

SHAMS TANVIR

North Carolina State University
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Education

- Ph.D., Transportation Systems Engineering** Jan. 2018
North Carolina State University, Raleigh, NC (GPA 4.00/4.00)
Dissertation: Modeling and Simulation of Driving Activity from an Energy Use-Emissions Perspective (Advisor: Drs. Nagui Roupail and H. Christopher Frey)
- M.Sc., Transportation Engineering** Jun. 2013
Bangladesh University of Engineering & Technology, Bangladesh (GPA 3.86/4.00)
Thesis: Development of Dynamic O-D Matrix based Travel Demand Modeling Framework using Cell Phone Data (Advisor: Dr. Charisma F. Choudhury)
- B.Sc., Civil Engineering** Oct. 2009
Bangladesh University of Engineering & Technology, Bangladesh (GPA 3.93/4.00)
Thesis: Development of Interrupted Flow Traffic Noise Prediction Model

Employment History

- Research Associate** May 2017 - Present
Institute for Transportation Research & Education
North Carolina State University
- Graduate Research Assistant** Aug. 2013 - May 2017
Institute for Transportation Research & Education
North Carolina State University (Supervisor: Dr. Nagui Roupail)
- Junior Consultant** Jul. 2010 - Aug. 2013
Bureau of Research, Testing, and Consultation, Bangladesh
Supervisor: Dr. Md. Shamsul Hoque
- Assistant Professor/ Lecturer** Jan. 2010 - Aug. 2013
Department of Civil Engineering
Bangladesh University of Engineering and Technology, Bangladesh

Fellowships and Honors

- Ramey Kemp Graduate Fellowship, North Carolina State University 2015
Don Blackburn Memorial Scholarship, NC Section ITE 2015
Bruce Edward Matthews Graduate Scholarship, North Carolina State University 2015
Summa cum Laude, Bangladesh University of Engineering & Technology 2009
F.R. Khan Award, Bangladesh University of Engineering & Technology 2007
Dean's List Scholarship, Bangladesh University of Engineering & Technology 2005-2009
Technical Scholarship, Bangladesh University of Engineering & Technology 2005-2009
Junior Scholarship, People's Republic of Bangladesh 2000-2002

Research Interests

Microscale driver behavior related to energy efficiency and safety
Automation and connectivity in transportation systems
Transportation energy and emissions models
Big data driven and sensor based cyber-physical systems
Agent-based transportation network models
Mobile data use for transportation modeling and operations

Summary of Record

Journal articles	2 Published, 2 Accepted, 2 under Review, and 6 in Preparation
Invited talks	2
Conference papers	9
Collaborations	Led and created collaborations across engineering (environmental, industrial, mechanical, and computer), statistics, public health, and atmospheric science.
Proposal Writing	4+ years' experience in proposal writing as PI and with advisor.

Peer-Reviewed Journal Articles

1. Zhou, X., **Tanvir, S.**, Lei, H., Taylor, J., Liu, B., Roupail, N. M., Frey, H. C. (2015) "Integrating a simplified emission estimation model and mesoscopic dynamic traffic simulator to efficiently evaluate emission impacts of traffic management strategies" , *Transportation Research Part D: Transport and Environment*, 37, 123-136.
2. **Tanvir, S.**, Karmakar, N., Schroeder, B.J., Roupail, N.M. (2016) "Modeling Freeway Work Zones with Mesoscopic Dynamic Traffic Simulators: Validation, Gaps, and Guidance", *Transportation Research Record: Journal of the Transportation Research Board*, No. 2567, 122-130.
3. **Tanvir, S.**, Frey, H.C., Roupail, N.M. (2018) "Effect of Light Duty Vehicle Performance on a Driving Style Metric", *Transportation Research Record: Journal of the Transportation Research Board* (Accepted for Publication)
4. Ahmed, I., Roupail, N.M., **Tanvir, S.** (2018) "Characteristics and Temporal Stability of Recurring Bottlenecks", *Transportation Research Record: Journal of the Transportation Research Board* (Accepted for Publication)
5. **Tanvir, S.**, Chase, T., Roupail, N.M. "Development and Analysis of Eco-Driving Metrics for Naturalistic Instrumented Vehicles", *Journal of Intelligent Transportation Systems*. (Under Review)
6. Schroeder, B. J., **Tanvir, S.**, Hajababie, A., Jia, A., Roupail, N.M., "Quantifying Network Level Impacts of Long-Term Freeway Work Zones in Urban Areas", *Case Studies on Transport Policy*. (Under Review)

Manuscript in Preparation

1. **Tanvir, S.**, Brantley, H., Saha, P., Roupail, N.M., Grieshop, A., Ko, K., Guinness, J., Fuentes, M., "On the Link between Traffic Based Indices and Near-Road Air Quality". (In Prep.)
2. **Tanvir, S.**, Taylor, J., Zhou, X., Roupail, N.M., "Dynamic Time Warping Stationarity Analysis to Study Impacts of Vehicle Activity Peaks on High Emissions Episodes". (In Prep.)
3. **Tanvir, S.**, Roupail, N.M., "Method for Processing Simulated Trajectories from Simplified Car- Following Models to Realistically Represent Fuel Use and Emissions Characteristics." (In Prep.)
4. **Tanvir, S.**, Zhou, X., Roupail, N.M., "Development of a Faster Emissions Estimation Module for Mesoscopic Traffic Simulators using High Dimensional Clustering". (In Prep.)

