

Bhavathrathan *Bhattiyil Kuzhiyankunnath*

Assistant Professor in Civil Engineering, Indian Institute of Technology Palakkad

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Experience

Indian Institute of Technology Palakkad Assistant Professor, Civil Engineering	PALAKKAD Apr '18 – Present
Singapore-MIT Alliance for Research and Technology Postdoctoral Associate, Future Urban Mobility	SINGAPORE Nov '16 – Mar '18
Indian Institute of Technology Bombay Research Associate, Department of Civil Engineering	MUMBAI Jul '16 – Oct '16
Royal College of Engineering and Technology Lecturer, Department of Civil Engineering	THRISSUR Jul '08 – Jul '09
Ramky Infrastructure Limited Graduate Engineer Trainee	HYDERABAD Jul '07 – Jul '08

Academic Profile

Indian Institute of Technology Bombay Ph. D. in Civil Engineering, Specialised in Transportation Systems Engineering	MUMBAI Jul '11 – Jun '16
Indian Institute of Technology Guwahati M. Tech. in Civil Engineering, Specialised in Transportation Systems Engineering	GUWAHATI Jul '09 – Jul '11
University of Calicut B. Tech. in Civil Engineering, Government Engineering College Thrissur	CALICUT Jun '03 – Jun '07

Research Interests

Transportation Systems, Traffic Flow, Urban Road Networks, Network Resilience, Urban Freight Transport

Teaching

Indian Institute of Technology Palakkad Jul - Nov 2018 CE 3010 Transportation Engineering I (Transportation Planning and Highway Engineering) CE 3410 Construction Materials Laboratory
Jan - May 2019 CE 3015 Transportation Engineering II (Traffic Engineering and Management)
Jul - Nov 2019 CE 3010 Transportation Engineering ID 1050 Concepts in Engineering Design

Publication

Published in Refereed International Journals

1. Sakai T., Bhavathrathan, B.K., Alho A., Hyodo T., and Ben-Akiva M., "Commodity flow estimation for a metropolitan scale freight modeling system: supplier selection considering distribution channel using an error component logit mixture model", *Transportation*, (2018) pp. 1 - 29 <https://doi.org/10.1007/s11116-018-9932-1>
2. Bhavathrathan, B.K., and Patil G.R., "An algorithm to compute urban road network resilience", *Transportation Research Record: Journal of the Transportation Research Board*, 2672.48(2018)pp. 104-115. <https://doi.org/10.1177/0361198118793329>
3. Bhosale, M., Bhavathrathan, B.K., and Patil G.R., "Red Light Running at Heterogeneous Saturated Intersections in Mumbai, India: On the Existence of Two Regimes and Causal Factors", *Transportation Research Record: Journal of the Transportation Research Board* 2619 (2017) pp. 75 – 84 <https://doi.org/10.3141/2619-08>
4. Patil, G.R., and Bhavathrathan, B.K., "Effect of traffic demand variation on road network resilience",

Advances in Complex Systems 19(1)(2016) <http://dx.doi.org/10.1142/S021952591650003X>

5. Bhavathrathan, B.K., and Patil, G.R., "Quantifying resilience using a unique critical cost on road networks subject to recurring capacity disruptions", *Transportmetrica A: Transport Science* 11(9)(2015) pp. 836 – 855, Taylor & Francis. <http://dx.doi.org/10.1080/23249935.2015.1087230>

6. Bhavathrathan, B.K., and Patil, G.R., "Capacity uncertainty on urban road networks: A critical state and its applicability in resilience quantification", *Computers, Environment and Urban Systems* 54 (2015) pp. 108 – 118, Elsevier. <http://dx.doi.org/10.1016/j.compenvurbsys.2015.07.005>

7. Chunchu, Mallikarjuna, and Bhavathrathan, B.K., "Analysis of the effect of two-wheeler lane-sharing behavior on macroscopic traffic flow modeling", *Transport* 29 (2) (2014) pp. 146 – 153
<http://dx.doi.org/10.3846/16484142.2014.928788>

