

RISHABH S. CHAUHAN

Ph.D. Candidate at University of Illinois at Chicago

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EDUCATION

Doctor of Philosophy (PhD) Civil Engineering (Expected June 2023)

Technical Concentration: Transportation Engineering

University of Illinois at Chicago (UIC), IL, USA

Advisor: Prof. Sybil Derrible

Master of Science (MS) Civil Engineering (June 2019)

Technical Concentration: Transportation System Engineering

University at Buffalo, The State University of New York (UB), NY, USA

Thesis: "Short-Term Traffic Delay Prediction at the Niagara Frontier Border Crossings using Deep Learning."

Advisor: Prof. Adel W. Sadek

Bachelor of Engineering (BE) Civil Engineering (June 2017)

Technocrat Institute of Technology (TIT), Bhopal, MP, IND

First division with Honors

AWARDS AND RECOGNITION

Achieved **3rd place** for poster on 'Comparing the Access to Rapid Transit Systems in the Major U.S. Cities' at UIC GIS Day 2019. November 2019.

1st prize at the event Pravah in 'Loca-De-Festa- 2016' for presentation on 'Solid Waste Management' at TIT, Bhopal. April 2016.

1st rank in the fourth semester examination of B.E. in the Civil Engineering Department (out of 100+ students) of TIT, Bhopal. June 2015.

7th rank in the Popsicle Bridge Designing Competition at Megastructure 2k14, organized by the Department of Civil Engineering, TIT Bhopal. April 2014.

Mr. M.G. Agrawal Memorial scholarship for highest marks in English in class 12th Board examination (out of about 150 students), from Champion School, in the year 2012-13.

Scored in the **top 25 percent** of grade XI participants in the region in the International Assessment for Indian Schools in Mathematics and Science conducted by UNSW Global, The University of New South Wales, Sydney, Australia in 2011.

RESEARCH INTERESTS

Transportation Planning, Causality, Machine Learning, Deep Learning, Statistical and Econometric Modeling, and Autonomous Vehicles.

WORK EXPERIENCE

Graduate Research Assistant

University of Illinois at Chicago.

Advisor: Prof. Sybil Derrible.

August 2019 - Present

Causality in Urban Engineering Studies. Studied causal relations and the effect of interventions in travel demand, electricity usage, and water consumption datasets using Causal Discovery and Causal Inference. Estimated Travel Choice Model by applying four Causal Discovery Algorithms, namely Peter-Clark (PC), Fast Causal Inference (FCI), Fast Greedy Equivalence Search (FGES), and Linear Non-Gaussian Acyclic Models (LiNGAM). Oct 2021 – Present

COVID Future Study. Conducted a Nationwide Online Longitudinal Survey in the United States on transportation related attitudes and behavior before, during, and after COVID-19. Helped in project planning, survey design, survey deployment, data preparation, and data analysis. May 2020 – Present

*Graduate Research Assistant**University at Buffalo, The State University of New York.**Advisor: Prof. Adel W. Sadek.**May 2018 – May 2019*

Olli Bus Project. Obtained Autonomous Vehicle Driverless License from Local Motors by successfully completing the Steward Training for a self-driving, electric and cognitive shuttle (Olli Bus). The training involved unmanned and manned operations, safety operations, data collection, charging, parking, loading, and unloading. Conducted Autonomous vehicle tests and Demonstrations, and prepared Observation Reports. May 2018 – May 2019

Short-Term Traffic Delay Prediction at the Niagara Frontier Border Crossings. Predicted passenger cars' traffic delays at the three Niagara Frontier Border Crossings for the next 60 minutes into the future using four deep learning techniques, namely Multilayer Perceptron (MLP), Convolutional Neural Networks (CNN), Long Short-Term Memory Recurrent Neural Networks (LSTM-RNN), and Gated Recurrent Unit Recurrent Neural Networks (GRU-RNN). May 2018 – May 2019

*Teaching Assistant**University of Illinois at Chicago*

CME 434: Finite Element Analysis. Spring 2022.

CME 440: Cities and Sustainable Infrastructure. Spring 2021.

CME 203: Strength of Materials. Fall 2020.

CME 201: Statics. Summer 2020.

