

Sudhan Bhattarai

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Professional Summary

Industrial Engineer, specialized in Operations Research and Data Science, with expertise in developing data-driven decision-making tools to improve operational efficiency. Skilled in formulating business problems as mathematical models and using data to design scalable, cost-effective solutions using inferential statistics, predictive analytics, and advanced optimization techniques. Proficient in Python and Gurobi, with proven ability to deliver insights through rigorous data and results analysis. An experienced leader, effective communicator, collaborative team player, and proactive learner.

Education

Ph.D. in Industrial Engineering , <i>Clemson University</i> , Clemson, SC	<i>Aug. 2021 – July 2025</i>
M.S. in Industrial Engineering , <i>Colorado State University-Pueblo</i> , Pueblo, CO	<i>Aug. 2019 – May 2021</i>
B.E. in Industrial Engineering , <i>Tribhuvan University</i> , Kathmandu, Nepal	<i>Jan. 2012 – Aug. 2016</i>

Technical Skills

- **Programming:** Python (advanced skills in data science libraries such as `pandas`, `numpy`, `matplotlib`, `scipy`, etc.), R, SQL
- **Optimization & Simulation:** Gurobi Optimization Solver (Simplex, Dual Simplex, Lazy-Callback), Arena Simulation
- **Mathematical Optimization:** Linear Programming (LP), Mixed-Integer Linear Programming (MILP), Stochastic Programming, Convex Optimization, Dynamic Programming, Benders' Decomposition, Column Generation, Stochastic Dual Dynamic Programming
- **Data Analysis:** Exploratory Analysis, Visualization, Descriptive & Inferential Statistics, Time Series Modeling, Forecasting
- **Machine Learning:** Scikit-learn (Supervised & Unsupervised ML), TensorFlow (Deep Learning, Neural Networks), PyTorch
- **High-Performance Computing:** SLURM job scheduling on Linux, SSH-based cluster computing
- **Version Control:** Git, GitHub

Experience

Clemson University

Clemson, SC

Research Assistant

Jan. 2022 – Present

- Developed **end-to-end optimization frameworks** to minimize operational costs under demand uncertainty.
- Integrated data-driven inferential statistics and time series models with optimization to **enhance decision-making**.
- Applied scalable decomposition-based algorithms to improve computational performance for **large-scale problems**.
- **Implemented a full-stack pipeline** from data processing to optimization and results analysis in Python and Gurobi.
- Conducted in-depth **results analysis and visualization** to **extract managerial insights** for strategic planning.

Teaching Assistant

Aug. 2021 – Dec. 2021

- Mentored undergraduate students through tutoring and guidance.

Colorado State University-Pueblo

Pueblo, CO

Research Assistant

Aug. 2019 – May 2021

- Designed and implemented optimization models for workforce scheduling and routing to **enhance operational efficiency**.
- **Built and evaluated** machine learning models for regression and classification tasks using `scikit-learn`.
- **Deployed, tuned, and optimized** deep learning models using TensorFlow, and Keras for healthcare applications.

Teaching Instructor

Aug. 2020 – Dec. 2020

- Designed and delivered lectures for Introduction to Engineering to undergraduate students.

Honors

INFORMS Student Chapter, Clemson University

Clemson, SC

President

Aug. 2022 – May 2023

- Led graduate students through orientation sessions, conference preparation seminars, and K-12 outreach programs.
- Chapter **awarded** *Magna Cum Laude* at INFORMS Annual Meeting, 2023.

Selected Presentations

- **Invited Session Presenter** at *INFORMS Annual Meeting 2024* Seattle, WA
- **Community Committee Choice Session Presenter** at *INFORMS Annual Meeting 2023* Phoenix, AZ
- **Contributed Session Presenter** at *IISE Annual Conference 2023* New Orleans, AZ
- **Community Session Presenter** at *INFORMS Annual Meeting 2022* Indianapolis, IN

Relevant Projects Experience

Clemson University

Clemson, SC

Stochastic Optimization with Rolling Forecasts

Feb. 2025 – Ongoing

- Designed stochastic optimization models that incorporate real-time forecast updates to **improve decisions**.
- Incorporated time-series-based forecast evolution into the optimization framework to **support informed planning**.
- Demonstrated up to **33% cost savings** by replacing static forecast with updated forecasts at each decision point.
- Achieved a further **38% cost reduction** by accounting for forecast dependencies across time with correlation-aware modeling.

Data-Driven Stochastic Optimization for Logistics Networks

Jan. 2024 – Dec. 2024

- Designed risk-averse optimization frameworks to **minimize costs** under unpredictable future demand scenarios.
- Developed data-driven stochastic optimization models by integrating historical data into probabilistic models.
- Provided **precautionary managerial insights** based on diverse data availability conditions.
- Achieved up to a **20% reduction** in worst-case operational costs using a data-driven optimization approach.

Stochastic Programming for Humanitarian Logistics Networks

Jan. 2022 – Jan. 2024

- Developed **optimal decision policies** under forecast uncertainty to **minimize the operational cost**.
- Built coordinated optimal logistics and inventory plans for real-world disaster scenarios in South Carolina and Florida.
- Integrated **autoregressive time-series** models into optimization models to **improve decision-making**.
- Achieved up to **47% cost savings** compared to myopic decision policies by implementing adaptive policies.

Colorado State University-Pueblo

Pueblo, CO

Multi-Objective Workforce Scheduling and Routing

Aug. 2019 – May 2021

- Built a **profit-maximizing** job assignment and scheduling optimization model for a home healthcare agency.
- Developed optimal decision-making tools to **balance** profitability, employee satisfaction, and customer satisfaction.
- Implemented and optimized Mixed-Integer Program (MIP) models using Python and Gurobi.

Selected Publications

- **Bhattarai, Sudhan**, and Yongjia Song. “Multistage stochastic programming for integrated network optimization in hurricane relief logistics and evacuation planning.” *Networks* 85.1 (2025): 3-37. <https://doi.org/10.1002/net.22249>
- **Bhattarai, Sudhan**, and Yongjia Song. “Integrated Hurricane Relief Logistics and Evacuation Planning under Forecast Uncertainty: A Case Study for Hurricane Florence.” *Proceedings of the IISE Annual Conference & Expo 2023*. <https://par.nsf.gov/biblio/10428837>
- **Bhattarai, Sudhan**, Yaneth Correa-Martinez, and Leonardo Bedoya-Valencia. “A multi-objective home healthcare routing problem.” *International Journal of Healthcare Management* 16.2 (2023): 311-325. <https://doi.org/10.1080/20479700.2022.2102111>