

## Academic Resume

**Narayan Venkataraman, PhD**  
**Texas Tech University**  
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### Professional Preparation

Ph.D. (Civil Engineering)	University of Iceland, Reykjavik
M.B.A (Marketing)	Sri Chandrasekarendra Saraswathi Vishwa Mahavidyalaya, India
B.S (Physics)	University of Madras, India

### Professional History

Post-Doctoral Research Associate, Texas Tech University (TechMRT- Center for Multidisciplinary Research in Transportation, Texas Tech University, Lubbock, TX, Sep 8 2017– present.

Post-Doctoral Scholar, The Pennsylvania State University, University Park, PA, Sep 1 2014– Sep 8 2017.

University Graduate Researcher, University of Iceland, May 26 2014– August 31, 2014.

Graduate Research Fellow, University of Iceland, Reykjavik, January 21 2010– May 26 2014.

### Research Interests

Interchange Safety Modeling, Model Transferability Methods, and Statistical and Econometric Analysis.

Current research work responsibilities (Perform research on sponsored projects in traffic safety, publish research papers in top-tier peer-reviewed journals, submit proposals to external research sponsors for funding transportation research projects at Texas Tech, secure and manage sponsored research funding as principal/co-principal investigator, present research findings at leading national/international conferences, serve on the editorial boards of top-tier transportation journals, and perform peer-review work related to the field of transportation.

### Research Experience

Developed tools for the system wide deployment of random parameter statistical models in departments of transportation (Washington and California). Statistical Modeling of Crashes, Pedestrian Safety Analyses, Driver Behavior and Risky Driving, Product Preference Survey Development, and Analysis, Econometric Model Development, Safety Evaluation Testbeds, Performance Based Design Database Development, Longitudinal Activity Analysis of Trip Diaries, Highway Design Variances and Performance Analysis, Econometric Methods in Safety Analysis, and Book Chapter Editing. Methods in transportation programming, safety prediction methods, pedestrian and bicycle safety analyses, model transferability methods, methodological bridge testing, and model specification searches.

Course Development Experience Course Notes Development: Econometric Methods in Transportation, Urban Infrastructure Planning, Transportation Network Analysis, Introduction to Transportation Engineering.

### **Membership on National Committees**

Member, Transportation Research Board Committee ACS20, Standing Committee on Safety Performance Analysis, US National Research Council, 2020-2022.

Member, Transportation Research Board Committee ANB25, Committee on Highway Safety Performance, US National Research Council, 2016-2017; 2017-2020.

### **Membership on Elsevier Editorial Board**

Editorial Advisory Board Member in Analytic Methods in Accident Research (Top Tier Transportation Safety Journal, Elsevier) Starting January 2017.

### **Transportation Research Board, US National Research Council Committee Activities**

Reviewer for the AASHTO Highway Safety Manual Second Edition.

### **Other Review Work Activities**

TRB Paper reviewer, US National Academy of Sciences. Committee work for ACH40, Standing Committee on Human Factors of Infrastructure Design and Operations, US National Research Council, 2020-. Reviewer for the 10th annual TTU Undergraduate Research Conference at Texas Tech University.

### **Proposal Submission:**

Assessing Data Needs for Multimodal System Analysis and Evaluation. Grant proposal submitted to the Washington State Department of Transportation Contract amount: \$365,865.00; Period:24 months.

NSF 19-505 grant proposal titled 18-539 “SPX: Collaborative Research: High-Performance Road Traffic Data Analytics and Simulations” submitted to the National Science Foundation, for potential grant consideration. Contract amount: \$300,000; Period:36 months. Participating Institutions: Texas Tech University in collaboration with Pennsylvania State University and University of California Berkeley.

University Transportation Centers (UTC) federal grant proposal “Sensors and Materials Approaches to Rural Transportation: Toward Emergent Resilience (SMART-ER) Center” submitted to the National Science Foundation, for potential grant consideration. Contract amount: \$5000,000; Period:6 months. Participating Institutions: Multiple institutions.

