

# Venktesh Pandey

Ph.D. Candidate, Department of Civil, Architectural, and Environmental Engineering  
The University of Texas at Austin

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## EDUCATION

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### Doctor of Philosophy

December 2019

Department of Civil, Architectural, and Environmental Engineering

(Expected)

The University of Texas at Austin

Dissertation title: *Dynamic Pricing and Long-term Planing Models for Managed Lanes with Multiple Entrances and Exits*

Certification in Engineering Education

### Masters of Science

August 2016

Department of Civil, Architectural, and Environmental Engineering

The University of Texas at Austin

Thesis title: *Optimal Dynamic Pricing for Managed Lanes with Multiple Entrances and Exits* (Winner, Milton Pikarsky Award, 2017)

### Bachelor of Technology with Honors

May 2014

Department of Civil Engineering

Indian Institute of Technology, Bombay

Minor: Center of Studies in Resource Engineering

Thesis: *Developing Simulation Model for Indian Road Networks Using TRANSIMS*

## WORK EXPERIENCE

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### Research Intern, IBM Research, Dublin, Ireland

May 2018- Dec 2018

- Developed algorithms for modeling cooperation and competition in multi-company ridesharing problem while working remotely and collaborating with an international team
- Coded programs in Java and Python for large scale modeling of the algorithms

### Research Assistant, Center for Transportation Research, Austin

May 2017-August 2017

- Performed statistical analysis on the National Performance Management Research Data Set (NPMRDS) and developed an online data interpretation interface in R-shiny to evaluate corridor performance metrics
- Aggregated and analyzed real-time Wi-Fi data for travel time estimation using City of Austin Wi-Fi detectors
- Collaborated with Texas Advanced Computing Center (TACC) in developing deep learning algorithms for automatic vehicle detection and safety quantification on intersection using traffic videos

## Graduate Research Assistant, The University of Texas at Austin

August 2014- Current

Project titles:

- Operational Effectiveness of Active Traffic Management (ATM) Strategies for Texas Corridors
- Decentralized Modeling of Large-scale Transportation Networks for Consistent Statewide Planning Models
- Modeling Managed Lanes in Long-term Planning Models

## Research Intern, Future Cities Laboratory, Singapore

May 2013- July 2013

- Improved the meta-model of incorporating signal delays in agent based simulation software, MATSIM, by handling agent arrival events at an intersection using 1000+ lines of Java code, leading to a 10% reduction in computation time

## AWARDS AND HONORS

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<b>Recipient</b> , People's Choice Award, Three-minute Thesis Competition, Organized by Graduate School, The University of Texas at Austin	2019
<b>Winner</b> , Three-minute Thesis Competition: Concise Portrayal of Research Discovery to Non-specialist Audience, Organized by Young Member Council, Transportation Research Board	2019
<b>Winner</b> , Transportation Technology Tournament, Organized by National Operations Center of Excellence (NO-CoE) and the U.S. DOT	2018
<b>Recipient</b> , Kolodzey Travel Grant, Department of Civil, Architectural, and Environmental Engineering	2018
<b>Recipient</b> , Milton Pikarsky Award for Outstanding Master's Thesis in Science and Technology	2017
<b>Recipient</b> , ITS Texas Scholarship for Graduate Study in Intelligent Transportation Systems	2015
<b>Winner</b> , Texas District Collegiate Traffic Bowl, Institute of Transportation Engineers	2015
<b>Recipient</b> , Undergraduate Research Award 2013, IIT Bombay	2013
<b>Awarded</b> Certificate of Merit, Indian National Mathematics Olympiad	2013
<b>Recipient</b> , National Talent Search Examination Scholarship (awarded to 700 applicants out of 300,000 by the Government of India)	2008

