

RAJAT VERMA

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RESEARCH INTERESTS

Transportation network modeling, traffic simulation, data-driven mobility modeling, graphs in machine learning.

EDUCATION

Purdue University *West Lafayette, IN*
Ph.D., Civil Engineering 8/2019 - Present. Current GPA: 4.0
Advisor: [Dr. Satish V. Ukkusuri](#)

Michigan State University *East Lansing, MI*
Master of Science, Civil Engineering. GPA: 4.0 8/2017 - 5/2019
Advisor: [Dr. Timothy J. Gates](#)
Thesis: *Evaluation of a rear-end collision avoidance system on winter maintenance trucks.*

Indian Institute of Technology Roorkee *Roorkee, India*
Bachelor of Technology, Civil Engineering. GPA: 8.64/10 7/2013 - 5/2017
Major project: *Design of sustainable drainage and rainwater harvesting for IIT Roorkee campus.*

RESEARCH EXPERIENCE

Purdue University *West Lafayette, IN*
Graduate Research Assistant 8/2019 - Present

- Working on improving and introducing new features in [A-RESCUE](#), a custom microscopic traffic simulator designed to simulate urban hazard evacuation scenarios. Project funded by NSF.
- Analyzing the information spread mechanism and the potential for organizing of [UberPeople](#), a forum for Uber drivers.

Michigan State University *East Lansing, MI*
Graduate Research Assistant 8/2017 - 7/2019

- Assessed the performance and effectiveness of a pilot rear-facing collision avoidance system on snowplows. Project sponsored by the Michigan Department of Transportation.
- Analyzed the effects of the 2017 speed limit change in Michigan on operating speeds based on three data sources.
- Developed OMR recognition system to automate processing of the annual state-wise safety belt survey data.

Indian Institute of Science
Research Intern
Supervisor: [Dr. Ashish Verma](#)

Bengaluru, India
5/2016 - 6/2016

- Worked on the sub-project “Spatial Analysis of Pedestrian Crowds of the main project “*The Kumbh Mela Experiment: Measuring and Understanding the Dynamics of Mankinds Largest Crowd*”, Ujjain, India.
- Studied pedestrian traffic flow theory and the social force method to study the basic forms of interaction among pedestrian groups.

PUBLICATIONS & PRESENTATIONS

Articles in Peer Reviewed Journals

3. Spatiotemporal contact density explains the disparity of COVID-19 spread in urban neighborhoods.
Verma, R., Yabe, T., Ukkusuri, S.V.
Scientific Reports, 11, 10952 (**2021**). doi:[10.1038/s41598-021-90483-1](https://doi.org/10.1038/s41598-021-90483-1)
2. Comparison of support vector and non-linear regression models for estimating large-scale vehicular emissions, incorporating network-wide fundamental diagram for heterogeneous vehicles.
Saedi, R., **Verma, R.**, Zockaei, A., Ghamami, M., Gates, T.J.
Transportation Research Record, 2674(5), 7084, (**2020**). doi:[10.1177/0361198120914304](https://doi.org/10.1177/0361198120914304)
1. Behavioral analysis of drivers following winter maintenance trucks enabled with collision avoidance system.
Verma, R., Saedi, R., Zockaei, A., Gates, T.J.
Transportation Research Record, 2673(10), 394-404 (**2019**). doi:[10.1177/0361198119850131](https://doi.org/10.1177/0361198119850131)

Articles in Conference Proceedings

2. How information heterogeneity influences traffic congestion during hurricane evacuation.
Verma, R., Lei, Z., Xue, J., Shen, J., Gehlot, H., Ukkusuri, S.V., Murray-Tuite, P.
2021 IEEE International Intelligent Transportation Systems Conference (ITSC), 1833-1838 (**2021**). doi:[10.1109/ITSC48978.2021.9564797](https://doi.org/10.1109/ITSC48978.2021.9564797)
1. A framework for incorporating the network fundamental diagram into large-scale emission estimation.
Saedi, R., **Verma, R.**, Zockaei, A., Ghamami, M., Gates, T.J.
Journal of Transport & Health 9, S54-S55 (**2018**). doi:[10.1016/j.jth.2018.05.041](https://doi.org/10.1016/j.jth.2018.05.041)

