight for four months from 7 November 2020 to 28 February 2021. The Directorate of Urban Land Transport (DULT), Government of Karnataka, India, was the primary partner, along with IISc's Sustainable Transportation lab (IST lab), Urban Morph, and Catapult UK, in implementing the Clean Air Street initiative. On 7 November 2020, Church Street First, under the Clean Air Street initiative, was inaugurated by the Hon'ble former Chief Minister of Karnataka, Shri BS Yediyurappa. On 24 September 2021 at 4 pm, the closing ceremony and release of the impact assessment report prepared by IST lab was held at Church Street, in the presence of Shri PC Mohan (Hon'ble Member of Parliament, Bengaluru Central), Shri NA Haris (Hon'ble Member of the Legislative Assembly from Shanthi Nagar Constituency, Bengaluru), Ms. V Manjula (Commissioner, Directorate of Urban Land Transport), Shri Gaurav Gupta (Commissioner, Bruhat Bengaluru Mahanagara Palike), and several other dignitaries.

The focus of this study was to analyze the air quality and public opinion towards pedestrianizing an urban street. Both quantitative and qualitative studies were carried out to understand the impact of the initiative in terms of Quality of Life. From the results, it has been inferred that people were pleased about the initiative and suggested extending the pedestrianization beyond February 2021. The increase in pedestrian footfall during the months of the project duration indicates that more people became aware of the initiative, and of the fact that closing the road for traffic improves air quality and a pedestrian-friendly environment improves their QoL. The outcomes of these studies suggest the importance of pedestrian-only streets, which would help stakeholders in planning and executing such sustainable transport strategies. The initiative received multiple awards, details of which are given in later sections.

IST Lab Activities in 2021

In 2021 there have been different activities conducted in IST Lab ranging from various projects such as IfCA, Clean Air Street - Church Street First Project etc., alumni activities, and festival celebrations. This section briefly mentions all these activities.

- In April 2021, a one-day online workshop was organized on "Smart Cities in Karnataka: Experiences and the Road Ahead" along with other organizers: Center for Study of Science, Technology, and Policy (CSTEP), National Institute of Advanced Studies (NIAS) and Indian National Academy of Engineering (INAE). And a workshop technical report was published in June 2021. Following are the details about the workshop.

  The Smart Cities Mission was launched in 2015 to address challenges associated with India's rapid growth and massive urbanization. Along with many upheavals, including floods, drought, and, most recently, the Covid-19 pandemic. It was felt that it is time to assess the smart city strategies and projects, evaluate the

progress, and explore the experiences. This workshop was organized with the objectives of (i) exploring the experiences in Smart City implementation in Karnataka through the eyes of the stakeholders; (ii) understanding the challenges in implementation; and (iii) exploring solutions and future strategies by interacting with key players and experts. The workshop focused on smart cities in the state to provide a platform for a broad range of stakeholders to share their experiences.

Against this backdrop, the Indian National Academy for Engineering (Bangalore Chapter), along with the Indian Institute of Science (IISc), Center for Study of Science, Technology, and Policy (CSTEP), and National Institute of Advanced Studies (NIAS), organized a workshop entitled 'Smart Cities in Karnataka: Experiences and the Road Ahead' on 17th April 2021. The Urban Development Department of Karnataka participated as the Government partner for this event. The workshop was organized as part of INAE BC's celebrations of Azaadi ki Amrit Mahotsav. This event, held online on 17th April 2021, had active participation by around 50 participants, including active stakeholders from various government departments, local bodies, Smart City projects, and academics, and representatives of civil society organizations.

Several representatives of various Smart City projects in Karnataka attended the workshop and participated in Breakout Sessions focusing on the above-mentioned themes of the Workshop. Several major successes and some challenges of these projects were brought out in the discussions, as well as specific recommendations. For example, the general recommendation on Sol id Waste Management was to identify solutions by engaging at the grassroots level. For Environment and Ecology projects, the suggestion was to use zones, while in the Transport and Water and Sanitation themes, the preference was to view a broader scale. In general, the need for better clarity of end goals, coordination with existing mechanisms and institutions such as local bodies, non-availability of data in the appropriate format, and a lack of a cohesive overarching vision stood out as common challenges that could be addressed over a period. These inputs are particularly relevant since these projects are executed through special purpose vehicles led by officials who are not necessarily familiar with al l nuances of local situations. Staggering initiation of new projects, evolving mechanisms for the smooth handover of finished infrastructural projects to local bodies, the cataloguing of improvement in efficiencies, exchange of lessons learned across different SPVs would serve as a course correction.

