

Debojjal Bagchi

Graduate Student and Graduate Research Assistant
Maseeh Department of Civil, Architectural, and Environmental Engineering
The University of Texas at Austin
Ernest Cockrell Jr. Hall (ECJ) 6.202
301 E. Dean Keeton St.
Austin, TX, 78712-1172

Cell: 737-304-9684
Email: debojjalb@utexas.edu
Web: debojjalb.github.io/

EDUCATION

Master of Science in Engineering (Thesis) 2023-2025

The University of Texas at Austin
Major: Civil Engineering (Transportation)
CGPA: 4.00 / 4.00
Advisor: Dr. Stephen D. Boyles

Bachelor of Science (Research) 2019-2023

Indian Institute of Science, Bengaluru
Major: Earth & Environmental Science, *Minor:* Mathematics
CGPA: 8.7/10 (*Major GPA:* 9.4/10)
Awards: **Institute Gold Medal** for Best Performance in Major
Advisor: Dr. Tarun Rambha

RESEARCH EXPERIENCE

Graduate Research Assistantship Sept 2023 – Dec 2024

“Data-Driven Multimodal Freight Modeling for Waterways and Port” sponsored by Coastal and Hydraulics Laboratory, US Army Corps of Engineers ERDC, *PI: Dr. Stephen Boyles*

- Part of the research team that processed and integrated data from multiple transport modes.
- Identified bottlenecks in multimodal freight networks through discrete event simulation.
- Simulated disruption scenarios to examine resilience and recovery bottlenecks.
- Proposed a queueing theory based model for defining operating capacity in multimodal port networks.

Graduate Research Assistantship Sept 2023 – May 2024

Sponsored by Centre for Transportation Research, UT Austin, *PI: Dr. Stephen Boyles*

- Implemented a Gradient Projection algorithm for Vista Software in Java.
- Developed Python and Bash scripts for database management on network modeling centre servers.
- Conducted an extensive literature review of data frameworks for vehicle-to-everything technologies.

MITACS Globalink Research Internship May 2022 – Aug 2022

“Integrating Waste and Resource Management: Data-Driven Optimization of Urban Mining Logistics” sponsored by MITACS at Université du Québec à Trois-Rivières, *PI: Dr. Amina Lamghari*

- Performed an extensive literature review of heuristics for Reverse Logistics (RL) network design problems including Tabu-Search, Simulated Annealing, and Bee Colony Optimisation.
- Developed a Scenario-based Mixed Integer Linear Program (MILP) formulation for the RL network design problem under uncertainties for wood industries of Quebec.
- Developed an Adaptive Large Neighbourhood Search (ALNS) heuristic for the RL network design problem and introduced the concept of adaptive neighborhoods.
- Solved the MILP using CPLEX and implemented the ALNS heuristic on Python.

Undergraduate Research Assistantship

July 2021 – July 2023

“A Local Search Heuristic for the Bi-criteria Steiner Travelling Salesman Problem with Time Windows (BST-SPTW)” at the Indian Institute of Science, Bengaluru, India, *PI: Dr. Tarun Rambha*

- Performed extensive literature review of existing heuristic algorithms for the Travelling Salesman Problem, including Pareto Local Searches, Lin-Kernighan Heuristic, and r-opt.
- Developed and implemented two brute-force exact methods for the Multi-Objective Steiner Travelling Salesman Problem (BSTSP).
- Formulated a new scalarization-based Mixed Integer Program (MIP) formulation for BSTSPTW which improves the single commodity flow formulation for STSP and implemented it using CPLEX.
- Proposed a novel local search-based heuristic with six operators that performs better than an adapted version of Lin-Kernighan-Helsgaun (LKH) Heuristic.
- Bench-marked results on real world instances focusing on Amazon delivery routes in Austin, US

MANUSCRIPTS UNDER REVIEW

- [M1] Agarwal, P.[†], **Bagchi, D.**[†], Rambha, T., and Pandey, V. (2024). A Bi-criterion Steiner Traveling Salesperson Problem with Time Windows for Last-Mile Electric Vehicle Logistics. [\[Code\]](#)[\[Preprint\]](#)

