

## Megh Bahadur KC

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### SUMMARY

Ph.D. candidate in Civil Engineering specializing in applying AI & Deep Reinforcement Learning to advance intelligent mobility, transit and freight systems. My research is supported by hands-on experience developing predictive models and optimization tools at the National Renewable Energy Laboratory (NREL) and for the New York City Department of Transportation (NYCDOT). This research is complemented by a proven track record of publications, effective teaching at Undergraduate and Graduate levels and extensive experience as a Highway Engineer in project management and public infrastructure.

### EDUCATION

- **Ph.D.** in Transportation System Engineering; University at Buffalo, SUNY- GPA: 4.00, expected May 2026

**Dissertation Title:** “**Accelerating Bus Transit Electrification through Optimization, metaheuristics and Reinforcement Learning Algorithms**”

- **M. Sc.** in Construction Management; Pokhara University, Nepal- GPA: 3.95
- **B. E.** in Civil Engineering; Institute of Engineering, Tribhuvan University, Nepal; ranked top 4

### WORK EXPERIENCE

SN.	From	To	Employer	Position	Supervisor
1	01- 2025	to date	University at Buffalo, SUNY	Project Research Assistant	Asso. Prof. Dr. Ziqi Song
2	09-2025	to date	New York City Department of Transportation	Volunteer Intern	Catherine Ponte
3	05-2024	01-2025	National Renewable Energy Laboratory (NREL), Denver, CO	Graduate Intern (PhD)	Jason Lustbador, Group Manager
4	08- 2021	01-2025	Utah State University, USA	Graduate Research Assistant	Asso. Prof. Dr. Ziqi Song
5	03- 2020	08- 2021	Pokhara University, Nepal	Asst. Professor	Dr. KN Pandey, Principal Director
6	07- 2015	08- 2021	Ministry of Physical Infrastructure and Transport, Nepal	Highway Engineer	General, Department of Roads
7	05-2015	07-2015	Kathmandu Metropolitan City	Civil Engineer	Rudra Singh Tamang, CEO
8	08- 2014	05- 2015	National Society of Earthquake Technology-Nepal	Team Leader	Suman Shrestha, Project Manager
9	03- 2014	08- 2014	Tribhuvan University, Nepal	Assistant Lecturer	Prof. Dr. Rajan Suwal

### Graduate Research Assistant @ University at Buffalo

- Ongoing research on AI in Transportation: *Deep Reinforcement Learning Framework for Simultaneous Fleet Optimization and Charging for Multi-line Bus Transit System in Dynamic Environment*
- Research on “Bus Electrification: Fleet Optimization and Charging Management Considering Partial Recharges, TOU and Demand Charge”
- Developing VMT assessment freight policy tool as part of the fellowship with NYMTC/NYCDOT
- Built an interactive Streamlit web app for US multimodal freight analysis
- Developed and published freight-analytics-dashboard Python package on PyPI

### Grant & Proposal Writing Contribution

- NYSDOT RFP 5965- *Electric School Bus Transition Support Contractor*, \$1M, 2025-2028 (PI: Dr. Ziqi Song)
  - Drafted Statement of Work (SoW) section [submitted]
- DOE, Joint Office of Energy and Transportation (JOET), Concept paper in response to FOA – *Expanding E-Mobility Solutions through Electrified School Buses*, \$250,000 (PI: Dr. Ziqi Song)
  - Drafted Background and Proposed Methodology section

### Volunteer Intern @ New York City Department of Transportation (NYCDOT)

- Designing a VMT assessment and GHG reduction tool for NYC freight transportation

### Graduate Intern @ National Renewable Energy Laboratory (NREL)

- Robust optimization of intermodal freight operations (national scale) through simulation of containerized shipment, traffic and disruptive events
- Built various last mile vehicle routing problems VRP, CVRP, VRPPD and benchmarked the solutions with Google OR-Tools
- Contributed on SMART 2.0 Freight project by successfully developing & integrating electric variant of NREL- open-sourced FReight Integrated Simulation Model (FRISM) for heterogeneous mixed fleet combination using VNS metaheuristics
- Developed & coded Freight Analysis Framework Flow Containerization Modeling & calibration model at National Scale
- Formulated methodological framework for county level freight flow disaggregation model and developed an algorithm
- Created & hosted interactive Container Freight data visualization Dashboard
- Received Excellent (best) performance grade during review for the year from Group Manager