CME 112: Evolution of Infrastructure and Society. Spring 2020.

CME 201: Statics. Spring 2020.

CME 201: Statics. Fall 2019.

PUBLICATIONS

Peer-Reviewed Journal Publication

[J7] Taghipour, Homa, Amir Bahador Parsa, **Rishabh Singh Chauhan**, Sybil Derrible, and Abolfazl Kouros Mohammadian. "[A novel deep ensemble based approach to detect crashes using sequential traffic data.](#)" *IATSS Research* (2021).

[J6] **Chauhan, Rishabh**, Matthew Conway, Denise Capasso da Silva, Deborah Salon, Ali Shamshiripour, Ehsan Rahimi, Sara Khoeini, Abolfazl (Kouros) Mohammadian, Sybil Derrible, and Ram Pendyala. "[A Database of Travel-Related Behaviors and Attitudes Before, During, and After COVID-19 in the United States.](#)" *Scientific Data*, 2021.

[J5] Mirtich, Laura, Matthew Wigginton Conway, Deborah Salon, Peter Kedron, **Rishabh Singh Chauhan**, Sybil Derrible, Sara Khoeini, Abolfazl Kouros Mohammadian, Ehsan Rahimi, and Ram Pendyala. "[How Stable Are Transport-Related Attitudes over Time?.](#)" *Findings* (2021): 24556.

[J4] **Chauhan, Rishabh Singh**, Denise Capasso da Silva, Deborah Salon, Ali Shamshiripour, Ehsan Rahimi, Uttara Sutradhar, Sara Khoeini, Abolfazl Kouros Mohammadian, Sybil Derrible, and Ram Pendyala. "[COVID-19 related attitudes and risk perceptions across urban, rural, and suburban areas in the United States.](#)" *Findings* (2021): 23714.

[J3] da Silva, Denise Capasso, Sara Khoeini, Deborah Salon, Matthew W. Conway, **Rishabh**

S. Chauhan, Ram M. Pendyala, Ali Shamshiripour et al. "[How are Attitudes Toward COVID-19 Associated with Traveler Behavior During the Pandemic?](#)." *Findings* (2021): 24389.

[J2] Salon, Deborah, Matthew Wigginton Conway, Denise Capasso da Silva, **Rishabh Singh Chauhan**, Sybil Derrible, Abolfazl Kouros Mohammadian, Sara Khoeini et al. "[The potential stickiness of pandemic-induced behavior changes in the United States.](#)" *Proceedings of the National Academy of Sciences* 118, no. 27 (2021).

[J1] **Chauhan, Rishabh**, Yunpeng Shi, Andrew Bartlett, and Adel W. Sadek. "[Short-Term Traffic Delay Prediction at the Niagara Frontier Border Crossings: Comparing Deep Learning and Statistical Modeling Approaches.](#)" *Journal of Big Data Analytics in Transportation* 2, no. 2 (2020): 93-114.

Under review, available on ArXiv

[PP3] **Chauhan, Rishabh Singh**, Christoffer Riis, Shishir Adhikari, Sybil Derrible, Elena Zheleva, Charisma F. Choudhury, and Francisco Camara Pereira. "[Causality in Travel Mode Choice Modeling: A Novel Methodology that Combines Causal Discovery and Structural Equation Modeling.](#)" *arXiv preprint arXiv:2208.05624* (2022).

[PP2] **Chauhan, Rishabh Singh**, Matthew Wigginton Bhagat-Conway, Tassio Magassy, Nicole Corcoran, Ehsan Rahimi, Abbie Dirks, Ram Pendyala, Abolfazl Mohammadian, Sybil Derrible, and Deborah Salon. "[COVID Future Panel Survey: A Unique Public Dataset Documenting How US Residents' Travel Related Choices Changed During the COVID-19 Pandemic.](#)" *arXiv preprint arXiv:2208.12618* (2022).

[PP1] Javadinasr, Mohammadjavad, Tassio B. Magassy, Ehsan Rahimi, Amir Davatgari, Deborah Salon, Matthew Wigginton Bhagat-Conway, **Rishabh Singh Chauhan**, Ram M. Pendyala, Sybil Derrible, and Sara Khoeini. "[The Enduring Effects of COVID-19 on Travel Behavior in the United States: A Panel Study on Observed and Expected Changes in Telecommuting, Mode Choice, Online Shopping and Air Travel.](#)" *arXiv preprint arXiv:2109.07988* (2021).