5. **Tanvir, S.**, Roupail, N.M., “Development of Driver Classifier and Personalized Recommender System to Optimize Driving Style for Real-Time Eco Driving Applications”. (In Prep.)
6. **Tanvir, S.**, Chase, T., Williams, B., Roupail, N.M., “Prediction of Hourly Traffic Volume from Probe based Travel Time”. (In Prep.)

Invited Talks

1. **Tanvir, S.**, “Minimizing Energy Use through Adjustments to Driving Style”, April 14, 2016, Maryland Transportation Innovation and Policy Summit. College Park, MD.
2. **Tanvir, S.**, & Hoque, M.S., “Application of Mobile Phone Data in Transportation Research in Dhaka”, March 2012, International Workshop on Environmental Information, CSIS, The University of Tokyo, Japan.

Peer Reviewed Conference Papers

1. **Tanvir, S.**, Ahmed, I., Karmakar, N., Schroeder, B.J., “Determination of Diversion Sensitivity at Urban Freeway Work Zones using Bluetooth Devices”, Proceedings of Transportation Research Board 96th Annual Meeting, January 2017, Washington DC.
2. Ahmed, I., Roupail, N.M., **Tanvir, S.**, Pan, L., “Characterizing and Ranking Recurring Freeway Bottlenecks”, Proceedings of Transportation Research Board 96th Annual Meeting, January 2017, Washington DC.
3. Karmakar, N., Hartmann, M., **Tanvir, S.**, Chase, T., Aghdashi, B., Schroeder, B.J., “Motivations and Lessons Learned in Regional Network Model Reduction for Macroscopic and Mesoscopic Modeling of Large Scale Work Zone Impacts”, Proceedings of Transportation Research Board 96th Annual Meeting, January 2017, Washington DC.
4. **Tanvir, S.**, Schroeder, B.J., Roupail, N.M., “Effect of Lane Closure on Vehicle Trajectories and Emissions: Simulation and Real-World Evaluation”, Proceedings of 109th Annual Meeting of Air & Waste Management Association, June 2016, New Orleans LA.
5. Ko, K., Kim, S., Roupail, N.M., **Tanvir, S.**, Huh, H., Yang, C., “Application of Mesoscopic Model for Estimating Regional Emissions and Energy Consumption”, Korea Transportation society, October 2015, Sejong-city, Korea. (won the best paper award)
6. **Tanvir, S.**, Schroeder, B.J., & Roupail, N.M., “Network Level Impacts of Major Freeway Reconstruction Project on Vehicular Emissions”, Proceedings of 108th Annual Meeting of Air & Waste Management Association, June 2015, Raleigh NC.
7. **Tanvir, S.**, Liu, B., Zhou, X., Frey, H.C., Roupail, N.M., “Assessing Emission Impacts of Transportation Management Strategies for Large-Scale Regional Networks”, Proceedings of Transportation Research Board 94th Annual Meeting, January 2015, Washington DC.
8. Haque, K., Fatmi, M.R., **Tanvir, S.**, “Effects and Feasibility of Relocation of Kamalapur Railway Station: An Econometric Approach”, 1st International Conference on Advances in Civil Engineering, December 2012, Chittagong, Bangladesh.
9. **Tanvir, S.**, Rahman, M.M., “Development of Interrupted Flow Traffic noise Prediction Model for Dhaka City”, 4th Annual Paper Meet and 1st Civil Engineering Congress, December 2011, IEB, Dhaka, Bangladesh. (won the best paper award)

Proposal Writing Experience (Selected)