NCHRP 17-92 federal grant proposal titled “Developing Safety Performance Functions for Rural Two-Lane Highways that Incorporate Speed Measures” submitted to the National Academy of Sciences, Transportation Research Board, Washington DC for potential grant consideration. Contract amount: \$500,000; Period: 36 months. Participating Institutions: Texas Tech University in collaboration with University of Missouri-Columbia and Pennsylvania State University.

NSF 18-539 grant proposal titled 18-539 “BIGDATA: IA: Collaborative Research: High-throughput Analysis of Heterogeneous Road Traffic Data” submitted to the National Science Foundation, for potential grant consideration. Contract amount: \$299,261.00; Period:36 months. Participating Institutions: Texas Tech University in collaboration with Pennsylvania State University and University of California Berkeley.

NCHRP 17-85 federal grant proposal titled “Development and Application of Crash Severity Models for the Highway Safety Manual” submitted to the National Academy of Sciences, Transportation Research Board, Washington DC for potential grant consideration. Contract amount: \$600,000; Period: 36 months. Participating Institutions: Texas Tech University in collaboration with Pennsylvania State University.

### **Research Grant Activities**

1. Principal Investigator, Safety Performance Function Implementation, Washington State Department of Transportation, \$236,000, July 1, 2015 to June 30, 2018.
2. Co-Principal Investigator, Effect of Roadway Continuous Safety Lighting on Severity Prediction on Urban State Highways: Washington State Department of Transportation, July 1, 2014 to 2015.
3. Lead post-doctoral researcher in Penn State College of Engineering seed grant research project: High Performance Computing for Network Traffic Safety (HPCNeTS), \$25,000 in direct costs, July 1, 2015 to June 30, 2017.
4. Co-Principal Investigator, Two-Lane Rural Roadway Safety Performance Function Development, Washington State Department of Transportation, Sep1, 2014 to June 30, 2016.
5. Investigator, Advanced Safety Performance Function Development using Roadway and Roadside Geometrics: California Department of Transportation, July 1, 2014 to June 30, 2016.
6. Investigator, Urban and Suburban Arterial Safety Performance Functions, Washington State Department of Transportation, 2012-2016.
7. External reviewer, Safety Performance Functions for California Highways, California Department of Transportation, 2013-2016.
8. Investigator, Random Parameter Analysis of Geometric Effects on Freeway Crash Occurrence, University of Iceland Research Foundation, 2010-2013.

### **Project Reports to Sponsor**

1. Blum, J., Venkataraman N., Shankar V., Huang S., Seraneeprakarn, P. “An Implementation Framework for Random Parameter Models for Crash Frequency Prediction and Safety Investment Prioritization on the Washington State Department of Transportation Highway Network,” WSDOT Final Report, 137 pages, June 2018.
2. Shankar V., Venkataraman N., Hong J., Hariharan B., Kwon D. “Urban and Suburban Arterial Safety Performance Functions,” WSDOT Final Report, 164 pages, June 2016.
3. Shankar V.N., Venkataraman N., Madanat S. “Methods for Identifying High Collision Concentrations for Identifying Potential Safety Improvements,” CALTRANS Final Report, 80 pages, June 2016.
4. Shankar V., Hong J., Venkataraman N., Hariharan B., Kheziyur A., Huang S., Kwon D. “Two Lane Rural Highways Safety Performance Functions,” WSDOT Final Report, 400 pages, May 2016.

5. Schalkwyk I.V., Venkataraman N., Shankar V., Milton J.C., Bailey T.J., Calais K. "Evaluation of the Safety Performance of Continuous Mainline Roadway Lighting on Freeway Segments in Washington State," WSDOT Research Report, 84 pages, March 2016.
6. Shankar V., Venkataraman N., Hong J., Hariharan B. "Urban and Suburban Arterial Safety Performance Functions," WSDOT Interim Report, 176 pages, September 2015.
7. Schalkwyk I.V., Shankar V., Hong J., Venkataraman N., Hariharan B., Kheziyur A., Huang S., and Kwon D. "Models for Two Lane Rural Highways Safety Performance Functions," WSDOT Interim Report, 370 pages, September 2015.