Technical Report

[T2] Salon, Deborah, Matthew Wigginton Conway, Denise da Silva Baker, **Rishabh Singh Chauhan**, Sybil Derrible, Abolfazl (Kouros) Mohammadian, Sara Khoeini, Nathan Parker, Laura Mirtich, Ali Shamshiripour, Ehsan Rahimi, and Ram M. Pendyala. "[Investigating Attitudinal and Behavioral Changes in US Households Before, During, and After the COVID-19 Pandemic.](#)" Teaching Old Models New Tricks (TOMNET) Transportation Center (2022).

[T1] Lin, Lei, Andrew Bartlett, **Rishabh Chauhan**, Yunpeng Shi, Qian Wang, and Adel W. Sadek. "[Developing Predictive Border Crossing Delay Models.](#)" Transportation Informatics Tier I University Transportation Center (2019).

Poster

[P6] Salon, Deborah, Matthew Wigginton Bhagat-Conway, Laura Mirtich, Adam Costello, Ehsan Rahimi, Abolfazl (Kouros) Mohammadian, **Rishabh Singh Chauhan**, Sybil Derrible, Denise da Silva Baker, Sara Khoeini, Ram Pendyala (2022). "The Effects of the COVID-19 Pandemic on Telecommuting in the United States." *Transportation Research Board Annual Meeting 2022*.

[P5] Khoeini, Sara, Shivam Sharda, Denise da Silva Baker, Ram Pendyala, Matthew Wigginton Bhagat-Conway, Deborah Salon, Laura Mirtich, **Rishabh Singh Chauhan**, Sybil

Derrible, Ehsan Rahimi, Mohammadjavad Javadinasr, Abolfazl (Kouros) Mohammadian (2022). "Expected Change in US Air Travel after the COVID-19 Pandemic." *Transportation Research Board Annual Meeting 2022*.

[P4] Javadinasr, Mohammadjavad, Tassio B. Magassy, Ehsan Rahimi, Motahare Yalda Mohammadi, Amir Davatgari, Abolfazl Kouros Mohammadian, **Rishabh Singh Chauhan**, Matthew Wigginton Bhagat-Conway, Ram M Pendyala, Deborah Salon, Sybil Derrible, Sara Khoeini (2022). "*Observed and Expected Impacts of COVID-19 on Travel Behavior in the United States: A Panel Study Analysis*." *Transportation Research Board Annual Meeting 2022*.

[P3] Mohammadi, Motahare, Ehsan Rahimi, Amir Davatgari, Mohammadjavad Javadinasr, Abolfazl (Kouros) Mohammadian, Matthew Wigginton Bhagat-Conway, Deborah Salon, **Rishabh Singh Chauhan**, Sybil Derrible, Denise da Silva Baker, Ram M. Pendyala (2022). "Examining the Stickiness of Telecommuting after the COVID-19 Pandemic." *Transportation Research Board Annual Meeting 2022*.

[P2] Parsa, Amir Bahador, **Rishabh Singh Chauhan**, Homa Taghipour, Sybil Derrible, Abolfazl (Kouros) Mohammadian (2020). *Applying Deep Learning to Detect Traffic Accidents in Real Time Using Spatiotemporal Sequential Data*. *Transportation Research Board Annual Meeting, January 2020*.

[P1] **Chauhan, Rishabh Singh** and Abdulaziz Alahmadi (2019). *Comparing the access to Rapid Transit Systems in the major U.S. Cities using GIS*. UIC GIS Day, November 2019. (won third prize).

Thesis

[TH1] **Chauhan, Rishabh Singh**. "[Short-Term Traffic Delay Prediction at the Niagara Frontier Border Crossings Using Deep Learning](#)." MS thesis, State University of New York at Buffalo, 2019.

