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| [rajat-verma-msu](https://www.linkedin.com/in/rajat-verma-msu/) |
| [rvanxer](https://github.com/rvanxer) |

# Areas of Interests

Intelligent Transportation Systems (ITS), Data Analytics in Transportation, Network Modeling.

# Education

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| 2019 – Present | Ph.D., Civil Engineering, Purdue University |
| 2017 – 2019 | Master of Science, Michigan State University.  Major in Civil Engineering with Graduate Certificate in Computational Modeling.  Current GPA: 4.0 out of 4.0.  Graduation expected: May 2019. |
| 2013 – 2017 | Bachelor of Technology (B.S. equivalent), Indian Institute of Technology (IIT) Roorkee,India.  Major in Civil Engineering. GPA: 8.636 out of 10. |

# Work Experience

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| Aug 2017 – ongoing | Graduate Research Assistant*,* Michigan State University.  Advisor: [Dr. Timothy Gates](https://www.egr.msu.edu/people/profile/gatestim). Worked/working in these projects:   * Effect of speed limit change on operating speeds in Michigan. * NCHRP project 17-76: Guidance for the setting of speed limits. * Safe Routes to School (SR2S) FY 2017. |
| May – Jun 2016 | Research Intern, Indian Institute of Science*,* Bengaluru, India.  Supervisor: [Dr. Ashish Verma](http://civil.iisc.ernet.in/~ashishv/).   * Worked on the sub-project “*Spatial Analysis of Pedestrian Crowds*” of the main project “[*The Kumbh Mela Experiment*](http://www.the-kumbh-mela-experiment.com/)*: Measuring and Understanding the Dynamics of Mankind’s Largest Crowd*”, Ujjain, India. * Studied pedestrian traffic flow theory and the social force method to study the basic forms of interaction among pedestrian groups. * Developed geometric formations of pedestrian groups under different conditions of traffic density and analyzed group recovery using MATLAB. |
| Dec 2015 | Web Developer, [Flicksup](https://letsventure.com/flicksup), Bengaluru, India.   * Designed and developed website user interface of a startup service using jQuery. * Flicksup [selected](https://tech.economictimes.indiatimes.com/news/startups/facebook-selects-7-month-old-flicksup-for-fbstart-program/55345603) for FbStart program after website launch. |

# Publications and Conference Papers

1. Verma, R., Saedi, R., Zockaie, A., Gates, T.J., “*Behavioral Analysis of Drivers Following Winter Maintenance Trucks Enabled with a Collision Avoidance System”.*
   * Under review for publication: [Transportation Research Record](http://journals.sagepub.com/home/trr).
   * Accepted for presentation: [Transportation Research Board Annual Meeting 2019](http://www.trb.org/AnnualMeeting/AnnualMeeting.aspx).
2. Saedi, R., Verma, R., Zockaie, A., Ghamami, M., Gates, T.J., “*Network-wide Emission Estimation by Incorporating Network Fundamental Diagram”*.
   * Abstract published: [Journal of Transport & Health](https://www.journals.elsevier.com/journal-of-transport-and-health) 9:S54-S55. DOI: [10.1016/j.jth.2018.05.041](https://www.sciencedirect.com/science/article/pii/S2214140518302263).
   * Poster presentation: [International Conference on Transport and Health 2018](https://www.tphlink.com/icth-2018-mackinac-island.html), MI.
   * Submitted (9/1/2018): [Transportation Research Part C](https://www.journals.elsevier.com/transportation-research-part-c-emerging-technologies): Emerging Technologies.
3. Paul, M., Verma, R., Ghosh, I., “*An Efficient Calibration of Microsimulation Model for Signalized Intersections under Heterogeneous and Undisciplined Traffic*”.
   * Accepted for presentation: Transportation Research Board Annual Meeting 2019.
   * Submitted: [World Conference on Transportation Research](https://www.wctrs-society.com/) (WCTR 2019), Mumbai, India.

# Relevant Projects

## Graduate Level

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| Aug 2018 – ongoing | Effect of Speed Limit Change in Michigan on Operational Speeds.   * Analysis of speed data before and after the speed limit increase in Michigan in 2017 from permanent traffic recorders, lidar gun survey, and video speed review. * Concluded that increase of speed limit by 5 mph increased operational speed by about 2 mph on non-freeway highways; awaiting more data. |
| Jan – Apr 2018 | Performance Analysis of FlexRoute23.   * Simulated a managed lane traffic corridor on US-23 in Michigan in PTV Vissim. * Preliminary performance analysis showed the effectiveness of hard shoulder running in reducing peak hour congestion is meager in the short-term. |

## Undergraduate Level

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| Jul 2016 – Apr 2017 | B.S. Senior Year Project. Design of sustainable urban drainage and rainwater harvesting systems for IIT Roorkee campus. |
| Feb – Apr 2016 | B.S. Junior Year Project. Origin-destination based traffic congestion modeling on a bus route in Delhi. |
| May – Jun 2015 | The effect of green signal countdown timer on dilemma zone of signalized intersections, with [Dr. Indrajit Ghosh](https://www.iitr.ac.in/~CE/indrafce). |
| Jan – Apr 2016 | Preparation of a thematic map of IIT Roorkee using GIS. |
| Jan – Apr 2015 | Optimized cross-sectional design of flexural member for cost minimization. |

