

Sudhan Bhattarai

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Professional Summary

Operations Research professional 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**, *Clemson University*, Clemson, SC 2021 – 2025
- M.S. in Industrial Engineering**, *Colorado State University-Pueblo*, Pueblo, CO 2019 – 2021
- B.E. in Industrial Engineering**, *Tribhuvan University*, Kathmandu, Nepal 2012 – 2016

Experience

Clemson University **Clemson, SC**
Graduate Research Assistant & PhD Candidate *Jan. 2022 – Present*

- Developed **end-to-end optimization frameworks** to minimize operational costs under demand uncertainty.
- Enhanced decision-making policies by integrating data-driven statistical models with optimization techniques.
- 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.

Graduate Teaching Assistant *Aug. 2021 – Dec. 2021*
– Mentored undergraduate students through tutoring and guidance.

Colorado State University-Pueblo **Pueblo, CO**
Graduate Assistant & M.S. Candidate *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, fine-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.

Relevant Projects

Clemson University **Clemson, SC**
Stochastic Optimization with Rolling Forecasts *Feb. 2025 – Ongoing*

- Developing stochastic optimization models that exploits real-time forecasts to improve decision-making.
- Modeling rolling forecasts using a Martingale time-series approach to make **robust, dynamic decisions**.

Data-Driven Stochastic Optimization for Logistics Networks *Jan. 2024 – Jan. 2025*

- Designed robust optimization frameworks to **minimize costs** under unpredictable future demand scenarios.
- Developed data-driven stochastic optimization models to incorporate varying levels of risk measures.
- **Optimized risk-averse decision policies** 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 **adaptive optimal decision policies** under forecast uncertainty to **minimize the overall cost**.
- Built coordinated optimal logistics 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 **33% cost savings** compared to myopic decision policies by implementing adaptive policies.
- Optimized under uncertain planning horizons, achieving **47% cost savings** over baseline approaches.

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.

Technical Skills

- **Programming:** Python (advanced skills in data science libraries such as **pandas**, **numpy**, **matplotlib**, **scipy**, etc.), R
- **Optimization & Simulation Software:** Gurobi Optimization Solver, Arena Simulation
- **Mathematical Optimization:** Linear Programming, Mixed-Integer Programming, Stochastic Programming, Convex Optimization, Markov Decision Processes, Dynamic Programming, Benders' Decomposition, 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

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

Selected Publications

- **Bhattacharai, 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>
- **Bhattacharai, 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>
- **Bhattacharai, 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>