### Graduate Research Assistant @ Utah State University

- Developed and linearized a Mult objective optimization model in GAMS and produced a hybrid metaheuristic algorithm in python 3.10 with solver efficiency (730 seconds) in large-scale networks
- Produced and enhanced a multistage Mult objective linear /nonlinear optimization model with achievement of efficient recharging and scheduling of EVs in 1,000 node networks in 2 stages
- Automated a space time prism (STP) modeling by developing ArcGIS Pro based algorithm in python using arcpy environment to measure accessibility for people with disabilities only in 1.5 months
- Written journal article on “Integrated Optimized Charging Decision and Optimal Battery Sizing of V2G Enabled Electric School Bus System Including Demand Charges & Battery Ageing”
- Prepared literature review article titled “School Transport Electrification - Adoption, Methods, Policy and Strategies: A Comprehensive Review”
- Completed interdisciplinary graduate courses from Data Science, Mathematics and Statistics, College of Business and Landscape architecture apart from College of Engineering
- Led for the best group project in machine learning titled on “Fake News Detection: Investigating ChatGPT” by using Naive Bayes, Random Forest and Neural Networks among 19 groups
- Conducted research on Discrete Mode Choice Modeling using Nested and Multinomial Logit in Pandas Biogeme 3.2.11, resulting policy recommendation for Inclusive Transportation System in Utah
- Completed Term project on Change Detection Analysis for Selected Municipalities in Utah using ArcGIS Pro 3.1
- Term project on Transportation Sustainability titled “Estimation of Mode Choice and potential emission reduction for the newly introduced commuter metro line in Thailand”
- Participated in Kaggle Competition as a part of Final Project on Machine Learning and Data Analytics
- Authored Six Journal articles on the independent PhD research & the project I involved which were presented at Transportation Research Board 2024

### Other professional and Field Experiences

- Completed feasibility studies for multiple multi-million Highways Projects, providing through cost-benefit analysis
- Obtained design approval for a 17 miles 6-lane road project, representing the GOVERNMENT OF NEPAL in the western region.
- Managed the procurement process for a massive Nrs. 5 billion (~\$40M) road project, including bid document preparation, contract work specification, bid publication, evaluation, and contract award.
- Served as a site project manager, leading a team of three engineers, eight sub-engineers, and fifteen site supervisors.
- Skillfully coordinated with the communication manager for the upper government body during the project's execution.
- Recognized with the Best Employee Award in 2019 for reducing office annual costs by 19% through optimizing employee schedules and operations.
- Part-time Assistant Professor, delivering lectures to first-year MSc students on "Project Planning and Control."

### RESEARCH EXPERIENCE

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#### Peer Reviewed Journal Articles

- **KC, M. B.** (2025). Land Use Transition and City Desirability: Case Study of Cache County Over Two Decades. *Growth and Change, A Journal of Urban and Regional Policy*, 2025; 56(4). DOI: <https://doi.org/10.1111/grow.70057>
- **KC, M. B.,** & Mishra K. (2019). Bidding Trends of Contracts based on Types and Sizes of Projects under Road Divisions Butwal and Shivapur. *Journal of Advanced Research in Construction and Urban Architecture* 2019; 4(4): 7-16. DOI: <https://doi.org/10.24321/2456.9925.201905>
- **KC, M.B.,** Mishra, A.K. & Karki, R. (2020). Perception Based Assessment of Bidding Practices and Effectiveness of E-Bidding System in Nepal. *East African Scholars of Economics, Business and Management* 2020; 3(7): 588-597.
- Mishra, A.K., **KC, M. B.** & Aithal, P.S. (2020). Association of Number of Bidders and Minimum Bid Ratio (AER) with Effect of E-bidding of Different Project. *International Journal of Management, Technology, and Social Sciences* 2020; 5(2): 201-215. DOI: <http://doi.org/zenodo.4111956>

#### Under Review and Under-Preparation Journal Papers

- **KC, M. B.,** & Song, Z. *Deep Reinforcement Learning Framework for Integrated Fleet and Charging Management for Electric Bus Transit System in Dynamic Environment*. [Under review, TRBAM 2026].
- **KC, M. B.,** & Song, Z. *Bus Electrification: Fleet Optimization and Charging Management Considering Partial Recharges, TOU and Demand Charge*. [Under review, TRBAM 2026].
- **KC, M. B.,** & Song, Z. (2025). *School Transport Electrification - Adoption, Methods, Policy and Strategies: A Comprehensive Review*. [Under review, Transport Reviews].
- **KC, M. B.,** & Song, Z. (2025). *Evolving School Transportation: A Comprehensive Approach to Bus Electrification with Dynamic Route Optimization and Partial Charging for Mixed Fleets*. [TRBAM 2023 & Under review, Management Science].
- **KC, M. B.,** & Song, Z. (2025). *Multi-Stage, Multi-School Electric Bus Routing and Scheduling Optimization with recharging schedule and re-use of Buses using metaheuristics*. [TRB 2024 & under review, Transportation Science, INFORMS]
- **KC, M. B.,** & Song, Z. (2025). *Integrated Optimized Charging Decision and Optimal Battery Sizing of V2G Enabled Electric School Bus System Including Demand Charges & Battery Ageing* [TRB 2024, under review, Applied Energy]

