Nitesh Raj Shah

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EDUCATION

Ph.D. in Transportation Engineering *August 2020 – May 2022*
The University of Tennessee, Knoxville, TN GPA: 3.93 / 4.0
Dissertation title: Understanding Safety, Demand Elasticity, and Sustainability Impacts of Shared E-scooters

Master of Science in Transportation Engineering *August 2018 – May 2020*
The University of Tennessee, Knoxville, TN GPA: 3.96 / 4.0
Thesis title: Big Data and Unsupervised Machine Learning Approach to Understand Why People Ride E-Scooter in Nashville, Tennessee

Bachelor of Science in Civil Engineering *November 2011 – October 2015*
Tribhuvan University, Nepal Overall score: 77% / 100%

RESEARCH EXPERIENCE

Oak Ridge National Laboratory (ORNL), Oak Ridge, TN
Graduate Advancement Training and Education (GATE) Fellow *August 2020 – Present*

- Awarded a research fellowship (one of 20 awardees among 41 applicants) based on a holistic evaluation of research proposal, motivation, academic standing, and recommendations
- Evaluating operational energy and emission impacts of e-scooters using unprecedented high-resolution micromobility data with an aim to integrate shared micromobility into the MA3T-MC energy model developed by ORNL
- Fellowship renewed for second year based on the first six months' progress and a potential expansion of the scope of work

The University of Tennessee, Knoxville, TN
Graduate Research Assistant *August 2018 – July 2020*

- Researched best practices for statewide bicycle and pedestrian (bike-ped) count program for the Tennessee Department of Transportation (TDOT), resulting in first authorship of an 80-page report; interviewed representatives of statewide transportation agencies to assess their bike-ped count programs; coordinated the project, a collaboration between the University of Tennessee Center for Transportation Research and the Toole Design Group
- Identified e-scooter crash typologies using police crash reports and compared them to bicycle crash typologies for a Collaborative Science Center for Road Safety (CSCRS) funded project; paper published in Journal of Safety Research
- Prepared successful research proposals by conducting background research and drafting technical details

PROFESSIONAL EXPERIENCE

World Resources Institute, Washington DC
Intern, New Urban Mobility Alliance (NUMO) *May 2019 – August* 2019

- Created a preliminary version of an innovative toolkit to profile existing and emerging vehicles for regulation; classification referenced in 2020 Safe Micromobility International Transport Forum (ITF) report
- Developed an instruction manual on using LEGO models as a communication tool for transportation planning; presented project as a finalist for internal competition amongst interns
- Evaluated transit performance, reviewed emerging technologies for bicycle and pedestrian planning, and collected transportation data for pilot cities

Total Management Services, Kathmandu, Nepal
GIS Analyst *March 2018 – June* 2018

- Analyzed spatial data in ArcGIS for the design of demand-based irrigation system funded by the Asian Development Bank (ADB)
- Consolidated workflow and database over multiple platforms, such as ArcGIS, Google Earth, and QGIS, to effectively facilitate tasks between team members
- Integrated disparate data from various sources and formats to create a methodical database

ELC Electroconsult, Kathmandu, Nepal
Civil Engineer *January 2018 – February 2018*

- Prepared topographic data for layout of 900 MW Dudhkoshi reservoir-type hydropower plant in ArcGIS
- Drafted plan and profile of hydropower layout along with typical drawing of its components for feasibility study

Full Bright Consultancy (Pvt.) Ltd., Kathmandu, Nepal
Civil/CAD Engineer *May 2016 – January 2018*

- Coordinated the drafting of working drawings for 60+ high-speed railway bridges (total of 34 km length)
- Supported engineering analysis of high-speed railway feasibility study, including through site visits
- Proposed and implemented innovative techniques, such as dynamic blocks, to significantly reduce drafting time and resources
- Managed travel time survey of Kathmandu Valley and processed the data for visual and tabular outputs

Rural Access Programme 3, Kathmandu, Nepal
Intern Civil Engineer *February 2016 – May 2016*