8. Bhavathrathan, B.K., and Chunchu, Mallikarjuna, "Evolution of macroscopic models for modeling the heterogeneous traffic: An Indian perspective", *Transportation Letters* 4 (1) (2012) pp. 29 – 39
[doi/abs/10.3328/TL.2012.04.01.29-39](https://doi.org/10.3328/TL.2012.04.01.29-39)

9. Alho, A., Bhavathrathan, B. K., Stinson, M., Gopalakrishnan, R., Le, D., Ben-Akiva, M. "A multi-scale agent-based modelling framework for urban freight distribution", *Transportation Research Procedia* 27 (2017) pp. 188 - 196 <https://doi.org/10.1016/j.trpro.2017.12.138>

10. Sultania G., Bhavathrathan, B. K. and Patil G.R. "Analysing risk associated with multiple simultaneous disruptions on urban roads". *Transportation Research Procedia* 17 (2016) pp. 539 -547
<https://doi.org/10.1016/j.trpro.2016.11.108>

11. Bhavathrathan, B.K., and Patil, G.R. "Analysis of worst case stochastic link capacity degradation to aid assessment of transportation network reliability", *Procedia-Social and Behavioral Sciences* 104 (2013), pp. 507 - 515 <http://dx.doi.org/10.1016/j.sbspro.2013.11.144>

Under Review

12. Sakai T., Alho A., Bhavathrathan, B.K., G. D. Chiara, R. Gopalakrishnan, P. Jing, Hyodo T., L. Cheah, and Ben-Akiva M., "SimMobility Freight: An Agent-Based Urban Freight Simulator for Evaluating Logistics Solutions", Submitted to *Transportation Research Part E*, 2019

13. Patil G.R. and Bhavathrathan, B. K. "Identifying critical links on disruption-prone road networks: An approach that obviates scenario enumeration", Submitted to *Current Science*, 2019

Presented at International Conferences

International Conferences Held Abroad

1. Bhavathrathan, B.K., and Patil G. R., "An algorithm to compute urban road network resilience", Presented at *Transportation Research Board 97th Annual Meeting*, January 2018, Washington DC. <https://trid.trb.org/view/1497308>

2. Sakai T., Bhavathrathan, B.K., Alho A., Hyodo T., and Ben-Akiva M., "Urban Freight Distribution considering Logistics Chain Structure: Selection of Supplier with Distribution Channel", Presented at *Transportation Research Board 97th Annual Meeting*, January 2018, Washington DC. <https://trid.trb.org/view/1497034>

3. Alho, A., Bhavathrathan, B. K., Stinson, M., Gopalakrishnan, R., Le, D., Ben-Akiva, M. "A multi-scale agent-based modelling framework for urban freight distribution", Presented at *20th EURO Working Group on Transportation Meeting*, September 2017, Budapest, Hungary. <http://toc.proceedings.com/38178webtoc.pdf>

4. Bhosale, M., Bhavathrathan, B.K., and Patil G.R., "Two regimes of red-light-running at heterogeneous, saturated intersections: A field investigation in Mumbai, India", Presented at *Transportation Research Board 96th Annual Meeting*, January 2017, Washington DC. <http://amonline.trb.org/63532-trb-1.3393340/t024-1.3404251/579-1.3404799/17-06610-1.3399804/17-06610-1.3404802?qr=1>

5. Bhavathrathan, B. K., and Patil, G. R., "Stochastic tolling to achieve long-run system optimum under tolerance-based probabilistic user equilibrium." Presentation at the *14th World Conference on Transportation Research*, July 2016, Shanghai, China. Available online at <https://wctrs.conference-services.net/view-file.asp?sessionID=&abstractID=863926&conferenceID=3909&abstractName=paper>

