Priyadarshan Patil

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Education

Ph.D. - Operations Research, The University of Texas at Austin *Expected Summer '22*
Graduate Certificate - Engineering Education, The University of Texas at Austin *Fall '20*
M.S.E. - Civil Engineering (Transportation), The University of Texas at Austin *Fall '16*
B.Tech. - Civil Engineering, Indian Institute of Technology Madras *Summer '15*

Refereed publications

7. Patil P., Walthall R., Boyles S.D., Budget-constrained rail electrification modeling using symmetric traffic assignment - a North American case study. *Journal of Infrastructure Systems, 28(2), 04022007.*
6. Gokalp C., Patil P., Boyles S.D., Post-disaster recovery sequencing strategy for road networks. *Transportation Research Part B, 153, 228-245.*
5. Venkatraman R., Boyles S.D., James R., Unnikrishnan A., Patil P., Adaptive routing behavior with real-time information under multiple travel objectives. *Transportation Research Interdisciplinary Perspectives, 10(100395).*
4. Andrews M.E. & Patil P., A systematic review of argument assessment frameworks in engineering education. *ASEE Annual Conference and Exposition, Conference Proceedings (2021).*
3. Patil P., Ross K., and Boyles S., Convergence behavior for traffic assignment characterization metrics. *Transportmetrica A: Transport Science, 17(4), 1244-1271.*
2. Astroza S., Patil P., Smith K., and Bhat C., Transportation planning to accommodate needs of wind energy projects.*Transportation Research Record: Journal of the Transportation Research Board, (2669), 10-18.* - **Ryuichi Kitamura paper award, 2017**
1. Patil P., Dubey S., Pinjari A., Cherchi E., Daziano R., Bhat C.R., Simulation evaluation of emerging estimation techniques for multinomial probit models, *Journal of Choice Modelling, 23, 9-20.*

Conference Presentations

16. Patil P., Walthall R., Boyles S.D., Rail network electrification using symmetric traffic assignment. (*Accepted, 10th INFORMS Transportation Science and Logistics Society Workshop, Norway*)
15. Patil P., Boyles S.D., Symmetric traffic assignment solution algorithms. (*Accepted, 10th INFORMS Transportation Science and Logistics Society Workshop, Norway*)
14. Patil P., Workshop on Doctoral Research in Transportation Policy, Planning, and Analysis. (*Invited speaker, 101^{st} TRB annual meeting*)
13. Patil P., Walthall R., Boyles S.D., Budget-constrained rail network electrification problem. (101^{st} *TRB annual meeting, Washington D.C.*)
12. Patil P., Boyles S.D., A fresh look at symmetric traffic assignment and algorithm convergence. (101^{st} *TRB annual meeting, Washington D.C.*)
11. Andrews M.E. & Patil P., A systematic review of argument assessment frameworks in engineering education. *ASEE Annual Conference and Exposition 2021 - Long Beach, CA*
10. Gokalp C., Patil P., Boyles S., Post-disaster recovery sequencing strategy for road networks. *100th Annual Meeting of the Transportation Research Board - Washington, DC/Virtual*
9. Patil P., Liao C., Boyles S., Effects of origin-destination matrix errors on user equilibrium. *100th Annual Meeting of the Transportation Research Board - Washington, DC/Virtual*
8. Gokalp C., Patil P., Khosvirikia F., Boyles S., Post-disaster recovery sequencing strategy for road networks. *INFORMS Annual Meeting, 2020 - Maryland/Virtual*
7. Patil P., Liao C., Boyles S., Effects of origin-destination matrix errors on user equilibrium. *INFORMS Annual Meeting, 2020 - Maryland/Virtual*
6. Pandey V., Patil P., Ganesh M., and Boyles S., Computationally-efficient decomposition heuristic for the static traffic assignment problem *2020 INFORMS Transportation Science and Logistics Society Conference - Arlington, VA*
5. Patil P., Ross K., and Boyles S., Convergence behavior for traffic assignment characterization metrics. *99th Annual Meeting of the Transportation Research Board - Washington, DC*
4. Patil P., Ross K., and Boyles S., Convergence behavior for traffic assignment characterization metrics. *INFORMS Annual Meeting, 2019 - Seattle, WA*
3. Pandey V., Patil P., and Boyles S., Online routing of heterogeneous vehicles on stochastic time-varying managed lane networks. *INFORMS Annual Meeting, 2018 - Phoenix, AZ*
2. Boyles S., Patil P., and Alexander W., Quantifying disruption impact across transportation networks, *INFORMS Annual Meeting, 2018 - Phoenix, AZ*