## Independent Projects

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| November 2018 | [Kakuro](https://en.wikipedia.org/wiki/Kakuro) Solver in Python using System of Simultaneous Equations ([GitHub](https://github.com/rvanxer/kakuro_solver)). |

# Relevant Course Work

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| Graduate Level | |
| * *CE841* Traffic Flow Theory * *CE849* Statistics in Transportation * *CE850* Intelligent Transportation Systems * *CE851* Transportation and Environment | * *CMSE801* Introduction to Computational Modeling * *ECE801-602* Data Science: Concepts, Techniques, and Practice |
| Undergraduate Level | |
| * Numerical Methods and Programming * Linear Algebra, Statistics and Probability * *CE448* Transportation Planning * Traffic Road Safety | * Railway Engineering and Airport Planning * Highway Pavement Engineering * Highway Geometric Design * Theory and Applications of GIS |
| Coursera | |
| * Introduction to Graph Theory, *University of California San Diego*. * Bayesian Statistics, *University of California Santa Cruz*. | |

# Participation and Achievements

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| 2018 | Best Poster in Civil Engineering (Transportation/Pavements), 2018 **Engineering Graduate Research Symposium**, Michigan State University. |
| 2018 | Part of winning team, **ITE Trivia Quiz** on traffic safety and management, Institute of Traffic Engineers Greater Lansing Chapter, MI. |
| 2017 | Participated in **Microsoft Hackathon** 2017, IIT Roorkee, India.   * Developed in one day a web scraper that collects country-level tabular statistics from Wikipedia pages and converts them to interactive choropleth maps. |
| 2014 – 2016 | **Merit-cum-means Scholarship**, IIT Roorkee, India.   * Received INR 100,000 ($1500) in scholarship for two consecutive years based on excellent academic performance and financial need. |
| 2013 | **Joint Entrance Examination**, India.   * Scored 98.84 percentile in Paper I (Mains) out of about 1.4 million candidates. * Secured national rank 2533 from a total of about 150,000 students in Paper II (JEE Advanced), one of the most competitive college entrance exams in the world. |
| 2009 | National rank 23, Indian National Cartographic Association **(INCA)** **Map Quiz.** |

# Skills

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| Programming and Web Development | Python  R  MATLAB  SQL  C++ | ●●●●●  ●●●●◐  ●●●●◐  ●●●◐○  ●●○○○ | HTML  CSS  JavaScript  jQuery  VBA | ●●●◐○  ●●●●○  ●●●◐○  ●●●●○  ●◐○○○ |
| Software Packages | Tableau  QGIS  IBM SPSS  MS Excel | ●●●●◐  ●●●◐○  ●●○○○  ●●●●◐ | PTV Vissim  Adobe Photoshop  Adobe Illustrator  Autodesk AutoCAD | ●●●○○  ●●●●◐  ●●●●●  ●●●○○ |
| Languages | English  Hindi (native)  Italian | ●●●●◐  ●●●●◐  ●○○○○ |  |  |

# Extra-Curricular Activities

## Groups and Communities

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| 2018 – now | Member, **American Society of Civil Engineers** (ASCE). |
| 2018 – now | Member, **Graduate Employees Union** (GEU), Michigan State University. |
| 2017 – now | Member, **Institute of Traffic Engineers** (ITE).   * Participated in ITE Student Leadership Summit 2017, Purdue University. |
| 2016 | **Recruitment Representative**, Department of Civil Engineering, IIT Roorkee.   * Coordinated management of senior-year job recruitment. |
| 2015 – 2016 | **Creativity and Design Coordinator**, Information Management Group (IMG), IIT Roorkee.   * IMG organizes the official website and intranet web-app portal of IIT Roorkee. * Conducted lectures on innovations in web design and organizational structures. |
| 2013 – 2016 | **Joint Secretary**, Design section, Kshitij – The Literary Magazine, IIT Roorkee.   * Supervised the graphic design of the magazine in coordination with different team sections, besides conducting design-oriented events. |

## Community Service

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| 2013 | Member, **National Service Scheme**, IIT Roorkee.   * Participated in cleanliness and electricity conservation drives, food waste prevention program, and promotion of handcrafted recycled paper bags. * Helped conduct blood donation drives; regular donor since 2015. |
| 2013 | Volunteer, **CRY Roorkee Chapter**, IIT Roorkee.   * Child Rights and You (CRY) is a philanthropic organization that focuses on individual level mentoring of unprivileged children in India. |

# References

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| [**Dr. Timothy J. Gates**](https://www.egr.msu.edu/people/profile/gatestim) Associate Professor Department of Civil and Environmental Engineering Michigan State University ✉ gatestim@egr.msu.edu | [**Dr. Ali Zockaie**](https://www.egr.msu.edu/people/profile/zockaiea) Assistant Professor Department of Civil and Environmental Engineering Michigan State University ✉ [zockaiea@egr.msu.edu](mailto:zockaiea@egr.msu.edu) |
| [**Dr. Peter Savolainen**](https://www.egr.msu.edu/people/profile/pete) Associate Professor Department of Civil and Environmental Engineering Michigan State University ✉ pete@egr.msu.edu | [**Dr. Indrajit Ghosh**](http://www.iitr.ac.in/~CE/indrafce) Assistant Professor Department of Civil Engineering Indian Institute of Technology Roorkee, India ✉ [indrafce@iitr.ac.in](mailto:indrafce@iitr.ac.in) |