Apart from the welcome infusion of much-needed financial resources, projects under the Smart City Mission have facilitated the large-scale utilization of ICTs to resolve longstanding challenges in many Tier-II cities. There have been major efforts towards launching new infrastructural projects, generation/compilation of new data and exploiting new technologies in the areas debated at the workshop. These initiatives have also enabled implementation of many regulations (including new ones) for a better life for the citizens. These discussions collated possible solutions to the issues identified and questions raised in the four thematic plenary sessions.

- In July 2021 Prof. Ashish Verma was invited as the Guest Editor of "Virtual Special Issue (VSI): Transport Policy in Post COVID-19 World", Transport Policy, Elsevier, 2021. The Issue has 46 articles and has been published by 'Science direct'. The Cite Score of the Special Issue is 6.9 and an impact factor of 4.674. Transport Policy is an international refereed journal aimed at improving quality of transport policy and strategy analysis, designing, and sharing innovative policy and management practices, and application bridging the gap between theory and practice in transport. Its subject areas reflect the concerns of policymakers in government, management strategists in industry, and the public at large, providing independent, original, and rigorous analysis to understand how policy and strategy decisions have been made, monitor their effects, and suggest how they may be improved. The journal covers the entire transport sector including all modes: air, maritime, urban, intercity, domestic, and international transport economics, policy, and strategy issues, etc. Policy and strategy concerns in transport are wide and cover safety, efficiency, economic development, infrastructure, environment, energy, land-use, equity, and access.

- IST Lab organized an online International Webinar on "Church Street First - Impact Assessment of Pedestrianizing an Urban Street in terms of Quality of Life" in association with SIG-H2 of World Conference on Transport Research Society (WCTRS), and TCT-D01 of Transportation Research Group of India (TRG) on 1st October 2021. The results from Clean Air Street project were disseminated in 11 lectures presented by Prof. Ashish Verma, Ms. Hemanthini Allirani and eight Project Interns. Nearly 45 participants from all around the world participated in the event.

- In October 2021, IST Lab coordinated a one-day online 12th Research Symposium on the theme of "Mobility for All" as part of the 14th Urban Mobility India

Conference 2021 in association with Ministry of Housing and Urban Affairs, Government of India along with Institute of Urban Transport (IUT), India. Details of the research symposium is presented below.

✓ Overview

The twelfth Research Symposium on Urban Transport will be held as part of the 14th Urban Mobility India Conference cum Exhibition 2021 was scheduled from 29th - 31st October 2021 at Grand Hyatt Kochi Bolgatty, Kerala, India. Due to unavoidable COVID-19 situation, the research symposium will be held virtually on 25th October 2021. The event would be held under the aegis of the Ministry of Housing and Urban Affairs, Government of India and is being coordinated this year by IISc Sustainable Transportation Lab. (IST Lab.), Indian Institute of Science (IISc) Bangalore. The symposium is a platform to highlight the current research activities in urban transport carried out by academic and research institutes, especially by young researchers. Eligible participants were either existing or recently passed out (Not earlier than May 2020) students of PG/PhD Programme.

✓ Purpose of the research symposium

The purpose of the research symposium is to encourage young researchers working in various facets of urban transport to present their research work and provide them an opportunity for networking with fellow researchers and professionals; enhance capacity building of young researchers in the field of urban transport, and contribute towards building up of research data base, its dissemination and identification of research thrust in the country.

✓ Participation and Review process

A total of 118 individuals attended the research symposium virtually. At any given time, the maximum number of participants was 87 in the symposium. Participants were alumni, faculty, student or research scholar and practitioners from 18 (listed below) different renowned institutions in India who exchanged their research, experiences, and views threadbare and suggested as to how the profession of transport planner and engineer can make a mark in a society.

On Microsoft Teams, 41 papers were presented by the authors out of 46 final accepted papers amongst which three best papers were awarded on 29th October in the valedictory function. The evaluation process of selecting the best paper awards was sent to all the authors and it was decided by four jury members. The quality of the papers was not compromised as double-blind review process was followed with transparent review process on EasyChair platform. A total of 41

reviewers were involved in the double-blind review process for abstracts and full paper submissions.