### Peer-Reviewed Journal Publications

1. Seraneeprakarn, P., Huang, S., Shankar, V., Mannering, F., Venkataraman, N., Milton, J., (2017). Occupant Injury Severities in Hybrid-Vehicle Involved Crashes: A Random Parameters Approach with Heterogeneity in Means and Variances. *Analytic Methods in Accident Research* 15, 41-55.
2. Hong, J., Shankar, V., Venkataraman, N., (2016). A Spatially Autoregressive and Heteroskedastic Space-Time Pedestrian Exposure Modeling Framework with Spatial Lags and Endogenous Network Topologies. *Analytic Methods in Accident Research*, Vol. 10, pp. 26–46.
3. Venkataraman, N., Shankar, V., Blum, J., Hariharan, B., Hong, J., (2016). Transferability Analysis of Heterogeneous Overdispersion Parameter Negative Binomial Crash Models. *Transportation Research Record*, 2583, pp. 99-109.
4. Venkataraman, N., Ulfarsson, G., Shankar, V., Deptuch, D., (2014). A Heterogeneity-in-Means Count Model for Evaluating the Effects of Interchange Type on Heterogeneous Influences of Interstate Geometrics on Crash Frequencies. *Analytic Methods in Accident Research*, Vol. 2, pp. 12–20.
5. Venkataraman, N., Ulfarsson, G., Shankar, V., (2014). Extending the Highway Safety Manual (HSM) Framework for Traffic Safety Performance Evaluation. *Safety Science*, 64, 146-157.
6. Venkataraman, N., Ulfarsson, G. F., Shankar, V. N., (2013). Random Parameter Models of Interstate Crash Frequencies by Severity, Number of Vehicles Involved, Collision and Location Type. *Accident Analysis & Prevention*, 59(1), 309-318.
7. Venkataraman, N. S., Ulfarsson, G.F., Shankar, V.N., Oh, J., Park, M., (2011). Model of relationship between interstate crash occurrence and geometrics: Exploratory insights from random parameter negative binomial approach. *Transportation Research Record: Journal of the Transportation Research Board*, No. 2236(1), pp. 41-48.

### Citations of Published Work

Published work has been cited 248 times using Scopus, 407 times in Google Scholar, and 275 times in ResearchGate. **Platinum H-index: 42.23** and Self citation: 3.63%.

### Journal Articles in Preparation for Submission

1. Venkataraman N., and Shankar V. Grouped Random Effects with and without Boosting in Random Parameters Modeling of Intersection Accidents with Heterogeneity in Means and Variance.
2. Al-Mothaffer G., Yamamoto T., Shankar V., and Venkataraman N. A Multivariate Panel Copula-Based Count Model to Examine Intertemporal and Inter-Crash Type Correlations.

3. Hong J., Shankar V., and Venkataraman N. An Application of Generalized Estimation Equations on Multivariate Multiple Outcome Marginal Model of Freeway Crash Type, Severity and Vehicle Involvement using Longitudinal Binary Crash Data.
4. Seraneeprakarn, P., Huang, S., Venkataraman N., and Shankar, V. An Empirical Investigation using Heckman Copula Method for Injury Rate Selection in Two-Vehicle Crash Severity Analysis.
5. Seraneeprakarn, P., Huang, S., Venkataraman N., and Shankar, V. A Random Parameter Heterogeneity in Means and Variance Negative Binomial Model with Human Factor Proportions as Additional Variables.
6. Huang, S., Seraneeprakarn, P., Venkataraman N., and Shankar, V. Modeling interstate crash frequencies: A random parameters negative binomial approach with heterogeneity in over-dispersion parameter.
7. Huang, S., Seraneeprakarn, P., Venkataraman N., and Shankar, V. Nonlinear Functional Form Versus Random Parameter Assumptions in Negative Binomial Cash Analysis: A Comparative Study.
8. Hong J., Shankar V., and Venkataraman N. Analysis on Integrated Transit Network in Seoul: Focus on non-recursive methods for transit ridership estimation.
9. Oh J., Shankar V., Venkataraman N., and Mannering F. A Latent Factors Logit- Negative Binomial Model for Evaluating Lighting Effects on Traffic Crash Occurrence.
10. Hariharan B., Shankar V., and Venkataraman N. A Heterogeneous Multivariable Fractional Polynomial Negative Binomial Model: Addressing Nonlinear Functional Forms for Crash Analysis.