- Assisted consultant in monitoring and evaluating rural road maintenance activities as part of aid project sponsored by the UK Department for International Development (DFID)
- Designed AutoCAD guidance and training manual for in-house staff training as an alternative to outsourcing
- Completed training on planning, design, procurement, and implementation of local road network (LRN) with distinction

Reach Nepal and Shelter Cluster, Nepal
Volunteer, Team Leader *May 2015 – June 2015*

- Accomplished primary data collection of earthquake damage using Open Data Kit (ODK) on a smartphone
- Completed on-site training for data collection and uploaded in-field data through ODK application

PUBLICATIONS

Research Papers

1. **Shah, N. R.,** Guo, J., Lee, H. D., & Cherry, C. R. Why do people take e-scooter trips? Big Data and Unsupervised Machine Learning insights on temporal and spatial usage patterns. (In review in Transportation Research Part A).
2. **Shah, N. R.,** & Cherry, C. R. Scooter curfews move over: Riding at night is not more dangerous. (Submitted to Transport Findings).
3. Ziedan, A., **Shah, N. R.**, Wen, Y., Brakewood, C., Cherry, C. R., & Cole, J. (2021). Complement or compete? The effects of shared electric scooters on bus ridership. Transportation Research Part D: Transport and Environment, 101, 103098.
4. **Shah, N. R.**, & Cherry, C. R. (2021). Different Safety Awareness and Route Choice between Frequent and Infrequent Bicyclists: Findings from Revealed Preference Study Using Bikeshare Data. Transportation Research Record. https://doi.org/10.1177/03611981211017136
5. **Shah, N. R.**, Aryal, S., Wen, Y., & Cherry C. (2021). Comparison of motor vehicle-involved e-scooter and bicycle crashes using standardized crash typology. Journal of Safety Research 77: 217-228.
6. **Shah, N.**, Buckner, I., & Cherry, C. R. (2020). A jughandle design will virtually eliminate single bicycle crashes at a railway crossing. Journal of Transport & Health, 19, 100962.
7. **Shah, N. R.**, (2020). Big Data and Unsupervised Machine Learning Approach to Understand Why People Ride E-scooter in Nashville, Tennessee. MS Thesis. University of Tennessee.

Technical Reports

1. **Shah, N.**, Cherry, C., Brakewood, C., Cate, M., Kohls, A. G., & Ortmann, P. (2020). TDOT Bicycle & Pedestrian Counting: Best Methodologies Assessment (No. RES2019-13). Tennessee. Department of Transportation.
2. Sandt, L., Gelinne, D., West, A., Harmon, K., Goodwin, A., Combs, T., Bryson, M., Cherry, C., Parks, E., **Shah, N.**, Clewlow, R., Seki, S., Brown, C., & Sanders, R. (2021). E-scooter Safety: Issues and Solutions (BTSCRP-10 Draft Interim Report).
3. Cherry, C., Harmon, K., Sandt, L., Martin, E., **Shah N.**, & Wen, Y. Understanding Micromobility Safety Behaviour and Standardized Safety metrics for Transportation System Integration (CSCRS-R26).