Dataset

[D1] Salon, Deborah; Conway, Matthew Wigginton; Capasso da Silva, Denise; **Chauhan, Rishabh**; Shamshiripour, Ali; Rahimi, Ehsan; Mirtich, Laura; Khoeini, Sara; Mohammadian, Kouros; Derrible, Sybil; Pendyala, Ram, 2021, "COVID Future Wave 1 Survey Data v1.0.0", <https://doi.org/10.48349/ASU/QO7BTC>, ASU Library Research Data Repository, V1, UNF:6:Z61cxFCm14zzNxiO4fCbfA== [fileUNF]

PRESENTATIONS

[PR5] **Chauhan, Rishabh Singh** (2021). Commute during COVID-19 in Urban, Rural, and Suburban United States. AScUS Unconference 2021. Online.

[PR4] **Chauhan, Rishabh Singh** and Sybil Derrible (2020). Travel Mode Choice during and after the Pandemic. TOMNET hosted webinar. Online.

[PR3] Bartlett, Andrew and **Rishabh Singh Chauhan** (2018). Predicting Border Crossing Delay through Newly Available Real-Time Data and Deep Learning Methods. Fourth Annual Symposium on Transportation Informatics, UB, NY, USA.

[PR2] **Chauhan, Rishabh Singh** (2016). Solid Waste Management. Event Pravah at 'Loca-De-Festa- 2016', TIT, MP, IND.

[PR1] **Chauhan, Rishabh Singh** (2014). Classification of bridges. Seminar and Group Discussion, TIT Bhopal, MP, IND.

PROFESSIONAL
INTERNSHIPS AND
TRAININGS

Road construction from Khajuri Itkhedi Mughaliya to Neelbad, Bhopal. Observed placing of formworks, laying of separation membrane, usage of miller, screed vibrator, and concrete float, creation of contraction joints using contraction joint cutter (saw), applying sealant, and curing by ponding method. *Public Works Department (P.W.D.) West Sub-division, Bhopal.* August 2 – September 1, 2016.

Construction of concrete roads. Observed the preparation of subgrade, sub-base and concrete slab. Performed tests such as standard proctor test, CBR test of soil, Atterberg limit test, determination of bitumen content and aggregate impact value, free swell index test of soil, fineness modulus of sand, and compression strength testing of concrete at the Central Laboratory, *Madhya Pradesh Rural Road Development Authority (M.P.R.R.D.A.), Bhopal.* April 23 – May 6, 2016.

Construction of Multilevel Parking at M.P. Nagar, Zone-I, Bhopal. Studied the plan of multilevel parking. Observed reinforcement in slab and staircase, tying of reinforcement, formwork for column, slab and staircase, on-site batching plant, pouring of concrete, concrete bleeding, curing, masonry construction, electrification work, etc. Performed workability tests (slump test) on concrete, shape and size test, soundness test, and structure test on brick. *Municipal Corporation, Bhopal.* April 4 –17, 2016.

One-day geological field training program in and around Bhojpur Area. Studied vindhyan sandstones and their bedding, folds and joints. October 11, 2014.

GRADUATE
COURSE
PROJECTS

Analyzing the Public Bus System Network in the Major U.S. Cities. Studied, analyzed and compared the public bus transportation system in the top five most populated cities in the U.S., namely New York City, Los Angeles, Chicago, Houston, and Phoenix. Used ArcGIS, Data analysis, and data visualization techniques. Course: Transportation Network (CME 509), Spring 2020.

Comparing the access to Rapid Transit Systems in the Major U.S. Cities. Compared the access to rapid transit systems among the five most populated cities in the U.S., namely New York City, Los Angeles, Chicago, Houston, and Pheonix. Calculated the percentage of population living within half a miles of a rapid transit station Using Geographic Information System (GIS). Course: GIS for planning and policy (UPP 461), Fall 2019.

Applications of Discrete Choice Modeling. Estimated Multinomial Logit (MNL) and Nested Logit (NL) models to predict the mode choice probabilities for intrazonal trips occurring in Buffalo, NY and determined the best model out of the two based on the modeling results. Course: Discrete Choice Analysis (CIE 555), Spring 2018.

Design Project. Designed horizontal and vertical alignments, drawn typical cross-sections, calculated earthwork and estimated cost using Carlson software for a relocated highway section at West Lafayette, Indiana, and determined the best alternative based on safety, cost, environmental and social impact. Course: Geometric Design of Highways (CIE 576), Spring 2018.

