

ABHILASHA SAROJ

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EDUCATION

Georgia Institute of Technology, USA

August 2020

Ph.D. in Civil Engineering
Minor in Computer Science

Dissertation Title: Development of a real-time connected corridor data-driven digital twin and data imputation methods

Overall GPA: 3.88/4.00

Georgia Institute of Technology, USA

August 2016

M.S. in Civil Engineering
Overall GPA: 4.00/4.00

Indian Institute of Technology Bombay, India

May 2012

B.Tech. in Civil Engineering
Overall GPA: 7.52/10.00

RESEARCH INTERESTS

- Smart Cities Traffic Simulation Modelling - Digital Twin, Connected Corridors, Connected Vehicles
- Machine Learning/Artificial Intelligence for Traffic Optimization for Safety and Environmental Impacts

RESEARCH AND PROFESSIONAL EXPERIENCE

Georgia Institute of Technology

Starting October 2020

Postdoctoral Fellow

Atlanta, GA

- Research will include design of a new simulation and modeling approach capable of reflecting emerging driver behavior in interactions with cooperative and autonomous vehicles
- Research will include development of real-time simulation model for connected vehicle environment to investigate feasibility of traffic signal control system optimized for fuel consumption

Georgia Institute of Technology

August 2014 - August 2020

Graduate Research Assistant

Atlanta, GA

- Project Title: Guidance for Design of Vissim Simulation Models
 - Developed guidance manual to design freeway interchange simulation model in PTV's Vissim 11.00 traffic simulation software; Project sponsored by Georgia Department of Transportation
- Project Title: Smart Cities Atlanta – “North Avenue Smart Corridor” Digital Twin
 - Developed digital twin of the North Avenue Smart Corridor in Atlanta, capable of leveraging connected corridor data to drive traffic simulation and estimate the traffic and environmental performance measures at near real-time rate
 - Investigated characteristics of gaps in connected corridor data streams
 - Investigated impacts of imputation methods - temporal neighboring imputation method and Long Short-Term Memory (LSTM) Recurrent Neural Networks (RNN) imputation model - on digital twin generated travel time measures

- Link to archived data digital twin generated performance metric visualization website - [Web Hyperlink](#); Project sponsored by City of Atlanta
- Project Title: Operational Evaluation of the "Don't Block the Box" (DBTB) Campaigns
 - Developed a Vissim probabilistic simulation model that emulated vehicle blocking behavior to investigate the impact of vehicle's blocking behavior on intersection delay and loss of capacity
 - Built a python-based software application – Georgia Tech Multi Video Player (GT-MVP) to aid video traffic data extraction to study vehicle's blocking behavior at intersections
 - Conducted Before-After Comparative Analysis to measure effectiveness of DBTB treatments: Compared estimates of propensity of a vehicle to block before and after the DBTB treatments at six selected field intersections in Atlanta, GA
 - Link to GT-MVP - [Web Hyperlink](#); Project sponsored by Georgia Department of Transportation

Indian Institute of Technology Bombay

September 2013 - May 2014

Research Assistant

Mumbai, India

- Worked on a methodology to measure street walkability index based on walking facilities, user perception survey and street connectivity
- Developed a VISSIM model to simulate the congestion impact from Bandra Worli Sea Link
- Assisted in conduct of road safety audit of Pilot Bus Rapid Transit System Corridor at Pune, India

Boston Analytics

July 2012 - July 2013

Analyst

Mumbai, India

- Developed a quantitative model of an expansion roadmap estimating the market size for motors and drives in India
- Created an analytical model to gauge relative prospects of waste management market of 14 EU countries

PUBLICATIONS

Refereed Conference Proceedings

1. **Saroj, A.** A Sensitivity Analysis Study to Measure Impact of Real-Time Traffic Volume Data Imputations on Traffic Performance Measures. Winter Simulation Conference, National Harbor, Maryland, 2019. (Ph.D. Colloquium - Extended Abstract, Podium Presentation, and Poster Presentation)
2. **Saroj, A.,** N. Choudhary, H. Kim, A. Guin, M. Rodgers, and M. Hunter. Operational Evaluation of Don't Block the Box Campaigns. Transportation Research Board, Washington, D.C., 2019. (Extended Abstract and Poster Presentation)
3. **Saroj, A.,** S. Roy, R. Fujimoto, A. Guin, and M. Hunter. Smart City Real-Time Data-Driven Simulation. Winter Simulation Conference, Gothenburg, Sweden, 2018. (Podium Presentation)
4. **Saroj, A.,** N. Choudhary, H. Kim, A. Guin, M. Rodgers, and M. Hunter. Video Tool for Manually Extracting Complex Traffic Data. Transportation Research Board, Washington, D.C., 2018. (Podium Presentation Delivered by Co-Author)
5. **Saroj, A.,** S. Harris, A. Guin, M. Rodgers, and M. Hunter. Analysis of Vehicle Blocking Behavior on Intersection Performance. Transportation Research Board, Washington, D.C., 2017. (Poster Presentation)