- ✓ Panel Discussion - Agenda of Panel Discussion
    1. How efficient exchange of data & and provision of funds can pave way for better university research on urban transport?
    2. What urban transport policy gaps are present in Indian context where universities can contribute in terms of decision support?
    3. How can universities provide quantifiable inputs to urban transport infrastructure investment and policy decisions?
    4. How can universities help in periodic evaluation and monitoring of urban transport projects?
    5. How stakeholder opinions and views can be used and integrated in scientific frameworks and model building?
- ✓ Core Committee Members from IST Lab, IISc Bangalore

Convenor: Dr. Ashish Verma

Student Working Committee: Ms. Almas Siddiqui (Coordinator), Mr. Furqan Ahmad Bhat, Mr. Rohit Singh Nitwal.

Volunteers cum Rapporteurs:

1. Furqan Ahmad Bhat
2. Karthika P. S.
3. Nipun Choubey
4. Hemanthini Allirani
5. Rohit Singh Nitwal
6. Ubaid Illahi
7. Almas Siddiqui
8. Gayathri H.
9. Aitichaya Chandra

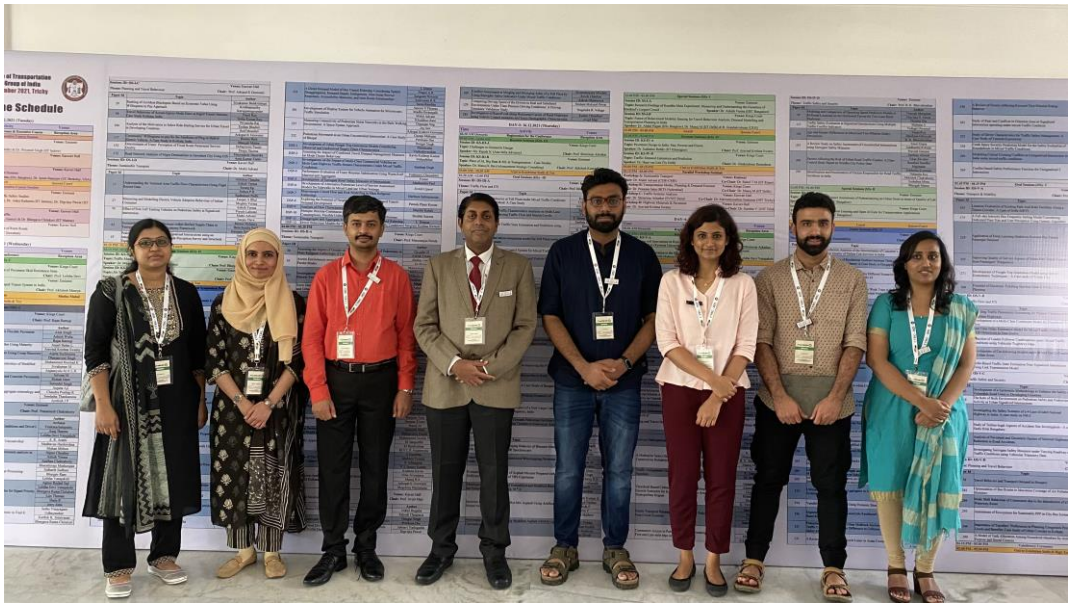
- The IST Lab Logo competition was held in the month of November and design of logo was finalized on 25th Nov 2021.

  The IST Lab logo competition was coordinated by Ms. Gayathrii H and Mrs. Karthika P S. The competition was held among the lab members. Four groups among the lab members were made,

  - ✓ Group 1 – Furqan Ahmad Bhat, Rohit Singh Nitwal, Gaurav Yash Tiwari
  - ✓ Group 2 – Almas Siddiqui, Hemanthini Allirani, Nipun Choubey
  - ✓ Group 3 – Aitichaya Chandra, Tarun Khandelwal, Ashutosh Dumka
  - ✓ Group 4 – Saransh Sahu, Ubaid Illahi, Rameshbabu, Poornashree

  The results were declared in a Lab meeting held on Nov 25, 2021. The design presented by Group 3 was finalized.

- The 6th Conference of the Transportation Research Group of India (CTRG-2021) was held between 14 and 17 December 2021 at SRM Hotel, Tiruchirappalli, Tamil Nadu, India. The 4-day conference witnessed the participation of eight IST Lab members including the convener Prof. Ashish Verma.