## JOURNAL PUBLICATIONS

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5. **Pandey V.**, and Boyles, S. D. (2019). Comparing route choice models for managed lanes with multiple entrances and exits. *Transportation Research Record*. <https://doi.org/10.1177/0361198119848706>
4. **Pandey V.**, and Boyles, S. D. (2018). Dynamic pricing of managed lanes with multiple entrances and exits. *Transportation Research Part C: Emerging Technologies*, 96, 304-320. <https://doi.org/10.1016/j.trc.2018.09.017>.
3. **Pandey, V.**, and Ruiz-Juri, N. (2018). Using National performance management research data set (NPM-RDS) for corridor performance measures: a US 281N corridor case study. *Transportation Research Record*. <https://doi.org/10.1177/0361198118796972>.
2. Yahia, C., **Pandey, V.**, and Boyles, S. D. (2018). Network partitioning algorithms for solving the traffic assignment problems using a decomposition approach. *Transportation Research Record*. <https://doi.org/10.1177/0361198118799039>.
1. Jafari, E., **Pandey, V.**, and Boyles, S. D. (2017). A decomposition approach to the static traffic assignment problem. *Transportation Research Part B: Methodological*, 105, 270-296. <https://doi.org/10.1016/j.trb.2017.09.011>.

### Currently under review/preparation

4. **Pandey, V.**, Perrine, K. A., and Levin, M.W. (2019). Dynamic user equilibrium with recourse and variable message signs. Under review in *Transportation Research Part-C: Emerging Technologies*.
3. **Pandey, V.**, Monteil, J., Gambella, C., and Simonetto, A. (2019). On the needs for MaaS platforms to handle competition in ridesharing mobility. Under review in *Transportation Research Part-C: Emerging Technologies*. Preprint: <https://arxiv.org/abs/1906.07567>.
2. **Pandey, V.**, Wang, E., and Boyles, S. D. (2019). Deep reinforcement learning algorithm for dynamic pricing of express lanes. (Under preparation).
1. Patil, P. N., **Pandey, V.**, and Boyles, S. D. (2019). A decomposition algorithm and heuristic for megaregional traffic assignment problem. (Under preparation).

### REFEREED CONFERENCE PROCEEDINGS

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13. **Pandey, V.**, Monteil, J., Gambella, C., and Simonetto, A. (2019). On the needs for MaaS platforms to handle competition in ridesharing mobility. Presented at the Tenth Triennial Symposium on Transportation Analysis (TRISTAN), Hamilton Island, Australia.
12. **Pandey V.** and Boyles, S. D. (2019). Multiclass user equilibrium with recourse model for long-term planning of managed lanes. Presented at 15th World Conference on Transport Research, Mumbai, India.
11. **Pandey V.** and Boyles, S. D. (2019). Comparing route choice models for managed lanes with multiple entrances and exits. Presented at 98th Annual Meeting of the Transportation Research Board, Washington, DC.
10. **Pandey V.** and Boyles, S.D. (2018). Multiagent reinforcement learning model for distributed dynamic pricing of managed lanes. Presented at the 21st IEEE International Conference on Intelligent Transportation Systems, Lahaina, HI. (**Candidate, Best paper award**)
9. Perrine, K. A., **Pandey, V.**, and Levin, M. W. (2018). Dynamic user equilibrium with recourse with variable message signs. Presented at the 7th International Symposium on Dynamic Traffic Assignment: June 2018, Hong Kong, China.
8. **Pandey V.** and Boyles, S. D. (2018). Dynamic pricing for managed lanes with multiple entrances and exits. Presented at 97th Annual Meeting of the Transportation Research Board, Washington, DC.
7. **Pandey V.**, Li, J., Yahia, C., and Boyles, S. D. (2018). Evaluation of active traffic management (ATM) strategies under recurring and non-recurring congestion: an IH-35 corridor case study. Presented at 97th Annual Meeting of the Transportation Research Board, Washington, DC.
6. **Pandey, V.** and Ruiz-Juri, N. (2018). Using National performance management research data set (NPM-RDS) for corridor performance measures: a US 281N corridor case study. Presented at 97th Annual Meeting of the Transportation Research Board, Washington, DC.
5. Yahia, C., **Pandey, V.**, and Boyles, S. D. (2018). Network partitioning algorithms for solving the traffic assignment problems using a decomposition approach. Presented at 97th Annual Meeting of the Transportation Research Board, Washington, DC.
4. **Pandey V.**, Xu, W., Huang, L., Liu, S., and Ruiz-Juri, N. (2018). Processing large-scale video data to support transportation safety, planning, and operations: a flexible approach to data storage and integration. Presented at 97th Annual Meeting of the Transportation Research Board, Washington, DC.
3. Huang, L., Weijia, X., Liu, S., **Pandey, V.**, Ruiz-Juri, N. (2017). Enabling versatile analysis of large scale traffic video data with deep learning and HiveQL. Presented at the 2017 IEEE International Conference on Big Data, Boston, MA.
2. Jafari, E., **Pandey, V.**, and Boyles, S. D. (2016). Static traffic assignment: a decentralized approach. Presented at 95th Annual Meeting of the Transportation Research Board, Washington, DC.
1. Saxena N., **Pandey, V.**, and Patil, G. R. (2013). Developing simulation model for urban road networks in