1. US Department of Energy. 'Empirically Grounded Agent Based Predictive Models for Energy Use in Mixed Autonomous Vehicle Fleet.' Proposal approved at the prescreening stage. Dr. Nagui Roupail proposed as PI.
2. North Carolina Department of Transportation. 'How to Account for Seasonal Population Shifts in distributing the Powell Bill Allocation Funds?' Shams Tanvir proposed as PI.
3. North Carolina Department of Transportation. "Predicting Lane Change Intensity within Urban Interchange Influence Areas".' Dr. Nagui Roupail as PI. \$233,447 for 08/01/2018 to 07/31/2020.
4. Federal Highway Administration: 'Evaluation and Guidance on Improved Methods for Quantifying Impacts of Highway Transportation Projects on Air Quality.' Dr. Chris Frey as PI. \$150,000 for 09/29/2017 to 09/28/2018.
5. US Department of Energy, Traveler Response Architecture using Novel Signaling for Network Efficiency in Transportation (TRANSNET): 'Integrated, Personalized, Real-time Traveler Information and Incentive Technology for Optimizing Energy Efficiency in Multimodal Transportation Systems (IPRETII).' Dr. Lei Zhang as PI. \$3,780,000 for 11/23/2015 to 05/22/2018.
6. Korea Institute of Civil Engineering and Building Technology: 'Development and Calibration of High Resolution Integrated Emissions and Mesoscopic Traffic Model for Korean Condition.' Dr. Nagui Roupail as PI. \$90,000 for 01/2015 to 12/2015.

Leadership Experience

Air and Waste Management Association Vice-President, Technical Committee on Mobile Source Emissions	Jun. 2015 - Present
NCSU ITE/ASHE/AREMA Student Chapter Secretary	Oct. 2015 - Sep. 2016
Civil Engineering Students' Association President	May 2008 - Oct. 2009

Mentoring

Azhagan Avr, Electrical Engineering, NC State University Research: Development of continuous headway measurement system using LiDAR sensor	Fall 2017
Ishtiak Ahmed, Civil Engineering, NC State University Research: Measuring diversion sensitivity of urban freeway work zones	Fall 2016
Kwanpyo Ko, Civil Engineering, NC State University Research: Mesoscopic simulation of traffic and emissions for large-scale road networks	Spring 2016
Scott Sallade, Civil Engineering, NC State University Research: Use of automated video detection to measure traffic movements at intersections	Fall 2015
Timothy Nye, Civil Engineering, NC State University Research: Bluetooth devices to monitor travel time at urban freeway work zones	Spring 2015
Nabaruna Karmakar, Industrial Systems Engineering, NC State University Research: Adapting regional travel demand model networks for dynamic traffic simulation	Spring 2015
Kambiz Tabrizi, Civil Engineering, NC State University Research: Application of freeway analysis tools for work zones	Fall 2014

Relevant Project Experience

US Department of Energy, TRANSNET. 'IPRETII. Minimizing Energy Use through Adjustments to Driving Style'. 10/2015 to Present.

Health Effects Institute. 'Characterizing the Determinants of Vehicle Traffic Emissions Exposure: Measurements and Modeling of Land-Use, Traffic, Transformation and Transport'. 01/2015 to Present.

US Environment Protection Agency. 'Framework for Context-Sensitive Spatially- and Temporally-Resolved Onroad Mobile Source Emissions Inventories'. 08/2013 to 01/2015.

North Carolina Department of Transportation. 'Work Zone Monitoring and Assessment for TIP I-5311/I-5338, I-40 Fortify'. 08/2013 to 08/2016.

Professional Affiliations

Institute of Transportation Engineers (ITE)

American Society of Civil Engineers (ASCE)

Air & Waste Management Association (AWMA)

American Society of Highway Engineers (ASHE)

The Institute of Engineers Bangladesh (IEB).

Friend of TRB Standing Committees: Freeway Operations (AHB20), Transportation and Air Quality (ADC20), Transportation Energy (ADC70), Transportation Network Modeling (ADB30).

Peer Review Participation

Transportation Research Part D: Transport and Environment

Journal of Air & Waste Management Association

Transportation Research Record: Journal of the Transportation Research Board

Sustainable Cities and Society

Skills

Simulation: TRANSCAD, Cube, HCS, Synchro, VISSIM, VISTRO, MOVES, R-Line, DTALite. Programming: C++, Python, R, MATLAB, SAS, SPSS, GISDK, SQL.

Drafting/ Visualization: Microsoft Office 15, AutoCAD, ArcGIS, QGIS, Gnuplot, Inkscape, Adobe Illustrator. Language: English, Bangla.

Courses and Workshops

Graduate: Traffic Operations, Traffic Flow Theory, Sensors and Instrumentation, Transportation Logistics, Air Pollution Control, Advanced Traffic Control, Environmental Exposure Risk Analysis, Transportation Economics, Fundamentals of Operations Research. Online: R Programming, Machine Learning (Coursera), Introduction to Computer Science and Programming using Python (edX)

Certifications

1. Data Science Short Course, NC State Data Science Initiative, August 8-12, 2016.
2. International Course on Transportation Planning and Safety, World Health Organization, Indian Institute of Technology, Delhi, December 2012.
3. Teachers' Appreciation, Directorate of Continuing Education, Bangladesh University of Engineering and Technology, May 2010.

Updated April 18, 2018