IST Lab at 6th CTRG Trichy

The papers and posters presented by the lab members covered a wide spectrum of topics related to the sustainable, safe, and efficient transportation of people. One of the parallel executive courses sessions on the 1st day was Pedestrian Flow and Risk Modelling was taken by Prof. Ashish Verma. The course covered some instrumental aspects such as (i) Macroscopic pedestrian flow models focusing on hydrodynamic models based on similarity of pedestrian flow with fluids and gases, first-order flow models that use fundamental diagrams and conservation equation; (ii) Microscopic pedestrian flow models that include Social force model, optimal velocity model (30 minutes); (iii) Sensing technologies including GPS or mobile data-based tracking models, Mask detection and social distancing model; (iv) Pandemic models such as Susceptible infected recovered model; and (v) Relevant case study discussions.

The second day was a "busy" one for IST Lab members. Mr. Nipun Choubey presented his paper titled "Automated crowd parameter estimation and crowd movement analysis in Kumbh Mela" in the Traffic Flow and ITS oral session chaired by Pranamesh Chakraborty. In a parallel oral session on Sustainable Transport chaired by Dr. Mukti Advani, Mr. Aitichya Chandra presented his paper titled, "Understanding the Terminal Area Traffic Flow Characteristics Using Flight Record Data". Within the same session, Mr. Aitichya's presentation was followed by the presentation of a paper titled, "Measuring and Modelling Electric Vehicle Adoption Behaviour of Indian Consumer" by Mr. Furqan Bhat and Prof. Meghna Verma. The second half of Day-2 started with a keynote session on Air Traffic Modelling over Airspace of India chaired by Prof. Ashish Verma. Day-2 ended with two important papers "Assessing the Impact of Groups on Fundamental Diagrams of Pedestrians in Mass Religious Gatherings- A Case Study of Kumbh Mela", presented by Ms. Gayathri H. and "Socio Demographic Variations in Mode Choice Preferences of Peri-Urban and Urban Areas– A Case Study of Bangalore", presented by Prof. Verma in the oral session on Sustainable Transport chaired by Prof. Manoranjan Parida. A picture from the oral session on Sustainable Transport in Day-2 is given below.

Day 3 started with the oral session on Sustainable Transport chaired Prof. Ashish Verma that included not one but three paper presentations from IST Lab. The first paper titled "Benefits from Active Transportation - A Case Study of Bangalore Metropolitan Region", was presented by Ms. Hemanthini Allirani. It was followed by a paper on "Investigating the Factors Affecting the Walking Dynamics of Pedestrians in Mass Gatherings" by Ms. Karthika P.S. The third paper in this session was titled "Framework for Evaluating Traffic Impact of a New Large Commercial Land Use – A Case Study from Bengaluru, India" and was presented by Ms. Gayathri H. The second half of Day-3 resumed with a special session on "Research Findings of Kumbha Mela Experiment: Measuring and Understanding the Dynamics of Mankind's Largest Crowd", which was delivered by Prof. Verma along with the Kumbh Mela Experiment (KME) team, Prof. Meghna Verma, Ms. Karthika P.S, Ms. Gayathri H, and Mr. Nipun Choubey. A snapshot after the special session is given below.

The latter half of the third day also saw enthusiastic participation from the IST Lab members in two important parallel workshop sessions: () Workshop-B: Transportation Modes, Planning and Demand Forecast, chaired by Dr. Prasanta K. Sahu and co-chaired by IST Lab alumni Dr. Manoj M, and (ii) Workshop-C: Traffic System Analysis, chaired by Dr. Shrinivas Arkatkar and co-chaired by Dr. M. Sankan. Four IST Lab members, Mr. Aitichya Chandra, Mr. Furqan Bhat, Ms. Almas Siddique, and Ms. Hemanthini Allirani, actively participated in Workshop-B and raised a few critical points that encourages future research in transportation network planning, land-use modelling, integrated and multimodal transportation planning. In the parallel Workshop-C, three IST Lab members, Ms. Gayathri H, Mr. Nipun Choubey and Ms. Karthika P.S engaged avidly. Several ideas on ITS and smart technological interventions in traffic data collection were raised by the three lab members. A picture from Workshop-C is given below.

