

# 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](mailto:debojjalb@utexas.edu)  
Web: [debojjalb.github.io/](https://debojjalb.github.io/)

## EDUCATION

---

### Master of Science in Engineering (Thesis) 2023-Present

The University of Texas at Austin

*Major:* Civil Engineering (Transportation), *Minor:* Operations Research & Industrial Engineering

*CGPA:* 4.00 / 4.00

*Thesis:* Error Bounds for Stochastic User Equilibrium Traffic Assignment (Ongoing)

### Bachelor of Science (Research) 2019-2023

Indian Institute of Science, Bengaluru

*Major:* Earth & Environmental Science, *Minor:* Mathematics

*CGPA:* 8.7/10 (*Major CGPA:* 9.4/10)

*Thesis:* Efficient and Safe Routing for Electric Vehicles Last Mile Logistics

## 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 modelling 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 neighbourhoods.
- Solved the MILP using CPLEX and implemented the ALNS heuristic on Python.

## Undergraduate Research Assistantship

July 2021 – July 2023

“A Local Search Heuristics for the Bi-criteria Steiner Travelling Salesman Problem with Time Windows (BSTSPTW)” at the Indian Institute of Science, Bengaluru, India, *Guide: Prof. 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 scalarisation-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

---

- [M3] **Bagchi, D.**, Bathgate, K., and Boyles S. D. (2024). A queuing-theory-based operating capacity model for multimodal port operations\*
- [M2] Bathgate, K., **Bagchi, D.**, and Boyles S. D. (2024). Use of AIS data to characterize vessel mix in Houston port operations for simulation\*
- [M1] Agarwal, P.<sup>†</sup>, **Bagchi, D.**<sup>†</sup>, Rambha, T., and Pandey, V. (2024). A Bi-criterion Steiner Traveling Salesperson Problem with Time Windows for Last-Mile Electric Vehicle Logistics. [\[Code\]](#)

<sup>†</sup> Equal contribution; \* For conference(s)

## REFEREED CONFERENCE PRESENTATIONS

---

- [C4] Kyle Bathgate, **Debojjal Bagchi**, Stephen D. Boyles (2024, October). Identifying capacities in a multimodal maritime freight network. *Accepted in Institute for Operations Research and the Management Sciences (INFORMS) Annual Meeting 2024, Seattle, USA.*
- [C3] **Debojjal Bagchi**, Stephen D. Boyles. (2024, October). Error Bounds for Stochastic User Equilibrium Traffic Assignment. *Accepted in Institute for Operations Research and the Management Sciences (INFORMS) Annual Meeting 2024, Seattle, USA.*
- [C2] **Debojjal Bagchi**, Prateek Agarwal, Tarun Rambha, Venktesh Pandey. (2023, January). *A Local Search Heuristic for Bi-criterion Steiner Travelling Salesman Problem. Presented in Transportation Research Board (TRB) 102nd Annual Meeting 2023, Washington, D.C., USA.*
- [C1] **Debojjal Bagchi**, Prateek Agarwal, Tarun Rambha, Venktesh Pandey. (2022, October). A Local Search Heuristic for Bi-criterion Steiner Travelling Salesman Problem. *Presented in Institute for Operations Research and the Management Sciences (INFORMS) Annual Meeting 2024, Indianapolis, USA.*

## TECHNICAL PRESENTATIONS AND POSTERS

---

- [T1] Kyle Bathgate, **Debojjal Bagchi**, Stephen D. Boyles (2024, October). Data-Driven Modelling for Multimodal Port Resilience Assessment. *Presented in UT Austin Center for Transportation Research Annual Symposium, 2024, Austin, USA.*

## HONORS AND AWARDS

---

- Graduate School Fellowship awarded by UT Austin Graduate School (2023-2027)
- Mitacs Globalink Research Internship (GRI) awarded by Mathematics of Information Technology and Complex Systems (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 Scholarship (NTSE) Scholar 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
- 99.3 percentile score in Joint Entrance Examination (Main) out of 1.5 million candidates
- Among top 1% in Joint Entrance Examination (Advanced) out of 1.2 lakh candidates
- All India Rank 40 in National Creativity Aptitude Test (NCAT), 2020
- 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

## SOCIETY SERVICE

---

### **Institute of Transportation Engineers (ITE)**

*University of Texas at Austin Student Chapter*

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

### **Women’s Transportation Seminar (WTS)**

*University of Texas at Austin Student Chapter*

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

### **NoteBook Drive (NBD)**

*Indian Institute of Science*

- Member (2019-2021)

## CO-CURRICULAR ACTIVITIES

---

- **Spanish Guitar:** Diploma with first-division distinction from Nikhil Bharat Sangeet Samiti
- **Chess:** Member of All India Chess Federation, Peak rating of 1378 on Lichess (Rapid) and 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.
- Co-ordinated 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

---

- **Programming Languages:** C, Python, Java, GAUSS
- **Software and Libraries:** SimPy, CPLEX, GAMS, OR-Tools, OSMnx (OpenStreetMap), NetworkX, TensorFlow, Pandas, NumPy, Scikit-learn, Matplotlib, Plotly, Streamlit, SciDavis, MS Office, L<sup>A</sup>T<sub>E</sub>X, Git, GitHub