PRESENTATIONS

Oral

1. **Shah, N. R.**, Ziedan, A., Brakewood, C., & Cherry, C. R. Shared e-scooter service providers with large fleet size have a competitive advantage: Findings from e-scooter demand and supply analysis of Nashville, Tennessee. TRB Committee on Innovative Public Transportation Services and Technologies (AP020). Transportation Research Board Annual Meeting 2022. Washington, D.C.
2. **Shah, N. R.,** Guo, J., Lee, H. D., & Cherry, C. R. Why do people take e-scooter trips? Big Data and Unsupervised Machine Learning insights on temporal and spatial usage patterns. Workshop on a Community Testbed to Support Micromobility Research, Webinar 2021.
3. **Shah, N. R.** NaTMEC: Micromobility Data Collection and Processing – Considerations for Policy Regulation and Data Privacy while Using the Data Meaningfully. Institute of Transportation Engineers (ITE) Webinar 2021.
4. **Shah, N.**, Aryal, S., Wen, Y., & Cherry C. Are scooter-car crashes different from bicycle-car crashes? International Cycling Safety Conference 2021. Lund, Sweden.
5. **Shah, N. R.**, Scoot over, survey: new insights from Big Data and Machine Learning. Transportation Research Board Annual Meeting 2020, 3-Minute Thesis Competition. Washington, D.C.
6. **Shah, N. R.**, Azad M., & Cherry C. What can data tell us about micromobility? And what can it not? Transportation Research Board Annual Meeting 2020. Washington, D.C.
7. **Shah, N. R.**, & Cherry C. Linking traditional crash data and bikeshare data to create a new picture of cycling safety. International Cycling Safety Conference 2019. Brisbane, Australia.

8. Azad M., **Shah, N. R.**, & Cherry C. How e-bike trips are different from conventional bicycles trips? A comparative study of route choices for Birmingham, Alabama. International Cycling Safety Conference 2019. Brisbane, Australia.
9. **Shah N. R.**, Infrastructure Asset Management. Civil Engineering Exhibition 2013. Kathmandu, Nepal.
10. **Shah N. R.**, Solid Waste Management. Civil Engineering Exhibition 2012. Kathmandu, Nepal.

Poster

1. **Shah, N. R.**, Ziedan, A., Brakewood, C., & Cherry, C. R. Shared e-scooter service providers with large fleet size have a competitive advantage: Findings from e-scooter demand and supply analysis of Nashville, Tennessee. Transportation Research Board Annual Meeting 2022. Washington, D.C.
2. Ziedan, A., **Shah, N. R.**, Cherry, C. R., & Brakewood, C. A Method for Placing Shared E-Scooters Corrals Near Transit Stops. Transportation Research Board Annual Meeting 2022. Washington, D.C.
3. **Shah, N. R.**, Aryal, S., Wen, Y., & Cherry C. Comparison of motor vehicle-involved e-scooter and bicycle crashes using standardized crash typology. TDOT Innovation to Implementation Forum 2021. Virtual Event.
4. **Shah, N. R.,** Guo, J., Lee, H. D., & Cherry, C. R., Why do people take e-scooter trips? Big Data and Unsupervised Machine Learning insights on temporal and spatial usage patterns. Transportation Research Board 100th Annual Meeting 2021, Washington, D.C.
5. Ziedan, A., **Shah, N. R.**, Wen Y., Brakewood, C., Cherry, C., & Cole, J., Impacts of Shared Electric Scooters on Bus Ridership in Nashville, Tennessee. Transportation Research Board 100th Annual Meeting 2021, Washington, D.C.
6. **Shah, N. R.**, Wen, Y., & Cherry C. Revealing the hidden patterns of the e-scooter trips through big data approach. National Travel Monitoring Exposition and Conference 2020. Raleigh, North Carolina. (postponed due to COVID)
7. **Shah, N. R.**, & Cherry C. Evaluating Safety Using Bicycle Route Choice: A New Approach to Model Perceived Safety. Lifesavers Conference 2019. Louisville, Kentucky.
8. Wen Y., Darling W., **Shah N. R.**, & Cherry C., Material Inventory of a Commercially-used Shared Electric Kick Scooter: A Key Step towards the Understanding of the Overall Environmental Footprint of Shared Micro-mobility Devices. LCA XIX Conference 2019. Tucson, Arizona

TECHNICAL SKILLS

- Data processing and visualization: Python, Tableau, and R
- Statistical and econometric modeling: Stata, R, JMP, MATLAB, and SAS
- Analysis: ArcGIS, QGIS, and TransCAD
- Machine Learning: Python and R
- Data Management: Git and GitHub, SQL (PostgreSQL) and NoSQL (MongoDB), and Apache Spark
- Design: Autodesk AutoCAD and Civil 3D