Metro Rail Project. Developed a new transit plan of Metro rail in Buffalo, NY for the year 2050. Course: Transportation (GEO 519), Fall 2017.

UNDERGRADUATE
PROJECTS

Analysis of Roller Compacted Concrete Pavement (RCCP). RCCP of under-construction road from Bhopal-Kolar road to Mahabadia was tested for gradation of aggregates and slump test. Its crushing strength was determined by performing core and cube test to draw a comparison between RCCP and traditional concrete pavements and the reduction in cost for RCCP was estimated. November 2016.

Lime stabilization of sub-grade soil. Treated the black cotton soil (of CBR value less than 8%) with different percentages of lime to make it suitable for its use in sub-grade. CBR values of all soil samples were determined by performing CBR test as per IS: 2720 (Part 16). Optimum percentage of lime to be mixed for this purpose was determined. October 2016.

PROFESSIONAL COURSES	<p><u>The Art of Structural Engineering – Bridges</u>. Princeton University Massive Open Online Course (MOOC) via edx. Earned 100% out of knowledge checks, calculation assignments and creative challenges. January 29 - April 09, 2016.</p> <p><u>Municipal Solid Waste Management in Developing Countries</u>. Massive Open Online Course (MOOC) by École Polytechnique Fédérale de Lausanne and Sandec/Eawag via coursera. February 22 – March 28, 2016.</p>
COMPUTER SKILLS	<p><i>Software-</i> GREET life-cycle model, MOVES motor vehicle emission simulator, Limdep, Minitab, Synchro, PTV Vissim, CARLSON, ArcGIS, AutoCAD, Microsoft Office.</p> <p><i>Programming language-</i> Python (including tensorflow, keras, scikit-learn, scipy, matplotlib, pandas, and numphy libraries), R, Matlab.</p> <p><i>Operating System-</i> Microsoft Windows XP, 7 and 10.</p>
LANGUAGE SKILLS	Proficient in <i>English</i> , Native Speaker in <i>Hindi</i> .
SERVICE	<p><i>Student volunteer</i> at AScUS unconference. June 2021.</p> <p><i>Scribe</i> for the Sustainable World Without Waste workshop. May 2021.</p> <p><i>Student Volunteer</i> for ‘Science is Elementary!’ at West Minster Charter School, Buffalo, NY. Taught science to 5th grade students. September 2018 – November 2018.</p> <p><i>Reviewer</i> for Transportation Research Part C (2022), Scientific Reports (2022), and Scientific Data (2021).</p>
PRESS	<p>The Washington Post (2021). Millions plan to travel for Christmas, New Year’s as omicron spreads. https://www.washingtonpost.com/transportation/2021/12/17/omicron-variant-christmas-travel/</p> <p>The Wall Street Journal (2021). Covid-19 Pandemic Likely Improved Your Commute to Work. https://www.wsj.com/articles/covid-19-pandemic-likely-improved-your-commute-to-work-11609669801</p> <p>UIC Today (2020). What will America look like after pandemic ends? https://today.uic.edu/what-will-america-look-like-after-pandemic-ends</p> <p>UB Now (2019). New NSF program aims to speed discovery, research results. http://www.buffalo.edu/ubnow/stories/2019/04/france-critical-conversation.html</p> <p>NGT News (2018). University at Buffalo Tests Self-Driving Electric Shuttle. https://ngtnews.com/university-at-buffalo-tests-self-driving-electric-shuttle</p> <p>PR Newswire (2018). Robotic Research And Local Motors Launch Operations Of Autonomous Shuttle At University of Buffalo. https://www.prnewswire.com/news-releases/robotic-research-and-local-motors-launch-operations-of-autonomous-shuttle-at-university-of-buffalo-300706096.html</p> <p>The Spectrum (2018). Two-year Olli bus testing begins on UB’s North Campus. http://www.ubspectrum.com/article/2018/08/two-year-olli-bus-testing-begins-on-ubs-north-campus</p>

METRO Magazine (2018). Local Motors' self-driving shuttle makes University at Buffalo debut. <http://www.metro-magazine.com/technology/news/730954/local-motors-self-driving-shuttle-makes-university-at-buffalo-debut>