### **Books and Monographs**

Sittikariya S., Shankar V., and Venkataraman N. "Modeling Heterogeneity: Traffic Accidents," VDM-Verlag, 80 pp, 2009.

### **Doctoral Dissertation**

Ph.D. Dissertation, **2014**. Random Parameter Analysis of Geometric Effects on Freeway Crash Occurrence. University of Iceland, Reykjavik. 250 pages. Available electronically from <http://hdl.handle.net/1946/19312>.

### **Fully Peer-Reviewed Conference Proceedings**

1. Hariharan B., Hong J., Shankar V., Venkataraman N.S., Huang S., Kezhiyur A.J., Milton J., and Schalkwyk I.V. "Roadside Geometry Effects on the Overdispersion Parameter" *The 95th Annual Meeting of the Transportation Research Board*, National Research Council, Washington, District of Columbia, U.S.A., 2016.
2. Hong J., Hariharan B., Shankar V., Venkataraman N.S., Milton J., and Schalkwyk I.V. "Random Parameter Framework for Two-Lane Rural Roadways: Findings from Washington State" *The 95th Annual Meeting of the Transportation Research Board*, National Research Council, Washington, District of Columbia, U.S.A., 2016.
3. Kwon D., Shankar V., Oh J., and Venkataraman N. "A Behavior Based Framework for Assessing Nonmotorized Exposure for Safety and Security Analysis," *Road Safety and Simulation International Conference*, Rome, Italy, 2013.
4. Shankar V., Kwon D., and Venkataraman N. "A Joint Model of Relative Risk of Exposure and Pedestrian Flow Measures," *Road Safety and Simulation International Conference*, Rome, Italy, 2013.

5. Venkataraman N., Ulfarsson G., Shankar V., and Deptuch D. "Modeling the Effects of Interchange Configuration on Heterogeneous Influences of Interstate Geometrics on Crash Frequencies," *Road Safety and Simulation International Conference*, Rome, Italy, 2013.
6. Venkataraman N., Ulfarsson G., and Shankar V. "Some Insights into Roadway Geometric Effects on Interstate Crash Occurrence from a Crash Typology Perspective." CD-ROM Proceeding of the *92nd Annual Meeting of the Transportation Research Board*, Washington D.C., U.S.A., 2013.

### **Abstract Peer-Reviewed Conference Papers**

1. Shankar V.N., Venkataraman N., and Pendyala R.M. "Determinants of Risky Driving: An Analysis of Socio-Economic Factors Affecting Individual Driving Violations." *Third International Conference on Traffic and Transportation Studies*, Guilin, China.