developing countries using TRANSIMS. Presented at the Conference on Agent-Based Modeling in Transportation Planning and Operations, Blacksburg, VA.

## TECHNICAL REPORTS

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4. Boyles, S. D., Patil, P. N., **Pandey, V.**, and Yahia, C. (2019). Beyond Political Boundaries: Constructing Network Models for Megaregion Planning. USDOT Tier 1 Center: Cooperative Mobility for Competitive Megaregions. (*in press*).
3. Boyles, S. D., **Pandey, V.**, Alexander, W. E., and Cheng, C. (2018). Modeling Managed Lanes for Long-term Planning Purposes. North Central Texas Council of Governments. (*in press*).
2. Boyles, S. D., Walton, C. M., Duthie, J., Jafari, E., Jiang, N., Khani, A., Li, J., Osorio, J., **Pandey, V.**, Rambha, T., and Yahia, C. (2017). A Planning Tool for Active Traffic Management Combining Microsimulation and Dynamic Traffic Assignment. Texas Department of Transportation Report FHWA/TX-17/0-6859-1.
1. Boyles, S. D., Bhat, C., Duthie, J., Jiang, N., Dias, F., Jafari, E., **Pandey, V.**, Singh, A., and Yahia, C. (2017). Methods for Improving Consistency between Statewide and Regional Planning Models. Texas Department of Transportation Report FHWA/TX-17/0-6900-1.

## CONFERENCE PRESENTATIONS

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6. **Pandey, V.**, Rambha, T., and Boyles, S.D. (2019). Sensitivity analysis for user equilibrium models with recourse. To be presented at the 2019 Annual Meeting of the Institute for Operations Research and Management Sciences, Seattle, WA.
5. **Pandey V.**, Patil, P. N., and Boyles, S. D. (2018). Comparison of route choice model for managed lanes with multiple entrances and exits. Presented at Annual Meeting of the Institute for Operations Research and Management Sciences, Pheoniz, AZ.
4. **Pandey V.** and Boyles, S. D. (2017). Optimal pricing for managed lanes with multiple entrances and exits. Presented at Annual Meeting of the Institute for Operations Research and Management Sciences, Houston, TX.
3. **Pandey V.** and Boyles, S. D. (2017). Real-time estimation of value of time distribution using measurements on managed lane networks. Presented at Annual Meeting of the Institute for Operations Research and Management Sciences, Houston, TX.
2. Yahia, C., **Pandey, V.**, and Boyles, S. D. (2017). Network partitioning algorithms to reduce computation time for parallel traffic assignment problems. Presented at Annual Meeting of the Institute for Operations Research and Management Sciences, Houston, TX.
1. **Pandey V.** and Boyles, S. D. (2016). Optimal dynamic pricing for managed lanes with multiple entrances and exits. Presented at Annual Meeting of the Institute for Operations Research and Management Sciences, Nashville, TN.

