# G M Iqbal Mahmud

gmiqbal@txstate.edu • +1 512 210 5413 • Google Scholar • linkedin.com/in/gmiqbal • gmiqbal.pages.dev
San Marcos, Texas, USA

## Research Interests

Facility location and network optimization • Large-scale optimization • Vehicle routing and transportation systems • Data center and energy infrastructures • Machine learning • Supply chain and logistics

## Education

**Master of Science in Industrial Engineering** Aug 2025 – May 2027 (expected)
**Texas State University**, San Marcos, Texas CGPA: **4.00/4.00**

- **Thesis:** *Multi-Period Hybrid Data Center Network Design with Modular Relocation and Multi-Sourcing*. Advisor: Dr. Wenquan Dong.
- **Coursework:** Applied Deterministic Operations Research, Advanced Optimization, Nonlinear Optimization for Engineers, Probability & Random Processes for Engineers, Modeling of Manufacturing Systems, Advanced Quality & Reliability; Machine Learning for Engineering Applications and Advanced Heuristic Optimization (in progress).

**Bachelor of Science in Industrial & Production Engineering** Feb 2017 – Apr 2022
**Khulna University of Engineering & Technology (KUET)**, Bangladesh CGPA: **3.65/4.00** (3.78 last 4 semesters)

- **Thesis:** *Solving a Capacitated Vehicle Routing Problem (CVRP) by Using Heuristics and Google OR-Tools: A Case Study*. Supervisor: Md. Habibur Rahman.

## Technical Skills

**Optimization:** Gurobi, AMPL, Knitro, Google OR-Tools
**Modeling and algorithms:** MILP, MINLP, second-order cone (SOCP), stochastic programming; Lagrangian relaxation and subgradient search, Primal repair heuristics, Benders decomposition
**Programming & computing:** Python (pandas, NumPy), SQL, LaTeX, Git, High-performance computing (HPC)
**Simulation & statistics:** Discrete-event simulation (Arena); Reliability and redundancy modeling; Exploratory data analysis and hypothesis testing
**Data & enterprise systems:** Power BI, Tableau; ArcGIS; SAP (PP/MM), Kinaxis RapidResponse

## Research Experience

**Graduate Research Assistant**, Transportation Lab, **Texas State University** Nov 2025 – Present
*Advisor: Dr. Wenquan Dong*

- Formulating a multi-period, power-constrained mixed-integer nonlinear model for data-center network design that jointly decides site activation, fixed capacity expansion, purchase and inter-site relocation of modular capacity, and multi-sourced (splittable) demand routing under latency and congestion-delay constraints.
- Derived a **second-order cone reformulation** of the nonconvex delay constraint, turning the model into a convex MISOCP that solvers handle directly.
- Built a **Lagrangian relaxation** framework in Python/Gurobi: dualizing the power constraint, subgradient lower bounds, and a primal repair heuristic that returns feasible designs, ran batches of independent model runs on the LEAP2 computing cluster.

**Food Loss and Waste (FLW) Supply Chain Project**, **Texas State University** 2026 – Present
*Sponsor: UT-Battelle, LLC (Oak Ridge National Laboratory), under a U.S. Department of Energy contract*

- Maintaining the national food supply chain mass-flow and FLW database: documenting data sources, update frequency and access methods, and auditing the loss coefficients and assumptions behind the estimates.
- Building a near-automated Python pipeline that regenerates the national mass-flow and FLW estimates when source data update, adding international trade and commodity-level datasets.

**Undergraduate Thesis: Capacitated Vehicle Routing (CVRP)** 2021 – 2022

- Solved a capacitated vehicle routing case for a Bangladeshi distributor using Nearest Neighbor, Sweep, and Clarke and Wright savings heuristics alongside Google OR-Tools; compared runtime against solution quality and recommended a deployable routing policy.

## Publications

1. Bhowmik, O., Chowdhury, S., Ashik, J. H., **Mahmud, G M Iqbal**, Khan, M. M., & Hossain, N. U. I. (2024). Application of artificial intelligence in reverse logistics: A bibliometric and network analysis. *Supply Chain Analytics*, 7, 100076.