[†] Equal contribution

REFEREED CONFERENCE PRESENTATIONS

- [C8] Robbennolt, J, **Bagchi, D.** and Boyles, S. D. (2025). *Localized Queue Spillback with Uncertain Demand*. *Accepted in 10th International Symposium on Dynamic Traffic Assignment (DTA2025)*, Salerno, Italy
- [C7] **Bagchi, D.** and Boyles, S. D. (2025). *Error bounds for stochastic user equilibrium traffic assignment*. *Accepted in 12th Triennial Symposium on Transportation Analysis conference (TRISTAN XII)*, Okinawa, Japan
- [C6] **Bagchi, D.**, Bathgate, K., and Boyles, S. D. (2025). *A queuing-theory-based operating capacity model for multimodal port operations*. in *Transportation Research Board (TRB) 104th Annual Meeting 2023*, Washington, D.C., USA. (Lectern session)
- [C5] Bathgate, K., **Bagchi, D.**, and Boyles, S. D. (2025). *Use of AIS data to characterize vessel mix in Houston port operations for simulation*. in *Transportation Research Board (TRB) 104th Annual Meeting 2023*, Washington, D.C., USA. (Lectern session)
- [C4] Bathgate, K., **Bagchi, D.**, and Boyles, S. D. (2024, October). *Identifying capacities in a multimodal maritime freight network*. in *Institute for Operations Research and the Management Sciences (INFORMS) Annual Meeting 2024*, Seattle, USA.
- [C3] **Bagchi, D.**, and Boyles, S. D. (2024, October). *Error Bounds for Stochastic User Equilibrium Traffic Assignment*. in *Institute for Operations Research and the Management Sciences (INFORMS) Annual Meeting 2024*, Seattle, USA. (TSL Invited session)
- [C2] **Bagchi, D.**, Agarwal, P., Rambha, T., and Pandey, V. (2023, January). *A Local Search Heuristic for Bi-criterion Steiner Travelling Salesman Problem*. in *Transportation Research Board (TRB) 102nd Annual Meeting 2023*, Washington, D.C., USA.
- [C1] **Bagchi, D.**, Agarwal, P., Rambha, T., and Pandey, V. (2022, October). *A Local Search Heuristic for Bi-criterion Steiner Travelling Salesman Problem*. in *Institute for Operations Research and the Management Sciences (INFORMS) Annual Meeting 2022*, Indianapolis, USA.

WORKING PAPERS

- [M4] **Bagchi, D.** and Boyles, S. D. (2025). *Error bounds for stochastic user equilibrium traffic assignment.*
- [M3] Robbennolt, J, **Bagchi, D.** and Boyles, S. D. (2025). *Localized Queue Spillback with Uncertain Demand.*
- [M2] **Bagchi, D.**, Bathgate, K., and Boyles S. D. (2025). *A queuing-theory-based operating capacity model for multimodal port operations.*
- [M1] Bathgate, K., **Bagchi, D.**, and Boyles S. D. (2025). *Use of AIS data to characterize vessel mix in Houston port operations for simulation.*

TECHNICAL PRESENTATIONS AND POSTERS

- [T2] Bathgate, K., **Bagchi, D.**, and Boyles S. D (2024, October). Simulation methods for measuring multimodal maritime freight system capacity, and resilience: A case study at the Port of Houston *Presented in UT Austin Center for Transportation Research Annual Symposium, 2025*, Austin, USA.
- [T1] Bathgate, K., **Bagchi, D.**, and Boyles S. D (2024, October). Data-Driven Modeling for Multimodal Port Resilience Assessment. *Presented in UT Austin Center for Transportation Research Annual Symposium, 2024*, Austin, USA.

THESIS

- [D2] **MS thesis:** Error bounds for stochastic user equilibrium traffic assignment.
Advisor: Dr. Stephen D. Boyles
University of Texas at Austin
- [D1] **Undergraduate thesis:** Energy efficient and safe routing for last mile logistics.
Advisor: Dr. Tarun Rambha
Indian Institute of Science, Bengaluru