Work in Progress - Peer-Reviewed Journal Submissions

1. **Saroj, A.,** A. Guin, and M. Hunter. Deep LSTM Recurrent Neural Networks for Arterial Traffic Volume Data Imputation. Journal of Big Data Analytics in Transportation. 2020. (submitted)

2. **Saroj, A.**, S. Roy, A. Guin, and M. Hunter. Impact of Connected Corridor Volume Data Imputations on Digital Twin Performance Measures. IEEE Transactions of Intelligent Transportation Systems. 2020. (submitted)
3. **Saroj, A.**, S. Roy, A. Guin, and M. Hunter. Development of a Connected Corridor Real-Time Data-Driven Traffic Simulation Model – Digital Twin. 2020. (in preparation)
4. **Saroj, A.**, A. Guin, and M. Hunter. Applicability of Long Short-Term Memory Traffic Volume Imputation Model to Drive Connected Corridor Simulation. 2020. (in preparation)
5. **Saroj, A.**, N. Choudhary, H. Kim, A. Guin, M. Rodgers, and M. Hunter. Measuring Effectiveness and Operational Performance of Do Not Block the Box Campaigns. 2020. (in preparation)

TECHNICAL REPORTS

1. Hunter, M. P., R. L. Guensler, A. Guin, **A. Saroj**, and S. Roy. “Smart Cities Atlanta - North Avenue.” City of Atlanta, Atlanta, Georgia, December 2019.
2. Guin, A., M. P. Hunter, M. O. Rodgers, **A. Saroj**, N. Choudhary, and H. G. Kim. “Operational Evaluation of Do Not Block the Box Campaigns in Georgia.” Georgia Department of Transportation, Atlanta, Georgia, Report No. FHWA-GA-18-1443, April 2018.
3. Guin, A., M. P. Hunter, M. O. Rodgers, and **A. Saroj**. “Enhanced Role of Activity Center Transportation Organizations in Regional Mobility.” Georgia Department of Transportation, Atlanta, Georgia, Report No. FHWA-GA-16-1316, February 2017.

TEACHING EXPERIENCE

Georgia Institute of Technology

Spring 2020

Co-Instructor, Graduate Course CEE 6300: Traffic Engineering

Atlanta, GA

- Designed syllabus, lecture content, and laboratory assignment for two-week duration on the topic of Traffic Simulations
- Delivered prerecorded asynchronous video lectures and synchronous online lectures

Georgia Institute of Technology

Spring 2017, Fall 2017, and Spring 2018

Graduate Teaching Assistant, Undergraduate Course CEE 4600: Transportation Planning and Design
Atlanta, GA

- Conducted laboratory lectures to teach fundamentals of traffic engineering and roadway design
- Advised student groups on semester project of roadway design.
- Graded coursework - homework, laboratory reports and semester project reports

Georgia Institute of Technology

Spring 2017 and Fall 2017

Graduate Student Mentor

Atlanta, GA

- Mentored two graduate students to lead data collection and analysis efforts for research project “Operational Evaluation of the Don’t Block the Box Campaigns” - Nishu Chaudhary and Han Gyol Kim
- Co-authored papers on this effort with the graduate students

HONOURS AND AWARDS

- 2020-2021 Civil and Environmental Engineering Future Faculty Fellow, Georgia Tech, 2020
- National Science Foundation Travel Grant for Winter Simulation Conference, NSF, 2019
- National Center for Sustainable Transportation Dissertation Fund, NCST, 2019
- 2nd Best Poster, Southeastern Transportation Research, Innovation, Development and Education Center Student Poster Competition, 2019

- Winter Simulation Conference Travel Grant, Winter Simulation Conference Foundation, 2018
- Helen M. Overly Memorial Scholarship, Women's Transportation Seminar Atlanta, 2018
- John D. Edwards Memorial Scholarship, Institute of Transportation Engineers Georgia Section, 2017
- Institute of Transportation Engineers Scholarship, Institute of Transportation Engineers Georgia Section, 2016
- Traffic Bowl Winner Team, Institute of Transportation Engineers Georgia Section, 2015
- BA's Best Employee Award, Project: "Power Conversion Market Assessment of India", Boston Analytics, 2013
- National Certificate of Merit, Central Board of Secondary Education; Central Board Secondary Exam, India, 2005