AWARDS AND HONORS

- First Place in Annual Student Paper Competition, Tennessee Section Institute of Transportation Engineers *April 2021*
- Second Place in Annual Student Paper Competition, Southern District Institute of Transportation Engineers *April 2021*
- McClure Scholarship, University of Tennessee *April 2021*
- Dr. Marva Rudolph Scholarship, University of Tennessee Office of Diversity and Engagement *February 2021*
- Graduate Advancement Training and Education (GATE) Fellow, Oak Ridge National Lab *July 2020*
- Tennessee Section Institute of Transportation Engineers T. Darcy Sullivan Scholarship *May 2020*
- Traffic Safety Scholars Scholarship, Lifesavers *March 2020*
- Graduate Student Senate Travel Awards, University of Tennessee *September 2019*
- Traffic Safety Scholars Scholarship, Lifesavers *March 2019*

- 2019 Traffic Bowl Champions, Tennessee Section Institute of Transportation Engineers *February 2019*
- University of Tennessee Professional Development Travel Award, University of Tennessee *December 2018*
- College Fellowship, Tribhuvan University *2011-2015*
- Institute of Engineering Scholarship, Tribhuvan University *2011-2015*

RELEVANT COURSEWORK

Graduate Courses

- Sustainable Transportation
- Transportation Policy and Economics
- Public Transit Planning and Operations
- Transportation Planning Models
- Traffic Engineering: Characteristics & Operations
- Geometric Design
- Analysis Techniques for Transportation Systems I & II
- Geography for Transportation
- Data Mining Methods and Application
- Elements of Econometrics I & II
- Database and Big Data Technologies
- Categorical Data Analysis
- Statistics for Research I & II
- Probability and Statistics I & II
- Environmental Model & Geospatial Analysis
- Design of Experiments

Massive Open Online Courses (MOOC)

- Applied Data Science with Python, a 5-course specialization (Visualization, Machine Learning, Text Mining, and Social Network Analysis) by University of Michigan on Coursera. Specialization Certificate earned on February 1, 2018
- Game Theory by Stanford University and University of British Colombia on Coursera. Certificate earned on April 3, 2018
- Model Thinking by University of Michigan on Coursera. Certificate earned on August 29, 2017
- Advanced Writing by University of California, Irvine on Coursera. Certificate earned on February 23, 2017
- Learning How to Learn: Powerful mental tools to help you master tough subjects by University of California, San Diego on Coursera. Certificate earned on July 10, 2016
- Greening the Economy: Sustainable Cities by Lund University on Coursera. Certificate earned on May 30, 2016

CAMPUS AND COMMUNITY INVOLVEMENTS

Institute of Transportation Engineers – UTK Student Chapter, Knoxville TN
Vice president *August 2019 – September 2020*
General Member *August 2018 – September 2019*

Women's Transportation Seminar (WTS) University of Tennessee, Knoxville Student Chapter, Knoxville TN
President *August 2019 – September 2020*

University of Tennessee Nepalese Student Association, Knoxville TN
Vice president *August 2019 – September 2020*
Executive Member, General Member *August 2018 – September 2019*

Rotaract Club of Durbarmarg, Nepal
Advisor of International Service Avenue *August 2018 – September 2019*
General Member *June 2015 – August 2018*

PROFESSIONAL LICENSES AND CERTIFICATIONS

Nepal Engineering Council (Regd. No. 12553 “Civil” “A” Category)

LANGUAGES

- Fluent in English and Nepali
- Conversant in Hindi

REFERENCES

Dr. Chris Cherry
Academic supervisor, MS thesis committee chair, and instructor for three courses
Department of Civil and Environmental Engineering
University of Tennessee, Knoxville
321 John D. Tickle Building, 851 Neyland Drive, Knoxville, TN 37996
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Dr. Han D. Lee
Committee member of MS thesis and instructor for three courses
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Carlos Pardo
Direct supervisor during summer internship
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