Day 3 ended with a sumptuous dinner among all the IST Lab members on an invitation from Prof. Verma at SRM Hotel, Trichy. The dinner witnessed light-hearted discussions on several aspects, not related to work. Prof. Verma also shared his stories about the initial days CTRGs and the herculean effort it took to make CTRG a conference of international repute. Few snapshots from the memorable dinner have been provided below.

The IST Lab members had an engaging schedule till the last day (Day-4) of the conference. The day started with Ms. Almas Siddique presenting her paper on the Influence of Connectivity of Streets on the Urban Form and Sprawl in the Sustainable Transport session chaired by Prof. Akhilesh Maurya. It was followed by a special session on "Church Street First – Impact Assessment of Pedestrianizing an Urban Street in terms of Quality of Life". By Prof. Ashish Verma, Ms. Hemanthini Allirani, and Prof. Meghna Verma. Few pictures from that session are given below.

Finally, Day-4 ended with two papers from IST Lab. First, a poster presentation on "Modeling and Assessment of Aircraft Arrival and Departure Process at Different Temporal Scales: A Case Study of Chennai International Airport", by Mr. Aitichya Chandra. Second, an oral presentation titled "Study of Techno-legal Aspects of Accident Site Investigation - A case Study from Bengaluru", by Prof. Verma. It will be right to conclude that IST Lab shared enthusiastic and active participation in the 6th CTRG. The wide array of topics and activities involving different IST Lab members is a testimonial to that.

- IST Lab Alumni Activities

  In the year 2021 various alumni activities were conducted which include IST Lab alumni webinar series and IST Lab alumni interview series. Also, a newsletter was published in May 2021 edited by Varun Raturi, Siddhartha Gulhare and Rohit Singh Nitwal.

A total of 8 webinars were organized and 7 alumni interviews were conducted. Below tables provide the details of these webinars and interviews.

IST Lab Alumni Webinar Series

Moderated by

Mr. Siddhartha Gulhare, Convenor, IST Lab Alumni Group
PhD student at University of Florida

S. No.	Speaker	Date	IST Lab Alumni Speaker's name & affiliation	Title of the webinar
1		6th Feb 2021	Dr. Sushma Srinivas, Senior Intelligent Transportation Systems (ITS)/Traffic Engineer AECOM, Boston (USA)	Traffic Impact Assessment Studies – Best Practices in the US
2		6th Mar 2021	Dr. Rahul T.M., Assistant Professor at IIT Ropar	Understanding Pedestrian Perception of an area using LOS Index, and Identifying its impact on future Travel Decisions
3		10th Apr 2021	Mr. DivyakantTahlyan, Ph.D. Candidate, Northwestern University	Disentangling Social Capital – Understanding the Effect of Social Support and Network Resources on Urban Activity Participation

4		8th May 2021	Dr. Varun Raturi, Research Associate at University of Glasgow	The impact of privacy protection measures on the utility of crowdsourced cycling data
5		2nd July 2021	Mr. PragunVinayak, Mobility and Transportation Analytics Consultant, Cambridge Systematics Inc. (Los Angeles)	Measuring hurricane evacuation behaviour using cellular location data
6		7th August 2021	Dr. Saikiran Mayakuntla Post-Doctoral Researcher, University of Chile	A node-based complementarity formulation for dynamic traffic assignment (DTA) problems
7		2nd October 2021	Ms. Prithvi Bhat Beeramoole PhD student at Queensland University of Technology	Can a metaheuristic be used to assist in discrete choice modelling?
8		20th November 2021	Dr. Vajjarapu Harsha, Research Associate at International Center for Environmental Audit and Sustainable Development, Jaipur	Evaluating Climate Change Mitigation & Adaptation Potential of Sustainable Urban Transport Measures in India.