## TEACHING EXPERIENCE

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### Certification in Engineering Education, The University of Texas at Austin

Spring 2017-Spring 2019

- Courses completed: Teaching Engineering, Curriculum and Assessment Design, Teaching Practicum, Advanced Instructional Methods Design
- Designed an introductory course on Probability and Statistics including the design of learning objectives, syllabus, assessment plan, lesson plan, and one week's worth of learning activities
- Taught an interactive 1.5-hour guest lecture session on the applications of Probability to a class of 40 students

**Teaching Assistant, Probability and Statistics, The University of Texas at Austin** Fall 2017, Spring 2018

- Taught one-hour lab sessions every week by designing learning activities and modules in R
- Designed homework and online testing modules for grading assessment. Assisted in design of mid terms and finals
- Used classroom assessment techniques to monitor student learning progress in the semester
- Held weekly office hours and organized review sessions before the exams
- Overall Teaching Assistant Rating (4.3/5.0)

**Teaching Assistant, Physics and Differential Equations, IIT Bombay** Fall 2012, Spring 2014

- Taught one-hour tutorial session every week for helping students with problem solving
- Organized office hours and held review sessions before the exams

**Participant, International Teaching Assistants connect with Undergraduate Teaching Ambassadors (ITA/UTA Connect) Program, Faculty Innovation Center, The University of Texas at Austin** Spring 2018

- Delivered two 12-minute lectures to an audience of fellow international graduate students, undergrads, and pedagogy experts at the Faculty Innovation Center and received detailed feedback about teaching and activity plans
- Gained first-hand exposure to facets of undergraduate life such as undergraduate learning groups, undergraduate advising, residence hall life, and extracurricular activities through small group experiences

## **MENTORING EXPERIENCE**

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**Graduate Student Mentor, Graduate Linked with Undergraduates in Engineering (GLUE). The University of Texas at Austin** Spring 2016, Fall 2017, Spring 2018, Fall 2018, Spring 2019

- Guided and trained sophomore students for research in the field of active traffic management strategies
- Served as a panelist on graduate student panel for preparing undergraduates for graduate school
- Undergraduates mentored: Anne Jillian Monsanto, Jordan Hammond, Abigail Beck, Andres Najera, Evana Wang

**Undergraduate Thesis Supervisor** Spring 2018

- Supervised the research conducted by Christine Cheng on value of time analysis for managed lanes
- Assisted her in experimental designs and review of drafts

**Head, Department Academic Mentorship Program, Department of Civil Engineering, IIT-Bombay** Fall 2013, Spring 2014

- Spearheaded the team of 17 mentors in developing a support program for under-performing students with involvement from faculty advisors
- Assisted 8 students through one-to-one counseling helping them clear their backlogs

## **LEADERSHIP EXPERIENCE**

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**Vice President, Institute of Transportation Engineers, Student Chapter. The University of Texas at Austin** Nov 2014- Oct 2015

- Initiated and assisted in increasing number of technical tour, guest speaker and social events of the chapter, leading it to win the Texas District Outstanding Student Chapter Award 2015
- Served as organizing committee member of the inaugural TexITE Student Leadership Summit 2015

**Overall Project Coordinator, Association for India's Development, Austin Chapter**      August 2015- August 2017

- Managed the process of approving funds worth \$20k to different non-profit organizations' projects in the area of health care, education, and social empowerment
- Headed the team of 15 people to organize a music concert as fundraiser attracting a footfall of 450+ attendees, leading to profits of more than \$13k

**Founding Manager, Abhyuday, Social Festival of IIT Bombay**      Jan 2014- April 2014

- Launched first ever Social Festival of IIT-Bombay within a span of 100 days, attracting 5000+ participants from 80+ colleges across India to realize a new vision of creating social awareness among the youth
- Designed festival's flagship "Action Plan" competition for hands-on learning through slum visits and workshops backlogs

**Traffic Bowl Coach**, UT Austin Student Chapter team at the ITE International Collegiate Traffic Bowl Championship      2017-2019

## PROFESSIONAL INVOLVEMENT

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Transportation Research Board (TRB),  
Member, Institute for Operations Research and Management Sciences (INFORMS),  
Member, IEEE Intelligent Transportation Systems Society (IEEE-ITSS),  
Active with the Institute of Transportation Engineers (ITE) and Intelligent Transportation Society of America (ITS-America)

## MISCELLANEOUS

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Paper Referee, Transportation Research Board (TRB) annual meeting (2017- Current)  
Paper Referee, Journal for Case Studies on Transport Policy (2018- Current)  
Paper Referee, Transportation Research Part-B: Methodological (2019- Current)  
Assisted in writing proposals funded by Texas Department of Transportation (TxDOT) and North Central Texas Council of Governments (NCTCOG)