2. Tabbakh, A., Al Amin, L., Islam, M., **Mahmud, G M Iqbal**, Chowdhury, I. K., & Mukta, M. S. H. (2024). Towards sustainable AI: A comprehensive framework for Green AI. *Discover Sustainability*, 5, 408.

**Manuscript in preparation**

**Mahmud, G M Iqbal**, & Dong, W. *Energy-Constrained Multi-Period Design of Data Center Networks with Relocatable Modular Capacity and Congestion-Aware Multi-Sourcing*. **Target: Journal of Cleaner Production.**

## Conference Presentations

1. **Mahmud, G M Iqbal**, & Dong, W. (2026). *Power-Constrained Multi-Period Planning of Hybrid Data Centers with Modular Relocation and Queueing-Based Delay.* INFORMS Annual Meeting, San Francisco, CA, November 1–4, 2026. Session: Data-Driven Optimization Under Uncertainty for Power Systems Resilience. **Accepted; to be presented**.

## Teaching Experience

**Graduate Instructional Assistant**, **Texas State University** Aug 2025 – Jul 2026

- Facilitated **Supply Chain Management**, **Operations Research**, and **Facility Location**: graded assignments and exams, held office hours, and supported students on modeling and solution methods.

**Instructor & Senior Executive**, IEM Robotics & CAD Club, **KUET** Aug 2019 – Feb 2022

- Designed and ran AutoCAD and SolidWorks workshops; mentored junior students through design projects.

## Industry Experience

**Supply Chain Planning Officer**, Nutrition, **Unilever Consumer Care Ltd.** Jun 2023 – Aug 2024

- Led daily master production scheduling across 3 plants of Nutrition portfolio
- Built Python/SAP/Power Automate automation that cut reporting time by **78%** (90 $\rightarrow$ 20 min)
- Raised dispatch rate from **92.3% to 98.2%** while absorbing a **158%** demand surge.
- Covered the end-to-end supply chain: raw-material procurement, production planning, and distribution

**ULIP Supply Chain Intern**, Unilever Bangladesh: selected from **4,500+** applicants (top 0.2%) Sep – Dec 2022
**Supply Chain Intern**, Bengal Group of Industries: built an MRP dashboard for 4 business units Jun – Sep 2022

## Selected Graduate Projects

- **Benders Decomposition for Multi-Period Data Center Network Design** (2026, Advanced Optimization course project): on a simplified MILP sub-model of the thesis problem, a master problem for site and capacity decisions with per-period LP dual subproblems adding feasibility and optimality cuts.
- **Airplane Boarding Optimization** (2025): nonlinear model minimizing aircraft turnaround time; AMPL, Gurobi.
- **Discrete-Event Simulation of an EV Battery Assembly Line** (2026): 7-stage Arena model with rework and scrap loops; located the line bottleneck and tested a capacity rebalance.
- **Reliability Design for a Lunar Life-Support System** (2026): reliability and availability modeling; sized 1-out-of-6 active redundancy per subsystem to a 0.95 one-year reliability target with a maintenance plan.
- **Amazon Delivery Logistics Analysis** (2025): exploratory data analysis and hypothesis testing on delivery-time drivers; Python.

## Honors, Awards & Certifications

- Texas State University: Graduate College **Scholarship** (2026); Graduate Merit **Fellowship** (2025)
- KUET: **Dean's List**, Faculty of Mechanical Engineering (2019); Technical **Scholarship**, 4 consecutive years
- ISCEA PTAK Prize Case Competition, 60% scholarship (2021); Top-10 finalist, SCA Upstream Case Competition, Dhaka (2020)
- **Certifications:** CADS Summer HPC Workshop (2026); Optimization 301 for Data Scientists, Gurobi (2025)

## Service, Membership & Community

- **President** (elected, 2026–27) and student member, INFORMS Student Chapter, Texas State University: lead the officer team and the chapter's academic-year program.
- Level-7 Local Guide, Google Maps: 1,711 contributions, 2.2M views; landscape/nature photographer.