IST Lab Alumni Group Interview Series

Moderated by

Ms. Prithvi Bhat Beeramoole, Co-Convenor, IST Lab Alumni Group
PhD student at Queensland University of Technology

S. No.	Alumni Interviewee	Date	IST Lab Alumni Interviewee's name & affiliation
1		20th Feb 2021	Dr. Saikiran Mayakuntla, Post-Doctoral Researcher, University of Chile
2		26th Mar 2021	Dr. Manoj M., Assistant Professor at IIT Delhi
3		21st May 2021	Dr. Rahul T.M., Assistant Professor at IIT Ropar

4		18th June 2021	Ms. Aparna P.M., Transport Planner, CDM Smith Inc., Qatar
5		20th August 2021	Ms. Mehvish Shah. Business Analyst – Microsoft Azure Release Ops / Redmond Washington
6		25th September 2021	Dr. Varun Raturi, Research Associate at University of Glasgow
7		6th November 2021	Mr. Sreenivasulu Sungadi, Traffic and Road Safety Expert at M/s Eclat Engineering Consultants, Hyderabad

- Festival Celebrations

  Continuing the tradition, the IST lab celebrated the various festivals throughout the year. Starting from Makarskranti, Pongal, Eid-ul-adha, Raksha Bandhan, Varalakshmi Vratam, Onam, Ganesh Chaturthi, Navratri, Durga Puja and Dussehra the lab celebrated the festivals with full enthusiasm. With the purpose of keeping the traditional Indian culture moving, lab members presented about the importance of festivals with different interesting stories, beliefs and rituals that are followed throughout India.

Makarskranti and Pongal

The lab celebrated the first festival of the year, Makarsakranti and Pongal on 14th January. We started with the rangoli at the lab entrance, proceed with the Pooja/Aarti and ended with the discussion how the festival is celebrated thorough the country with different ritual. The festive sweets, Til barfi and Pongal was also distributed amongst the members.



Eid-ul-adha

Eid-ul-Adha is the second most important festival in the Muslim calendar after Eid-ul-Fitr which is celebrated as an act of sacrifice. Furqan and Almas provided us the insights about the festivals through presentation and with interesting stories and beliefs. After presentation and discussion, all the lab members enjoyed the feast with sitting together in a room following all the covid and safety protocols.



Varalakshmi Vratam, Raksha Bandhan and Onam

The lab celebrated these three prominent Hindu festivals will full enthusiasm with participation from all the members. The celebration started with the rangoli competition amongst the three teams. Then, the celebration is proceeded with the Pooja of goddess Varalakshmi. Lab members, Gayathri and Ambika gave the insights about the significant of Varalakshmi and how it is celebrated in the southern part of India. Karthika with interesting videos, presentation and stories talked about the Onam festival. Nipun and Saransh presented the about the Raksha Bandhan festival. The lab discussed on how these festivals were celebrated across the India with different rituals and foods, the stories, and beliefs. At the last, the lab enjoyed the lunch party.

Ganesh Chaturthi, Navratri, Durga Puja and Dussehra

The Lab celebrated these four festivals with great excitement. Continuing the practice, lab members coordinate the festival celebration and present the significance of the festival on why and how the festival is celebrated. These four festivals are celebrated with different traditions all over India and since our lab hosts students from all regions of India, it was a wonderful opportunity, knowing about the culture of different areas and how the same festival is celebrated in different states.

First, the Ganesh murti was established, and the rangoli was made. Then, the celebration is proceeded with the Ganesh aarti. The lab sang beautiful bhajans and then proceeded to the hall for the festival stories and rituals. Rohit, Aitichya and Saransh gives the insights related to this festival, its significance, practices, the

stories, and the beliefs. The lab enjoyed the lunch party and concluded the festival with Ganesh visarjan.




IST Lab Achievements in 2021

In 2021 our lab has been awarded for various papers and projects. Some of these major achievements are presented below:

- ✓ **Best Research Presentation Gold Award** in "The 7th International Conference on Integrated Land Use Transport Modeling" - ILUTM-7", at City of Xi'An, China, organized online on 18-19, June 2021 for the presentation titled: "Review of institutional framework for integrated land use transport planning in Bengaluru".

  A review paper was presented by **Ms. Almas Siddiqui** on institutional framework for integrated land-use transport planning in Bengaluru. She was awarded "**Best Research Presentation Gold Award**" in student category. She spoke about the importance of integration of land-use and transport planning and management especially in Indian Cities. Various policies and initiatives related to it were discussed. The need for strategic planning and identification of evaluation criteria of any new institution before dissolving powers was emphasized. From all the lessons learnt in different studies, the lack of an institutional framework has been identified as one of the major drawbacks in applying integrated land use transport planning practices in India. Formation of 'Unified Metropolitan Transport Authority' (UMTA) for Bengaluru Metropolitan Region was discussed. The identified research gaps in the integrated land use transport planning

practices for Bengaluru city/region along with the constraints in setting up an institution like UMTA were briefly discussed.