HONORS AND AWARDS

- Graduate school fellowship awarded by UT Austin Graduate School (2023-2027)
- Institute gold medal awarded by Indian Institute of Science for best performance in 4-year Bachelor of Science (Research) in Earth and Environmental Science (2023)
- Mitacs Globalink Research Internship (GRI) awarded by MITACS, Canada (2022)
- Kishore Vaigyanik Protsahan Yojana (KVPY) fellowship awarded by Department of Science and Technology, Government of India (2019-2023)
- Awarded “Special Honor” in category “Academic excellence by a student” in The Telegraph School Awards (2019)
- Awarded Dhirubhai Ambani scholarship by Reliance Foundation (2019)
- Jagadis Bose National Talent Search (JBNSTS) fellowship (2018)
- National Talent Search (NTSE) Scholarship awarded by National Council of Education Research and Training, India (2017)

TEST SCORES

- Graduate Record Examination (GRE) – 155/170 (Verbal Reasoning), 167/170 (Quantitative Reasoning), 4.0/6.0 (Analytical Writing), 2023
- Test of English and Foreign Language (TOEFL) iBT Test – 29/30 (Reading), 29/30 (Listening), 26/30 (Writing), 25/30 (Speaking), 109/120 (Overall), 2023
- All India Rank 40 in National Creativity Aptitude Test (NCAT), 2020
- 99.3 percentile score in Joint Entrance Examination (Main) out of 1.5 million candidates, 2019
- Among top 1% in Joint Entrance Examination (Advanced) out of 1.2 lakh candidates, 2019
- 96% in All India Senior School Certificate Examination (12th Board examination), 2019
- CGPA 10/10 in All India Secondary School Examination (10th board examination), 2017

TEACHING EXPERIENCE

CE 311S Probability and Statistics for Civil Engineers

Teaching Assistant, University of Texas at Austin, Spring 2025

- Assisted with major course redesign
- Led two weekly discussion and recitation sections of 20 students each

MENTORING EXPERIENCE

Undergraduate students mentored

- Dylan Croteau (2024-2025)

SOCIETY SERVICE

Transportation Research Board (TRB)

- AW010 Standing Committee on Ports and Channels, **Member** (2025-2028)
- AEP40 Standing Committee on Transportation Network Modeling, **Friend** (2025-Present)
- AT015 Standing Committee on Freight Transportation Planning and Logistics, **Friend** (2025-Present)

Institute of Transportation Engineers (ITE)

University of Texas at Austin Student Chapter

- Member (2023-Present)
- Social Service Officer (2023-2025)

NoteBook Drive (NBD)

Indian Institute of Science

- Member (2019-2021)

REFEREE SERVICE

Journal Referee

- Transportation Research Part B

COURSEWORK

- **University of Texas at Austin:** Linear programming, Non linear programming, Optimization, Public transportation, Traffic engineering, Discrete choice modeling, Transportation network analysis, Dynamic traffic assignment,
- **Indian Institute of Science:** Optimization, Public transportation, Game theory, Traffic network equilibrium, Dynamic traffic assignment, Introduction to computing for AI & ML, Linear algebra, Real analysis, Behavioral science, Finance and accounts

CO-CURRICULAR ACTIVITIES

- **Spanish Guitar:** Diploma with first-division distinction from Nikhil Bharat Sangeet Samiti
- **Chess:** Member of All India Chess Federation, Peak Lichess ratings: 1378 (Rapid), 1346 (Bullet)

LEADERSHIP ROLES

- Co-founded [CoachIO](#), an ed-tech startup to provide affordable bootcamp courses to KVPY and olympiad aspirants across India. Managed a team of 9 members with gross revenue over 5 lakh INR.
- Coordinated and sourced funding for [Quadspark](#), a national level quiz competition as a part of Pravega, IISc, Bengaluru. The event witnessed 1200+ participants and was held in 3 stages.
- Content creator on personal YouTube channel [Debojjal Bagchi](#). The channel currently has over 10k subscribers and 1M+ views.

SKILLS

- **Core Competencies:** Optimization, Discrete event simulation, Machine learning, Data analysis, Operations research, Mathematical programming
- **Programming Languages:** Python, C, Julia, GAUSS, SQL
- **Software and Libraries:** SimPy, CPLEX, OR-Tools, OSMnx (OpenStreetMap), NetworkX, TensorFlow, Pandas, NumPy, Scikit-learn, Matplotlib, Plotly, Streamlit, SciDavis, MS Office, SymPy $\text{\LaTeX}$, Git, GAMS, Microstation, CORSIM