- **KC, M.B.,** Song, Z., Park, K. & Christensen, K. (2025). *Understanding Mode Choice Behavior of People with Disabilities: A Case Study in Utah*. [TRBAM 2025 & Under review, Travel Behavior & Society]
- **KC, M. B.,** Song, Z., Park, K., Chamberlin, B. & Christensen, K. (2025). *Household Residential Location Choice Modeling for People with Disabilities in Utah* [TRBAM 2026 & under review, TR Part A]

## RESEARCH PROJECTS

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- Intermodal Freight Optimization for a Resilient Mobility Energy System (INFORMES), Advanced Research Projects Agency-Energy's (ARPA-E), US Department of Energy (DOE) @ National Renewable Energy Laboratory, Denver Colorado, USA
- *Route Optimization, On-route Charging and V2G Integration on Transportation thrust for ASPIRE* (Advancing Sustainability through Powered Infrastructure for Roadway Electrification) National Science Foundation (NSF) Engineering Research Center, Logan, Utah
- *Increasing Affordability, Energy Efficiency, and Ridership of Transit Bus Systems through Large-Scale Electrification*, US Department of Energy (DOE)
- Systems and Modeling for Accelerated Research in Transportation SMART 2.0, Vehicle Technologies Office, US Department of Energy (DOE) @ National Renewable Energy Laboratory, Denver CO
- *Feasibility Analysis of Electric Roadways Through Localized Traffic, Cost, Adoption, and Environmental Impact Modeling*, ARPA-E, DOE
- *Investigating the Feasibility of Introducing Alternative Fuel Vehicles into Maintenance Fleet*, Utah Department of Transportation (UDOT)
- *Enhancement in 4-step Travel Demand Modeling considering individuals with disabilities incorporating physical community and environmental context*, Funded by National Institute on Disability, Independent Living, and Rehabilitation Research (NiDILRR)

## TEACHING EXPERIENCE

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- **Teaching Assistant**, University at Buffalo; Utah State University, USA: 2021- present  
- Taught & provided feedback to students on assignments in class and in office hours
- **Assistant professor**, Pokhara University, Nepal: 2020-2021  
- Project planning & Control, Graduate Course – achieved 100% pass rate for MSc 1<sup>st</sup> semester
- **Lecturer**, Tribhuvan University, Nepal: 2013-2014  
- Transportation Engineering, Undergraduate Course – improved pass rates than in previous year  
- Supervised 2 Undergraduate Final projects as a part of graduation requirement

## COMPUTER SKILLS

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- **Programming:** Python, R, GAMS, Gurobi, GurobiPy
- **Mapping and Visualization Software:** ArcGIS Pro, QGIS, ArcPy, matplotlib, seaborn
- **Machine/Deep Learning Frameworks:** SVM, SVD, DQN, Pytorch
- **Transportation demand modeling:** CUBE, Synchro, TransCAD
- **Project management software:** Microsoft Project
- **Others:** Jupyter, Pandas, NumPy, scikit-learn, Web scraping, NLP, SQL

## RESEARCH INTERESTS

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- **Operation Research:** Application of operation research on transportation systems, Reinforcement learning for vehicle electrification, Optimization, Freight transportation, AI/ML in transportation
- **Data Science:** Machine learning, Statistical methods, Simulation modeling, Reinforcement Learning
- **Integration of Optimization & Data Science to Improve Transportation System Efficiency**
- **Travel Demand, Travel Behavior & Discrete Choice Modeling, Inclusive Planning & Policy**

## CERTIFICATIONS & LICENCES

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- Fundamentals of Engineering (FE) Civil Exam, NCEES, since 2025
- General Engineer, Civil, Nepal Engineering Council (NEC), since 2015

## PROFESSIONAL AFFILIATIONS

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- Member, TRB Standing Committee on Transit Operations (AP014), 08/2025-04/2028
- Member, TRB Standing Committee on Bus Transit Systems (AP050), 2025-2025
- Member, TRB Sub-committee on Freight Modeling (AT015(1)), 2023-2025
- Member, American Society of Civil Engineers (ASCE), 2025-2026
- Student member, Institute of Transportation Engineers (ITE), 2023-2025