- ✓ **Ms. Gayathri H. submitted her PhD thesis** entitled "Crowd flow and risk modelling in mass religious gatherings".

  Since time immemorial, India has hosted numerous religious gatherings and periodic events. Many of these events have been marred by crowd crushes and accidents. Human behavior is a complex phenomenon, which can lead to complex behaviors. This makes the safety of people in crowded places a major concern for the government and management authorities. Capturing and studying these behaviors through empirical studies is essential to predicting crowd risk at a given location. Therefore, a comprehensive crowd risk prediction model in the form of a Crowd Risk Index (CRI) was developed to predict the risk level. The case study considered was Kumbh Mela 2016, held in Ujjain, India, between 22 April and 21 May. Data was collected throughout the event, covering the important days the crowd was expected to be more. Data in video form was recorded using Go-Pro, head-mount cameras, mobile phones, and CCTV cameras. Additionally, data was also collected using GPS trackers and survey forms. Further, quantitative data was collected through visual observations.

  The Crowd Risk Index was developed from three pillars of indices: Crowd Dynamic Index (CDI), Crowd Anxiety Index (CAI), and Temperature-Humidity Index (THI). CDI included (i) macroscopic fundamental flow diagrams of a spiritually motivated crowd (ii) characteristics of stop and go waves in one-dimensional interrupted pedestrian flow through narrow channels (iii) understanding social group behavior in the crowd and the effect of the presence of groups on the crowd movement, and (iv) understanding serpentine group behavior and its impact on crowd dynamics. CAI included the obtained patience and aggression scores to study the crowd's emotions. THI from literature was used to gauge the effect of temperature on the crowd risk. The risk prediction model was developed using the random forest algorithm. This is a one-of-a-kind study in crowd disaster and crowd safety that has never been attempted before in the literature. With an overarching understanding of the factors leading to critical crowd conditions, the CRI developed in this work can help the crowd managers reasonably predict the level of risk and implement appropriate crowd management measures.

- ✓ **IST Lab's "Clean Air Street - Church Street First Project" awarded the "Certificate of Special Recognition" as part of "Volvo India Innovation Award 2021" held at**

Hotel Taj West End, Bengaluru on 10th November 2021. The award jury consisted of the following eminent members: -

Mr. Kris Gopalakrishnan, Co-Founder, Infosys & Chair, Axilor Ventures

Mr. Borjesson Lennart, SVP, Volvo Group HQ, Sweden

Mr. Vinayak Chatterjee, Chairman - Feedback Infra

Mr. Zarin Daruwala, CEO - Standard Chartered Bank, India

Mr. Helene Niklasson, VP, Volvo Group HQ, Sweden

- ✓ The collaborative project with Directorate of Urban Land Transport, Energy Systems Catapult, Urban Morph etc. on "Clean Air Street - Church Street First" has been conferred the "Commendation Award in Urban Transport" under the category "Running trophy for the State/UT, which has Implemented Best Urban

Transport Projects during the previous year“ by Ministry of Housing and Urban Affairs (MoHUA), Government of India.

- ✓ “**Best Research Paper Award (1st Prize)**“ for the paper titled “Impact Assessment of Pedestrianizing an Urban Street in Terms of Quality of Life” presented by **Ms. Hemanthini Allirani** in the 12th Research Symposium of Urban transport held online on 25th October 2021 as a part of 14th Urban Mobility Conference 2021 organized by Ministry of Housing and Urban Affairs (MoHUA), Government of India and Institute of Urban Transport (IUT), India and coordinated by IST Lab.

Report Summary

This report captured the main IST Lab activities and achievements in 2021. Details are provided starting from the vision of Prof. Ashish Verma to revamp the Lab image to IST Lab activities to Alumni activities to various achievements bagged by our lab. The report consists of four sections starting from introduction, IST Lab research contribution, IST Lab activities in 2021, including the details about IST Lab alumni activities and various festival celebrations of the year 2021. Finally, the report showcased the IST Lab's achievements in 2021.

We thank all the alumni and current lab members who, with their hard work and research contribution, have made a positive impact in the field of sustainable transportation and mobility. Their contributions have brought several recognitions and laurels to the IST Lab. The future goal will be to continue this strive for excellence and improve the quality of life and transportation system in our society.