1. Astroza S., Patil P., Smith K., and Bhat C., Transportation planning to accommodate needs of wind energy projects. *96th Annual Meeting of the Transportation Research Board - Washington, DC*

Technical Report

2. Boyles S., Patil P., Pandey V., and Yahia C., Beyond political boundaries: Constructing network models for megaregion planning.*USDOT Tier 1 Center: Cooperative Mobility for Competitive Megaregions, CM2-11.*
1. Astroza S., Patil, P., Smith K., Kumar V, Bhat C., Zhang Z., Texas transportation planning for future renewable energy projects, *Texas Department of Transportation, FHWA/TX-16/0-6850-1*

Awards

8. **Best student paper Award, 2022** - Awarded by Texas chapter of ITE International for best student transportation paper in Texas
7. **Professional Development Award, 2021** - Awarded by the Graduate School at UT Austin for presentations at the 2022 TRB annual meeting
6. **Professional Development Award, 2020** - Awarded by the Graduate School at UT Austin for presentations at the 2020 INFORMS annual meeting and 2021 TRB annual meeting
5. **Winner, fORged by Machines competition, 2019** - Awarded by INFORMS computing society cluster and AWS for the best demand prediction/inventory control model
4. **Professional Development Award, 2019** - Awarded by the Graduate School at UT Austin for presentations at the 2019 INFORMS annual meeting
3. **Scholarship for Graduate Study in ITS, 2018** - Awarded by Intelligent Transportation Society Texas chapter for academic achievements
2. **Professional Development Award, 2018** - Awarded by the Graduate School at UT Austin for presentations at the 2018 INFORMS annual meeting
1. **Ryuichi Kitamura paper award, 2017** - Best Paper award for a professor- student pair awarded by Travel analysis methods section (ADB00) of the Transportation Research Board

Teaching Experience

Graduate Teaching Assistant: Probability and Statistics (Spring 2019, Spring 2020), Civil engineering systems (Fall 2018), Transportation systems (Fall 2016)

- **Probability and Statistics:** Assisted course design, evaluation design, and handled grading, in addition to weekly lab sessions and office hours (Overall Rating: 4.33/5)
- **Civil Engineering Systems:** Created new modules on data analysis and linear regression, in addition to conducting regular lab sessions, office hours, and grading (Overall Rating: 4.46/5)
- **Transportation Systems:** Conducted regular discussion sessions, office hours, and grading

Certification in Engineering Education, The University of Texas at Austin (Completed, Fall 2020)

- Courses completed: Knowing/learning in STEM education, Supervised teaching in engg., Assessment/curriculum design in engg., Teaching practicum, Argumentation in engineering education
- Designed an introductory course on network analysis including design of learning objectives, syllabus, assessment plan, lesson plan, and one weeks worth of learning activities
- Taught an interactive 1.5-hour guest lecture session on probability applications to a class of 60 students
- My research (as a part of the certification) resulted in a peer-reviewed publication (See pub. no. 4)

Mentoring Experience

Graduates Linked with Undergraduates in Engineering (GLUE) mentor (Fall '18 - Spring '19)

- Mentored two undergraduate sophomores (Ms. Katherine Ross, Ms. Bradley Gladdens) on transportation and hurricane evacuation research
- Ms. Ross aided in experimental work on a publication and Ms. Gladdens helped with a literature review used for proposal writing

MiTR mentor, IIT Madras (Fall '14 - Spring '15)

- Mentored 8 freshmen undergraduate students and supported their academic journey on campus.