6. Patil, G.R., and Bhavathrathan, B.K., "A Game-Theoretic Model to Identify Critical Links on Urban Road Networks", *Transportation Research Board 95th Annual Meeting* 16-5213, January 2016, Washington DC. Available online at <http://amonline.trb.org/trb60693-2016-1.2807374/t001-1.2823436/264-1.2823590/16-5213-1.2981771/16-5213-1.2993251?qr=1>

7. Bhavathrathan, B. K., Madhusoodhanan, C. G., Patil, G. R., and Eldho, T.I. "Climate change impacts on coastal urban road networks: A methodological approach." International Conference on Climate Change Innovation and Resilience for Sustainable Livelihood (*ClimDev15*), January 2015, Kathmandu, Nepal. Available online at <https://smallearthnepal.files.wordpress.com/2014/06/proceeding.pdf>

8. Patil, G.R., and Bhavathrathan, B.K., "Investigating the sensitivity of road network resilience to demand variability", *Transportation Research Board 94th Annual Meeting* 15-4173, January 2015, Washington DC, USA.

Available online at <http://docs.trb.org/prp/15-4173.pdf>

9. Bhavathrathan, B.K., and Patil, G.R. "A critical state of multiple simultaneous link disruptions", *Transportation Research Board 93rd Annual Meeting* 14-4351, January 2014, Washington DC, USA. Available online at <http://amonline.trb.org/trb-55856-2014a-1.823612/t-1134-1.870386/234-1.877005/14-4351-1.877014/14-4351-1.877018?qr=1>

10. Bhavathrathan, B.K., and Patil, G.R. "Modelling network degradation using game theory- Optimal strategies at Nash equilibrium", *13th World Conference on Transportation Research*, July 2013, Rio de Janeiro, Brazil. Available online at <http://www.wctrs-society.com/wp/wp-content/uploads/abstracts/rio/selected/3076.pdf>

International Conferences Held in India

11. T. Sakai, A. Alho, B.K. Bhavathrathan, G. Dalla Chiara, R. Gopalakrishnan, P. Jing, T. Hyodo, L. Cheah, M. Ben-Akiva, "Modeling Freight in SimMobility, A Multi-scale Agent-based Urban Simulation Platform", Presented at *World Conference on Transportation Research*, June 2019, Mumbai.

12. Bhavathrathan, B.K., and Patil G. R., "Identifying urban road-segments that are critical to network resilience", Presented at *4th World Congress on Disaster Management*, January 2019, Mumbai.

13. Bhavathrathan, B. K., and Patil, G. R., "Identifying tipping-points of disruptions on urban road networks." Presented at the *Transportation Planning and Implementation Methodologies for Developing Countries*, December 2016, Mumbai, India.

14. Bhavathrathan, B. K., and Patil, G. R., "Urban transportation demand management: A review of strategies, modelling frameworks, and case studies." *3rd Conference of the Transportation Research Group of India*, December 2015, Delhi, India.

15. Sultania, G., Bhavathrathan, B. K., and Patil, G. R., "Quantifying risk due to capacity uncertainty on urban road networks." *11th Transportation Planning and Implementation Methodologies for Developing Countries*, December 2014, Mumbai, India.

16. Bhavathrathan, B. K., and Patil, G. R., "Analysis of worst case stochastic link capacity degradation to aid assessment of transportation network reliability." *2nd Conference of the Transportation Research Group of India*, December 2013, Delhi, India.

17. Bhavathrathan, B. K., and Patil, G. R., "Modelling worst-operable-case on urban networks due to stochastic link capacity degradations." *10th Transportation Planning and Implementation Methodologies for Developing Countries*, December 2012, Mumbai, India.

Presented at National Conferences

18. Bhavathrathan, B. K., and Patil, G. R., "Investigating demand-sensitivity and establishing a generalized index of transportation network resilience." *Colloquium on Transportation Systems Engineering and Management*, May 2014, Kozhikode, India.