PROFESSIONAL DEVELOPMENT

- Center for the Integration of Research, Teaching, and Learning (CIRTL) Associate Level Certificate, May 2020
- Tech to Teaching Certificate in college teaching, Center for Teaching and Learning, Georgia Tech, May 2020
- Deep Learning Specialization Certificate, Coursera - DeepLearning.AI, Series of five courses: Neural Networks and Deep Learning, Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization, Structuring Machine Learning Projects, Convolutional Neural Networks, and Sequence Models, May 2020
- DeepLearning.AI TensorFlow Developer Professional Certificate, Coursera - DeepLearning.AI, Series of four courses: Introduction to TensorFlow for Artificial Intelligence, Machine Learning, and Deep Learning, Convolutional Neural Networks in TensorFlow, Natural Language Processing in TensorFlow, and Sequences, Time Series, and Prediction, July 2020
- Fundamentals of Reinforcement Learning Course Certificate, Coursera – University of Alberta, August 2020
- Predictive Modelling with Azure Machine Learning Studio Course Certificate, Coursera, September 2020
- Machine Learning Pipeline with Azure ML Studio Course Certificate, Coursera, September 2020

SERVICE TO UNIVERSITY

Board Member	Graduate Student Advisory Council, CEE Georgia Tech	2016-2020
Mentor	Stempower Mentoring Program, Georgia Tech	2018-2019
President	Institute of Transportation Engineers, Georgia Tech	2018-2019
Vice President	Institute of Transportation Engineers, Georgia Tech	2016-2017
Secretary	Institute of Transportation Engineers, Georgia Tech	2015-2016
Social & Outreach Chair	American Society of Highway Engineers, Georgia Tech	2015-2016
Publicity Manager	Technical Festival, Department of Civil Engineering, IITB	2010-2011

SERVICE TO PROFESSION

- **Peer-Reviewer:** Standing Committee on Highway Traffic Monitoring, TRB Committee
- **Peer-Reviewer:** Standing Committee on Intelligent Transportation Systems, TRB Committee
- **Peer-Reviewer:** Artificial Intelligence and Advanced Computing Applications, TRB Committee
- **Peer-Reviewer:** Winter Simulation Conference 2020 - Agent Based Modeling Track
- **Programming Committee Member:** Winter Simulation Conference 2020
- **Member:** ACM SIG SIM and American Society of Civil Engineers

SERVICE TO COMMUNITY

- TEAMBuzz Georgia Tech Volunteering Service (Spring & Fall 2017)
- Grader, 2016 MATHCOUNTS Georgia Competition at Marietta High School, Engineering Outreach Event, Institute of Transportation Engineers Georgia
- Teach for India - Tutored underprivileged students in Mumbai suburban school
- Event Assistant, Woodruff Arts Center: Create ATL Family Fun Event