## LEADERSHIP ACTIVITIES

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- Member, Tau Beta Pi, Utah Gamma Chapter, 2023-2025
- Member, Student Library Advisory Board, USU, 2023/24
- Utah State University Graduate Student Council (GSC), 2023/2024
- Secretary, ITE-USU chapter 2022/23, Logan, Utah
- Secretary, Ministerial level Nepal Civil Employees Union, Ministry of Physical Infrastructure & Transport (MoPIT), 2019-2021, Nepal
- Advisor, Nepal Student Union (NSU), Lumbini Engineering College chapter, 2018-2020, Nepal
- Polling Officer, House of Representative Election, 7 December 2017 at Rupandehi District
- Polling & Counting Officer, Local Body Election at Kapilvastu District, 28 June 2017
- Vice-President, Civil Engineering Student Society-Nepal (CESS), 2012/2013, IOE Pulchowk, Nepal

## AWARDS

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- **Winner – Fellowship (\$35,000)**, September 11th Memorial Program for Regional Transportation Planning; New York Metropolitan Transportation Council (NYMTC)
- **Winner** - Institute of Transportation Engineers (ITE) Student Research Competition, Utah, 2024
- **Winner** - Prakash S Lad Scholarship for Courage and Perseverance in the College of Engineering (ENGR), Utah State University, 2023 (**\$2000.00**)
- Best student term project on data science titled "*Fake News Detection: Investigating ChatGPT.*"
- **Dean listed and University topper** in MSc Construction Management, Pokhara University, 2021
- **Outstanding MSc Student of the Year**, Pokhara University, 2019.
- Ranked top 4 in BE, Civil Engineering, Tribhuvan University (TU), 2013
- Merit-based government scholarship (2009-2013) by the institute of Engineering, Nepal

## PEER-REVIEWED CONFERENCE PRESENTATION

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17. **KC, M. B.**, Song, Z., Park, K., Chamberlin, B. & Christinsen, K. (2025). Household Residential Location Choice Modeling for People with Disabilities in Utah. *ASCE International Conference on Transportation Development*, June 6-8, 2025, Arizona, USA (Accepted)
16. **KC, M. B.**, & Song, Z. (2024). Multi-Stage, Multi-School Electric Bus Routing and Scheduling Optimization Using Metaheuristics. *Transportation Research Board (TRB) Annual Meeting, January 5-9, 2025*, Washington DC
15. **KC, M. B.**, & Song, Z. (2024). Integrated Optimized Charging and Economic Analysis of V2G Enabled School Bus System. *Transportation Research Board (TRB) Annual Meeting, January 5-9, 2025*, Washington DC
14. **KC, Megh and Song, Ziqi** (2024), " Inclusive Transport Policy: Mode Choice Behavior of People with Disabilities in Utah," *2024 ITE Mountain District Annual Meeting, Big Sky, Montana*, 19-21 June 2024 (Accepted)



13. **KC, Megh;** Song, Ziqi; Park, Keunhyun and Keith Christinsen (2024), “Inclusive Transportation System and Understanding Mode Choice Behavior of People with Disabilities: A Case Study in Utah”, 6-Minute Showcase for the 2024 TRB Annual Meeting as part of the Young Member Council - Sustainability and Resilience, Washington DC (awarded as recognized presentation)
12. **KC, Megh** and Song, Ziqi (2024), “Evolving School Transportation: A Comprehensive Approach to Bus Electrification with Dynamic Route Optimization and Partial Charging for Mixed Fleets”, *Transportation Research Board (TRB) Annual Meeting, January 7-11, 2024, Washington DC*
11. **KC, Megh;** Song, Ziqi; Park, Keunhyun and Keith Christinsen (2024), “Understanding Mode Choice Behavior of People with Disabilities: A Case Study in Utah”, *Transportation Research Board (TRB) Annual Meeting, January 7-11, 2024, Washington DC*
10. **KC, Megh** and Song, Ziqi (2023), "School Transportation Electrification: Simultaneous Route Optimization, Timetabling, and Partial Charging for Mixed Fleet," *2023 ITE Mountain District Annual Meeting, St. George, Utah, 21-23 June 2023*
9. **KC, Megh** and Song, Ziqi (2023), "Electric School Buses: Optimal Routing and Partial Charging," *USU Student Research Symposium 2023, Logan, 12 April 2023*
8. **KC, Megh** and Song, Ziqi (2023), "School Bus Electrification: Route Optimization, Timetabling, and Partial Charging," *College of Engineering Research Week, USU, Logan, 4 April 2023.*
7. National Academies: Sciences, Engineering, and Medicine (NASEM) Transportation Research Board (TRB) Annual Meeting, January 8-12, 2023, Washington DC
6. Utah Department of Transportation (UDOT) Annual Conference, October 25-27, 2022, Mountain America Exposition Center in Sandy, Utah
5. ASPIRE (Advancing Sustainability through Powered Infrastructure for Roadway Electrification) ERC Annual Meeting, October 17-19, 2022, ASPIRE Center in Logan, Utah
4. National Academies: Sciences, Engineering, and Medicine (NASEM) Transportation Research Board (TRB) Annual Meeting, January 9-13, 2022, Washington DC
3. LEC Web-Based First International Conference on Engineering and Technology, 4 December 2021
2. Utah Department of Transportation (UDOT) Annual Conference, October 26-28, 2021, Mountain America Exposition Center in Sandy, Utah
1. International Conference on Sustainable Development (ICSD 2019), May 1-3, 2019, Pokhara Nepal

