Megh Bahadur KC
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PROFESSIONAL SUMMARY

Ph.D. candidate in Civil Engineering at the University at Buffalo, specializing in sustainable public transport, freight systems and intelligent mobility through optimization, machine learning and deep reinforcement learning. Over 8 years of combined research, academic and industry experience developing efficient optimization tools, predictive models, techno-economic analyses, advanced data analytics and inclusive planning/policies at NREL, NYCDOT, Utah State University and the Department of Roads. Proven achievements include 7+ peer-reviewed publications, 17+ conference presentations, 2 internships, multiple awards and fellowships, effective undergraduate and graduate level teaching and hands-on project management as a Highway Engineer in transport infrastructure design and implementation.

EDUCATION

- **Ph.D.** in Transportation System Engineering**; University at Buffalo, SUNY**- GPA: 4.00, by May 2026
Dissertation Title: "Accelerating Bus Transit Electrification through Optimization, metaheuristics and Reinforcement Learning Frameworks" Advisor: Dr. Ziqi Song, Associate Professor
- **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

RESEARCH INTERESTS

- **Operation Research:** Optimization, Application of operation research on transportation systems, Reinforcement Learning for transport system efficiency, Multimodal Freight modeling
- AI/RL/ML in transportation, ITS and advanced transportation applications (V2X, CAV), Digital twins
- Travel Demand, Travel Behavior & Discrete Choice Modeling
- Inclusive Planning & Policy for urban land use & transportation system analysis

WORK EXPERIENCE

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

1) Graduate Research Assistant @ University at Buffalo

- Ongoing PhD Dissertation research:
  - *Multi-Agent Deep Reinforcement Learning for Integrated Bus Scheduling and Charging Management Under Uncertainty in Multi-Line Public Transit Operation*
  - *Deep Reinforcement Learning Framework for Simultaneous Fleet Optimization and Charging for Multi-line Bus Transit System in a Dynamic Environment*

- *Bus Electrification: Fleet Optimization and Charging Management Considering Partial Recharges, TOU and Demand Charge*

- Led "Residential Location Choice Modeling" project for WFRC Utah, identified key policy intervention for TOD & pedestrian-friendly infrastructure, contributing to an increase in transit ridership
- 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

- NYSERDA 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

2) Freight Analytics Intern @ New York City Department of Transportation (NYCDOT)

- Designing a VMT assessment and GHG reduction tool for NYC freight transportation
- Quantifying the effect of freight policy intervention such as NY congestion pricing, off-hour delivery programs in terms of VMT, GHGs and air pollution
- Complex public and private dataset analysis including StreetLight, INRIX, Geotab, ATRI

3) Transport System Analysis Intern @ National Renewal 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
- 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

4) Graduate Research Assistant @ Utah State University

- Developed and linearized a multi-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 multi-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 algorithm in python using arcpy environment to measure accessibility for people with disabilities only in 1.5 months
- Performed techno-economic analysis 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”
- 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, resulting policy recommendation for Inclusive Transportation System in Utah
- Completed Term project on Change Detection Analysis for Selected Municipalities in Utah using ArcGIS Pro

- Conducted emission modeling for a new electrified metro line system, estimating mode shift which reduced 6% annual GHG emissions
- Participated in Kaggle Competition as a part of Final Project on Machine Learning and Data Analytics

5) Highway Engineer/ Site Project Manager [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 ~$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, lectured to first-year MSc students on "Project Planning and Control."

RESEARCH EXPERIENCE

Peer Reviewed Journal Articles

- **KC, M. B.,** & Song, Z. (2025). Evolving School Transportation: Integrated Dynamic Route Optimization and Partial Charging for Mixed Fleets. In arXiv e-prints. https://doi.org/10.48550/arXiv.2511.00600
- **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.,** Song, Z., Park, K. & Christensen, K. (2025). *Understanding Mode Choice Behavior of People with Disabilities: A Case Study in Utah*. In arXiv e-prints. https://doi.org/10.48550/arXiv.2511.11748
- **KC, M.B.,** Mishra, A.K. & Karki, R. (2020). Perception Based Assessment of Bidding Practices and Effectiveness of E-Bidding Systemin Nepal. *East African Scholars of Economics, Business and Management* 2020; 3(7): 588-597. Link
- 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. Link
- **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. Link

Under Review and Under-Preparation Journal Papers

- **KC, M. B.,** & Song, Z. (2026). *Multi-Agent Deep Reinforcement Learning for Integrated Bus Scheduling and Charging Management Under Uncertainty in Multi-Line Public Transit Operation*.
- **KC, M. B.,** & Song, Z. (2026). *Deep Reinforcement Learning Framework for Integrated Fleet and Charging Management for Electric Bus Transit System in Dynamic Environment*. [TRBAM 2026].
- **KC, M. B.,** & Song, Z. (2026). *Bus Electrification: Fleet Optimization and Charging Management Considering Partial Recharges, TOU and Demand Charge*. [TRBAM 2026].
- **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. (2025). *School Transport Electrification - Adoption, Methods, Policy and Strategies: A Comprehensive Review*. [Under review, Transport Reviews].

- **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, TR Part D]
- **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

- INtermodal Freight Optimization for a Resilient Mobility Energy System (**INFORMES**), Advanced Research Projects Agency-Energy's (ARPA-E), US **Department of Energy (DOE)** @ National Renewal Energy Laboratory, Denver, Co, 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 Renewal 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

- **Teaching Assistant**, University at Buffalo; Utah State University, USA: 2021- present
  - Taught, provided feedback & graded 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 1st semester
- **Lecturer,** Tribhuvan University, Nepal: 2013-2014
  - Transportation Engineering, Undergraduate Course – improved pass rates than in previous year
  - Supervised 2 Undergraduate Final projects on transportation planning and design

SKILLS

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

CERTIFICATIONS & LICENCES

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

PROFESSIONAL AFFILIATIONS

- 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

- 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, 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 Representatives 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

- **Winner – Fellowship ($35,000)**, September 11th Memorial Program for Regional Transportation Planning; New York Metropolitan Transportation Council (NYMTC), 2025
- **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 list 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

MEDIA MENTIONS

- Weitekamp, R. (2025, Oct). *Scholars Announced for NYMTC's 2025-26 9-11 Memorial Fellowship Program.* Media link here
- Maxwell, A. (2025, Sept 17). *CSEE student awarded September 11th Memorial fellowship for AI driven transportation solution for system efficiency.* Medial link here
- Dahle, S. (2024, Jan 23). *USU Engineering Scholar Showcases Transportation Research.* Media link

REFERENCES

Ziqi Song, PhD Associate Professor Dept. of Civil, Str. and Env. Eng. University at Buffalo, SUNY Email: zqsong@buffalo.edu Phone: (716)-645-3393	**Keith Christensen, PhD** Professor & Department Head LAEP Utah State University, Utah Email: keith.christensen@usu.edu Phone: +1-435-797-0507	**Jason Lustbader** Group Manager Advanced Vehicle Charging Infrastructure, CIMS National Renewable Energy Laboratory (NREL) Email: jason.lustbader@nrel.gov

PEER-REVIEWED CONFERENCE PRESENTATION

17. KC, M. B., Song, Z., Park, K., Chamberlin, B. & Christensen, 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

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)

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.*