### **Conference Presentations**

1. Venkataraman N.S., Shankar V., Blum J., Hariharan B., Hong J. "Transferability Analysis of Heterogeneous Overdispersion Parameter Negative Binomial Safety Performance Functions: A Case Study from California" *The 95th Annual Meeting of the Transportation Research Board*, National Research Council, Washington, District of Columbia, U.S.A., 2016.
2. Hariharan B., Hong J., Shankar V., Venkataraman N.S., Huang S., Kezhiyur A.J., Milton J., and Schalkwyk I.V. "Roadside Geometry Effects on the Overdispersion Parameter" *The 95th Annual Meeting of the Transportation Research Board*, National Research Council, Washington, District of Columbia, U.S.A., 2016.
3. Hong J., Hariharan B., Shankar V., Venkataraman N.S., Milton J., and Schalkwyk I.V. "Random Parameter Framework for Two-Lane Rural Roadways: Findings from Washington State" *The 95th Annual Meeting of the Transportation Research Board*, National Research Council, Washington, District of Columbia, U.S.A., 2016.
4. Schalkwyk I., Milton J., Venkataraman N. and Shankar V. "Roadway Illumination Effects on Crash Occurrence and Implications" *The 95th Annual Meeting of the Transportation Research Board*, National Research Council, Washington, District of Columbia, U.S.A., 2016.
5. Kwon D., Shankar V., Oh J., and Venkataraman N. "A Behavior Based Framework for Assessing Nonmotorized Exposure for Safety and Security Analysis," *The 4th International Conference on Road Safety and Simulation*, Rome, Italy, October 23-25, 2013.
6. Shankar V., Kwon D., and Venkataraman N. "A Joint Model of Relative Risk of Exposure and Pedestrian Flow Measures," *The 4th International Conference on Road Safety and Simulation*, Rome, Italy, October 23-25, 2013.
7. Venkataraman N., Ulfarsson G., Shankar V., and Deptuch D. "Modeling the Effects of Interchange Configuration on Heterogeneous Influences of Interstate Geometrics on Crash Frequencies," *The 4th International Conference on Road Safety and Simulation*, Rome, Italy, October 23-25, 2013.
8. Venkataraman N., Ulfarsson G., and Shankar V. Venkataraman N., Ulfarsson G., and Shankar V. "Some Insights into Roadway Geometric Effects on Interstate Crash Occurrence from a Crash Typology Perspective," *The 92nd Annual Meeting of the Transportation Research Board*, National Research Council, Washington, District of Columbia, U.S.A., 2013.

9. Venkataraman N.S., Ulfarsson G., Shankar V., Oh J. and Park M. "Modeling Relationship Between Interstate Crash Occurrence and Geometrics: Exploratory Insights from Random Parameter Negative Binomial Approach," *The 90th Annual Meeting of the Transportation Research Board*, National Research Council, Washington, District of Columbia, U.S.A., 2011.
10. Venkataraman, N. S., G. F. Ulfarsson, V. N. Shankar, J. Oh, and M. Park. "An Econometric Investigation on Interstate Crash Occurrence and Geometrics with a Random Parameters Negative Binomial Approach," *The 1st Engineering and Natural Sciences Research Symposium*, University of Iceland, Reykjavík, Iceland, 2010.

#### **Invited Talks and Seminars (Authored/Co-Authored)**

1. Shankar, V., and Venkataraman, N. Estimation of Hierarchical Random Effects, Random Parameter Safety Performance Functions, Caltrans, Sacramento, January 2015.
2. Shankar, V., and Venkataraman, N. Hierarchical Random Effects in Safety Performance Functions, Caltrans, Sacramento, November 2014.
3. Venkataraman, N. S., G. F. Ulfarsson, and V. Shankar. Extending the Highway Safety Manual (HSM) framework for Traffic Safety Performance Evaluation. International Research Seminar, Korea Research Institute for Human Settlements, Anyang, Republic of Korea, July 29, 2014.
4. Shankar, V., and Venkataraman, N. Advanced Safety Performance Functions, Caltrans, Sacramento, July 2014.

#### **Scientific Peer Reviews**

Peer-reviewed 100+ articles submitted to the following journals: Analytic Methods in Accident Research, Accident Analysis and Prevention, Transportation Research Record, IATSS Research, Safety Science, Canadian Journal of Civil Engineering, Highway Safety Manual, and IEEE Intelligent Transportation Systems Society Conference.

#### **Student Mentorships**

Served as a mentor for two civil engineering/transportation PhD students on Advanced Statistical Modeling for Traffic Safety at Texas Tech University and Pennsylvania State University. Seraneeprakarn (2014-2018) and Huang (2015-2018).