## RESEARCH OUTREACH ACTIVITIES

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11. Reviewer: *Transportation Research Board Annual meeting, 2026*
10. Reviewer: *International Journal of Transportation Engineering and Technology (IJTET)*
9. Reviewer: *Journal of Transportation System and Engineering (JoTSE)*
8. Reviewer: *Energy 360*
7. Reviewer: *Transportation Research Record, Journal of Transportation Research Board*
6. Reviewer: *Transportation Research Board Annual meeting, 2025*
5. Reviewer: *Transportation Research Board Annual meeting, 2024*
4. Reviewer: *Transportation Research Board Annual meeting, 2023*
3. Reviewer: *Transportation Research Board Annual meeting, 2022*
2. Reviewer: *East African Scholars Journal of Economics, Business and Management*
1. Reviewer: *LEC Web-Based First International Conference on Engineering and Technology*

## PEER-REVIEWED JOURNAL ARTICLES (ROLE: REVIEWER)

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14. Demand-Responsive Bus Route Planning Considering Passenger Behavior and Road Time

Impedance, *Transportation Research Board Annual Meeting 2026*

**13.** Railway Operational Line Construction Safety Risk Analysis based on Improved FP Growth Algorithm and Bayesian Theory, *Transportation Research Board Annual Meeting 2026*

**12.** Efficiency Improvement of Shared Mobility Based on Flexible Origin-Destination Strategies, *Transportation Research Board Annual Meeting 2026*

**11.** Towards Flow-Based Transit Desert Measure: Identifying Public Transport Supply Demand Gaps Considering Network Connectivity and Human Mobility, *Transportation Research Board Annual Meeting 2026*

**10.** Reinforcement Learning for Charging Infrastructure Planning and Scheduling Problems in Battery Electric Bus System. *Energy 360*.

**9.** Empowering Africa to Transition from Consumer to Producer of Technology: Challenges and Opportunities. *International Journal of Transportation Engineering and Technology (IJTET)*.

**8.** Application of Dijkstra's Algorithm in Finding the Shortest Road Alignments. *Journal of Transportation System and Engineering (JoTSE)*.

**7.** Vehicle-to-grid enabled charging infrastructure planning and operations considering demand uncertainties. *Transportation Research Part D: transport and Environment*.

**6.** A Two-Stage Stochastic Model for Road-Rail Intermodal Freight Transport with Carbon Emission Reduction, *Transportation Research Board Annual Meeting 2025 & Transportation Research Record*.

**5.** Electric Vehicle Routing Problem with Drones Considering En-route Charging and Solution Algorithm. *Transportation Research Board Annual Meeting 2024 & Transportation Research Record*.

**4.** Optimal En-Route Charging Station Locations in Highway Networks: Minimizing Required Networkwide Driving Ranges of Electric Vehicles. *Transportation Research Board Annual Meeting 2024 & Transportation Research Record*.

**3.** Industry Insights about Traffic Sensors for Freight Data using Natural Language Processing. *Transportation Research Board Annual Meeting 2024 & Transportation Research Record*.

**2.** Bayesian Optimization for Battery Electric Vehicle Charging Station Placement by Agent-based Demand Simulation. *Transportation Research Board Annual Meeting 2023 & Transportation Research Record*.

**1.** Identifying the Electricity-saving Driving Behaviors based on Trip-level Electricity Consumption of Electric Bus: A Machine Learning Approach. *Transportation Research Board Annual Meeting 2023 & Transportation Research Record*.