Conference Presentations

3. How hurricane evacuation dynamic decision-making progresses with information-seeking behavior.
Verma, R., Shen, J., Murray-Tuite, P., Lee, S., Ge, Y., Ukkusuri, S.V.
Transportation Research Board 100th Annual Meeting, Washington D.C., **2021** (poster)
2. An efficient calibration methodology of microsimulation model for signalized intersections under heterogeneous and indisciplined traffic environment.
Paul, M., **Verma, R.**, Ghosh, I.
Transportation Research Board 98th Annual Meeting, Washington D.C., **2019** (poster)

1. Behavioral analysis of drivers following winter maintenance trucks enabled with collision avoidance system.

Verma, R., Saedi, R., Zockaie, A., Gates, T.J.

Transportation Research Board 98th Annual Meeting, Washington D.C., 2019

Official Reports

2. Hazards SEES: Bridging information, uncertainty, and decision-making in hurricanes using an interdisciplinary perspective.

Ukkusuri, S.V., Murray-Tuite, P., Lee, S., Ge, Y., Lei, Z., **Verma, R.**, Gehlot, H., Xue, J., Shen, J., Zhan, X., Qian, X., Le, T., et al.

National Science Foundation, Award [#1520338](#) (Oct 7, 2021)

1. Evaluation of a collision avoidance and mitigation system (CAMS) on winter maintenance trucks. Zockaie, A., Saedi, R., Gates, T.J., Savolainen, P.T., Schneider, B., Ghamami, M., **Verma, R.**, Fakhrmoosavi, F., Kavianipour, M., Shojaie, M., Singh, H., Zhou, C.

Michigan Department of Transportation Research Administration, [OR 17-103](#) (Sep 18, 2018)

AWARDS & SCHOLARSHIPS

Best M.S. Student

5/2019

Department of Civil Engineering, Michigan State University, \$200

Annual ITE Scholarship

2/2019

Institute of Transportation Engineers - Michigan Chapter, \$3,000

Student Travel Award

6/2018

2018 International Conference on Transport & Health, \$800

Best Poster in Civil Engineering (Transportation)

3/2018

2018 Engineering Graduate Research Symposium, Michigan State University

Merit-cum-Means Scholarship

1/2014 - 4/2015

Indian Institute of Technology Roorkee, INR 200,000 (\approx \$2,600) over 2 years

EXTRACURRICULAR COURSEWORK

Text Mining and Analytics

2/2020

University of Illinois, Urbana-Champaign ([Coursera](#))

Introduction to Graph Theory

7/2018

University of California, San Diego ([Coursera](#))

Bayesian Statistics

5/2018

University of California, Santa Cruz ([Coursera](#))

MEMBERSHIPS AND SERVICE

Professional Organizations

- American Society of Civil Engineers 3/2018 - Present
- Institute of Transportation Engineers 12/2017 - Present

Student Bodies

- Purdue Graduate Student Government, *Purdue University* 3/2020 - Present
- Civil Engineering Graduate Student Advisory Council, *Purdue* 9/2019 - Present
- Graduate Employees Union, *Michigan State University* 11/2018 - 5/2019
- Civil Engineering Consortium, *I.I.T. Roorkee* 7/2016 - 12/2016
- Information Management Group, *I.I.T. Roorkee* 2/2015 - 5/2017
- National Service Scheme, *I.I.T. Roorkee* 8/2013 - 7/2014

SKILLS

Programming	Languages: Python, R, MATLAB, Java, JavaScript, HTML, CSS, SQL Tools: Anaconda, MySQL
Software	VISSIM, QGIS, Tableau, Gephi, AutoCAD, SPSS Graphic Design: Photoshop, Illustrator, InDesign, CorelDRAW
Languages	English (proficient), Hindi (native), Spanish (basic)