NON-REFEREED CONFERENCE/WORKSHOP PRESENTATIONS

1. Hunter, M., A. Guin, **A. Saroj**, and S. Roy. Data Analysis for Smart Transportation, North Avenue Digital Twin. Invited presentation (online) for Midwest Energy Research Consortium (M-WERC). April 9th, 2020. (Approx. 10 real-time logins). (Speaker - Dr. Hunter)
2. Hunter, M., A. Guin, **A. Saroj**, and S. Roy. Smart City Real-Time Data Driven Simulation, North Avenue Digital Twin. Invited presentation (online) for A Better Half: Using Digital Twins to Improve City Infrastructure, Engineering News-Record (ENR), March 30th, 2020. (Approx. 250+ real-time logins). (Speaker - Dr. Hunter)
3. **Saroj, A.**, S. Roy, R. Fujimoto, A. Guin, and M. Hunter. Smart City Connected Digital Twin. GDOT/GTRI Research Expo, Atlanta, Georgia, September 13th, 2019.
4. Roy, S., **A. Saroj**, A. Guin, and M. Hunter. Connected Infrastructure Data Loss Patterns. GDOT/GTRI Research Expo, Atlanta, Georgia, September 13th, 2019.
5. Hunter, M., **A. Saroj**, S. Roy, R. Fujimoto, R. Guensler, and A. Guin. Smart City Real-Time Data Driven Simulation – North Avenue Digital Twin. ITE Summer Seminar, St. Simons Island, Georgia, July 21st to July 24th, 2019. (Speaker - Dr. Hunter)
6. Hunter, M., **A. Saroj**, S. Roy, R. Fujimoto, R. Guensler, and A. Guin. North Avenue Smart City Digital Twin. Georgia Power – A Southern Company, Atlanta, Georgia, July 25th, 2019. (Speaker - Dr. Hunter)
7. **Saroj, A.**, S. Roy, R. Fujimoto., R. Guensler, A. Guin, and M. Hunter. Smart City Digital Twin – Connected Data-Driven Traffic Simulation Model. Automated Vehicles Symposium, Orlando, Florida, July 15th to 18th, 2019.
8. Roy, S., **A. Saroj**, A. Guin, and M. Hunter. Investigation of Data Loss Patterns in Real-Time Connected Transportation Infrastructure Data. Automated Vehicles Symposium, Orlando, Florida, July 15th to 18th, 2019.
9. **Saroj, A.**, N. Choudhary, H. Kim, A. Guin, M. Rodgers, and M. Hunter. Operational Evaluation of Don't Block the Box Campaigns. Southeastern Transportation Research, Innovation, Development, and Education Center Student Poster Competition, Washington, D.C., January 13th to 17th, 2019.
10. **Saroj, A.**, N. Choudhary, H. Kim, A. Guin, M. Rodgers, and M. Hunter. Operational Evaluation of Don't Block the Box Campaigns. Transportation Research Board Annual Meeting, Washington, D.C., January 13th to 17th, 2019.
11. **Saroj, A.**, S. Roy, A. Guin, and M. Hunter. Smart Corridor Real-Time Dynamic Simulation. University Transportation Center Conference for the Southeastern Region, Clemson, South Carolina, October 24th to 25th, 2018.
12. **Saroj, A.**, N. Choudhary, H. Kim, A. Guin, M. Rodgers, and M. Hunter. Operational Evaluation of DBTB Campaigns in Georgia. University Transportation Center Conference for the Southeastern Region, Clemson, South Carolina, October 24th to 25th, 2018.
13. Hunter, M., A. Guin, R. Guensler, R. Fujimoto, M. Rodgers, **A. Saroj**, S. Roy, J. Bolen, and A. Biswas. Smart Cities Atlanta – Real-Time Data-Driven Transportation Simulation. GDOT/GTRI Research Expo., Atlanta, Georgia, September 6th, 2018.

14. **Saroj, A.**, N. Choudhary, H. Kim, A. Guin, S. Harris, C. Maddox, M. O. Rodgers, and M. Hunter. Operational Evaluation of DBTB Campaigns in Georgia. GDOT/GTRI Research Expo., Atlanta, Georgia, September 6th, 2018.
15. **Saroj, A.**, N. Choudhary, H. Kim, A. Guin, M. Rodgers, and M. Hunter. Analysis of Vehicle Blocking Behavior on Intersection Performance. University Transportation Center Conference for the Southeastern Region, Gainesville, Florida, November 16th to 17th, 2017.
16. Hunter, M., R. Guensler, A. Guin, M. O. Rodgers, R. Fujimoto, J. Bolen, A. Biswas, S. Roy, and **A. Saroj**. Energy, Emissions, and a Smarter North Avenue – City of Atlanta Demonstration Project, Smart Cities Advisory Board Meeting, Atlanta, Georgia, October 2017.
17. **Saroj, A.**, A. Guin, S. Harris, C. Maddox, M. O. Rodgers, and M. Hunter. Operational Evaluation of DBTB Campaigns in Georgia. GDOT/GTRI Research Expo., Atlanta, Georgia, October 5th, 2017.
18. **Saroj, A.**, A. Guin, S. Harris, C. Maddox, M. O. Rodgers, and M. Hunter. Enhanced Role of Activity Center Transportation Organizations in Regional Mobility and Operational Evaluation of DBTB Campaigns in Georgia. GDOT/GTRI Research Expo., Atlanta, Georgia, September 13th, 2016.
19. **Saroj, A.**, S. Harris, A. Guin, M. O. Rodgers, and M. Hunter. Sensitivity Analysis of Vehicle Blocking Behavior on Intersections. University Transportation Center Conference for the Southeastern Region, Knoxville, Tennessee, March 31st to April 1st, 2016.
20. **Saroj, A.**, A. Guin, S. Harris, C. Maddox, M. O. Rodgers, and M. Hunter. Enhanced Role of Activity Center Transportation Organizations in Regional Mobility. GDOT/GTRI Research Expo., Atlanta, Georgia, September 22nd, 2015.