Sudhan Bhattarai

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Professional Summary

Industrial Engineer, specialized in Operations Research, 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 — *Aug. 2021 – July 2025*

M.S. in Industrial Engineering, *Colorado State University-Pueblo,* Pueblo, CO — *Aug. 2019 – May 2021*

B.E. in Industrial Engineering, *Tribhuvan University,* Kathmandu, Nepal — *Jan. 2012 – Aug. 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.
- 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.

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.

Technical Skills

- **Programming:** `Python` (advanced skills in data science libraries such as `pandas`, `numpy`, `matplotlib`, `scipy`, etc.), `R`
- **Optimization & Simulation Software:** `Gurobi` Optimization Solver (Simplex, Dual Simplex, Lazy-Callback), `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
- **Version Control:** Git, GitHub

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

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`.

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