19. Bhavathrathan, B. K., and Patil, G. R., "Minimax optimization to analyze worst-case of transportation networks." *Recent Advances in Civil Engineering*, April 2013, Belgaum, India.F

Professional Activities

Ph. D. Supervision

Shilpa R. Nair, Accident prediction at regional road network scales, 2018 – to-date

B. Tech. Project Supervision

Vivek TV, Traffic Rerouting to Maximize Structural Reliability, 2019 - 2020

Ankuj Dahiya, Analysis of capacity and crash-risk at a Rotary Intersection in Palakkad, 2018 - 2019

Chirag, Simulation based sensitivity analysis on traffic parameters, 2018 - 2019

Akshay Kumar Verma, Geometric design and capacity analysis of circular runway: A case study for Bangalore and Hyderabad airports, 2018 - 2019

Sponsored Projects

Analysis of Evacuation Options considering Citizen Mobility Patterns and Disaster Vulnerability in a Himalayan Region Transportation Network, National Mission on Himalayan Studies, Ministry of Environment, Forest & Climate Change, 2019-2022

(with Dr. Manoj M., IIT Delhi and Dr. Rahul TM, IIT Ropar)

Invited Lectures

1. Invited Lecture on *Integrated agent-based simulation for urban transportation planning* at National Transportation Planning and Research Centre, May 2019

2. Keynote Lecture on *Why and how shall we quantify infrastructural resilience?* at Amal Jyothi College of Engineering, Kerala, April 2019
3. Keynote Lecture on *Simulating Demand and Supply of Urban Commute* at Viswajyothi College of Engineering and Technology, Kerala, October 2018

Reviewing & Refereeing

ADB30 Committee of TRB: Member of the ADB30 (Transportation Network Modeling Committee) reviewer pool for Transportation Research Board Annual Meeting, Washington D.C.

Transportmetrica A: Transport Science Published by Elsevier

Transportation Letters: the International Journal of Transportation Research, published by Maney & J. Ross.

Reliability Engineering & System Safety: Published by Elsevier in association with the European Safety and Reliability Association, and the Safety Engineering and Risk Analysis Division

Journal of Urban Technology: Published by Taylor & Francis

EWGT: European Working Group on Transportation

CTRG: Conference of Transportation Research Group of India

TPMDC: International Conference on Transportation Planning and Implementation Methodologies in Developing Countries

Organizing Academic Events

Overall Coordinator (Students'), TPMDC '14: International Conference on Transportation Planning and Implementation Methodologies in Developing Countries (TPMDC 2014), IIT Bombay, Mumbai, December 10-12, 2014

Assisted in organizing UFT Workshop: An Indo-US workshop on Urban Freight Transport: A Global Perspective, Jointly organized by IIT Bombay and VREF Center of Excellence for Sustainable Urban Freight Systems, Rensselaer Polytechnic Institute, Troy, New York at IIT Bombay, April 9-10, 2014

Assisted in conducting IUT Meeting: Workshop on Transit-Oriented Development by Institute of Urban Transport (India) Western region Chapter at IIT Bombay, September 24, 2013

Assisted in organizing CE&QIP Course: Continuous Education (CE) & Quality Improvement Program (QIP) Short Term Course on Transportation Demand Modeling at IIT Bombay during June 17-21, 2013

Scientific Committee (Students') and Delegate Relation, TPMDC '12: International Conference on Transportation Planning and Implementation Methodologies in Developing Countries (TPMDC 2012), IIT Bombay, Mumbai, December 12-14, 2012

Assisted in organizing InTranse 2011: International Conference on Intelligent Transportation Systems (InTranSe 2011) jointly organized by IIT Bombay and Centre for Development of Advanced Computing (C-DAC) Thiruvananthapuram at IIT Bombay, October, 2011

Consultancy Projects

Vehicular Congestion and Emissions Analysis: Assisted in vehicular congestion and emissions analysis of a proposed township 'Rising City' in Mumbai. PI: Prof. Gopal R. Patil, IIT Bombay, October 2015

Professional Memberships

TRG: Life member, Transportation Research Group of India, since 2019

MISTE: Life member, Indian Society for Technical Education, since 2008