Relevant Technical Skills

Languages: C, C++, Python, MATLAB, R, AMPL

Tools/Packages: SPSS, Stata, TransCAD, OpenCV, Vissim, ArcGIS

Python libraries: Pandas, Numpy, Scipy, Matplotlib, Seaborn, Sklearn, NLTK, Catboost/XGBoost, Tensorflow

Coursework Highlights

UT Austin (PhD) - Data Science Lab, Public Transportation Engineering, Network Optimization, Linear Programming, Integer Programming, Applied Engg. Data Analysis/Visualization/Optimization, Applied Stochastic Processes, Markov Decision Processes, Queueing Theory, Production/Inventory Control, Decision Analysis

UT Austin (MS) - Transportation Network Analysis, Transportation Systems Management, Logistic Regression/Discrete Choice, Dynamic Traffic Assignment, TransCAD GIS, Logistics Analytics

IIT Madras - Transportation Network Analysis, Computer Applications in Traffic & Highway Engineering, Probability-Statistics and Stochastic Processes, Calculus I & II

Thesis

Masters Thesis : Simulation Evaluation of Emerging Estimation Techniques for Multinomial Probit Models *Jan' 16 - Dec' 16*

Advisor: Dr. Chandra Bhat, UT Austin

Evaluated computational performance of MACML, GHK-ML, GHK-CML, GHK-SGI and Bayesian MCMC for multinomial probit models across different simulation settings

Bachelors Thesis : Network Algorithms for Sustainability Objective *Aug' 14 - May' 15*

Advisor: Dr. Karthik K Srinivasan, IIT Madras

Formulated a multi-objective multiple user class gradient projection algorithm for the traffic assignment problem (TAP) and implemented on the Chennai road network

Selected Projects

1. Simulation of liver transplant systems for multiple liver quality thresholds
   - Designed and simulated liver transplant systems for heterogeneous patient groups under various liver allocation policies.
2. Intersection redesign study as Consultant for the city of West Lake Hills
   - Conducted a traffic count study and traveler satisfaction survey for multiple traffic control interventions at the intersection under study
   - Presented results of the study to the city council and members of the public; providing recommendations for changing intersection configuration
3. Modeling inequity through dynamic traffic assignment (DTA)
   - Designed a parking search problem with departure time choice to model inequity
   - Derived analytical solutions for the parking search problem with PQ model integration
4. Planning for environmental effect of pollutants by Visualization in TransCAD
   - Performed 4-step planning process, linked trip distribution to emission density and prepared visualizations to pinpoint areas of maximum impact for easy remedial measures

Research Service

- Paper Referee, Transportation Letters (current)
- Paper Referee, Transportation Research Interdisciplinary Perspectives (current)
- Paper Referee, Transportation Research Board (TRB) annual meeting (2018-current)
- Paper Referee, American Society for Engineering Education (ASEE) annual conference (2020-current)
- Paper Referee, Transportation Research Record (TRR) (2018-2019)

Leadership and Misc. Service

- Tenant advisory board award winner, University Housing and Dining (January 2021 - current)
- Graduate student representative, Shuttle Bus Committee, UT Austin.
- Graduate student representative, East Campus Graduate Housing Project committee, UT Austin.
- Secretary, ITE/ITS student chapter, UT Austin (*Best TX student chapter award, 2019*)
- Secretary, INFORMS student chapter, UT Austin
- ORIE Representative, Women's Transportation Seminar (WTS) student chapter (*Teamwork excellence award, 2019; Support excellence award, 2019*)
- Friend of AEP40 committee, Transportation Research Board (TRB)
- Member, Institute for Operations Research and Management Sciences (INFORMS)
- Member, Institute of Transportation Engineers and Intelligent Transportation Society of America

Miscellaneous

- National Intercollegiate Racquetball Player, UT Austin.
- 99.99 %ile in CAT 2014 (conducted by IIMs), ranked among top 25 among over 1,70,000 candidates.
- KVPY fellowship granted by the Dept. of Science and Technology, Govt. of India.

References

Dr. Stephen D. Boyles
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