

# Preetam Kulkarni

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## Professional Summary

PhD-trained researcher skilled in machine learning, optimization, and simulation, with experience building predictive models, designing experiments, and developing scalable analytics solutions. Proven ability to apply advanced analytical methods to drive data-informed decisions and solve complex business problems.

## Education

**University of Texas at Arlington**, Arlington, TX  
Doctor of Philosophy in Industrial Engineering, *GPA – 4*  
Honors: *Lawrence W. Stephens Fellowship*

*Aug 2021 – May 2025*

Probability & Statistics | Applied Regression Analysis | Design of Experiments | Data Mining & Analytics | Stochastic Processes | Response Surface Methodology | Simulation and Optimization | Operations Research | Non-linear Programming | Systems Engineering

**Iowa State University**, Ames, IA

*Aug 2016 – Aug 2018*

Master of Science in Industrial Engineering, *GPA – 3.91*  
Linear Programming | Computational Optimization

## Skills

- **Data Analysis:** Python (Pandas, NumPy, Matplotlib, Seaborn), SQL, PySpark, SAS, MATLAB, Tableau, Power BI, Excel
- **Statistical Analysis:** Regression Analysis, Design of Experiments, Hypothesis Testing, Response Surface Methodology
- **Machine Learning:** scikit-learn, TensorFlow, PyTorch, CatBoost, XGBoost, Transformers, NLP, Deep Learning (CNN, RNN)
- **Simulation:** Agent-Based Modeling (ABM), Discrete-Event Simulation, NetLogo, MESA, WITNESS, AnyLogic, Simio
- **Risk Management:** Failure Modes and Effects Analysis (FMEA), Root Cause Analysis (RCA), 3-Legged 5 Whys (3L5Y), 8D
- **Others:** MILP, PuLP, Gurobi, CPLEX, Jupyter, GitHub, AWS, Streamlit, Google AppSheet, HTML, CSS

## Projects

- **Disaster Tweet Classification:** Built and compared Naïve Bayes, Logistic Regression, and fine-tuned DistilBERT models (validation F1 ~ 0.79; Kaggle leaderboard F1 ~ 0.83); deployed via Streamlit for real-time prediction - [GitHub](#) - [Streamlit App](#)
- **Retail Sales Forecasting:** Developed multivariate linear regression, deep neural networks, and XGBoost models, incorporating trend, seasonality, and promotional features across 54 stores and 33 product families, improving forecast accuracy - [GitHub](#)
- **Heart Rate Prediction:** Used multiple linear regression to predict gym user's heart rates based on equipment settings and personal characteristics, supporting personalized training recommendations - [GitHub](#)
- **Stock Price Simulation:** Developed a state transition matrix from historical data and simulated future stock price variations in Python to evaluate potential investment strategies - [GitHub](#)
- **Silicon Wafer Production Simulation:** Built a discrete-event simulation to generate a monthly investment plan to efficiently increase the facility's production capacity over a year - [GitHub](#)
- **3D Printing DOE:** Conducted a Design of Experiments study to evaluate the effects of infill percentage (density) and print speed on tensile strength of polylactic acid (PLA) components, providing actionable insights - [GitHub](#)
- **Response Surface Optimization:** Applied Response Surface Methodology to identify the optimum temperature of water, stirring rate and amount of water that would minimize the salt dissolution time - [GitHub](#)

## Work Experience

**Graduate Research Assistant**, University of Texas at Arlington – Arlington, TX

*Sep 2021 – May 2025*

- Implemented sequential sampling to generate a Random Forest and XGBoost metamodel of an ABM of a crowd logistics network, reducing the number of simulation runs by 60% while maintaining 70% predictive accuracy
- Developed a participatory ABM using Python's Tornado and MESA, enabling real-time user interactions for scenario testing
- Deployed the participatory ABM on AWS EC2 via cloud9, allowing remote access for over 15 participants simultaneously
- Performed sentiment analysis using a transformer NLP model on student feedback from simulation experiments, identifying key insights to improve simulation design - [GitHub](#)
- Mentored and collaborated with graduate students on GitHub, improving productivity and code quality in ABM development
- Created a prototype crowd logistics mobile app using Google AppSheet to help farmers optimize produce transport

- Developed an ABM of a centralized and decentralized crowd logistics network using Python and NetLogo, analyzing efficiency trade-offs across network designs - [GitHub](#)

**Quality Engineer**, John Deere - Hagie – Clarion, IA

May 2018 – Jul 2021

- Built an interactive Excel dashboard to analyze machine failures at assembly stations, supporting data-driven decision-making
- Conducted supplier risk assessments and audits using failure rates, quality and delivery PPM, improving supply chain reliability
- Facilitated FMEA and root cause analysis using 3L5Y and 8D to resolve recurring quality issues, enhancing product quality

**Quality Engineer Co-op**, Whirlpool – Amana, IA

Jun 2017 – Jan 2018

- Created process maps and analyzed quality defects to develop effective quality control plans
- Designed experiments to optimize processes, reducing annual service incident rate by ~0.3%
- Received “Whirlpool Bravo” award for developing and implementing the Door Value Stream Quality System

**Graduate Research Assistant**, Iowa State University – Ames, IA

Jan 2017 – May 2017

- Developed stochastic & deterministic optimization models in MATLAB for production and inventory control, improving decision-making under uncertainty

**Process Engineer**, Tata Technologies Limited – Pune, India / Solihull, United Kingdom

Mar 2014 – Jul 2016

- Analyzed and improved data consistency by 40% in GSPAS – assembly process management tool that uses standard language
- Reviewed and eliminated Non-Value-Added (NVA) operations in GSPAS, reducing cycle time allocation by 30%
- Conducted knowledge transfer sessions on DELMIA V5 and GSPAS for 10 employees, enhancing team capability

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## Certifications

- **DeepLearning.AI** - Generative AI with Large Language Models (LLM), Deep Learning, NLP, Machine Learning in Production
  - **Udemy** - Big Data with Apache Spark and Python, Microsoft Power BI, Tableau, SQL Bootcamp
  - **Kaggle** - Time Series (Forecasting)
  - **DataCamp** - Supervised Learning with scikit-learn
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## Publications

- Krejci, C., Kulkarni, P., Paliwal, A., & Boardman, B. (2024). Using Participatory Agent-Based Modeling to Teach Systems Thinking for Inventory Control. In *IISE Annual Conference. Proceedings* (pp. 1-6). Institute of Industrial and Systems Engineers (IISE).
- Kulkarni, P., & Krejci, C. C. (2023, December). Matchmaking In Crowd-Shipping Platforms: The Effects Of Mediator Control. In *2023 Winter Simulation Conference (WSC)* (pp. 303-314). IEEE.
- Kulkarni, P., Patel, P., & Krejci, C. (2023). Designing a collaborative online transportation platform for sustainable regional food distribution. In *IIE Annual Conference. Proceedings* (pp. 1-6). Institute of Industrial and Systems Engineers (IISE).
- Kulkarni, P., & Krejci, C. (2022, October). Evaluating a Crowd Logistics Network Using Agent-Based Modeling. In *Conference of the Computational Social Science Society of the Americas* (pp. 21-34). Cham: Springer International Publishing.
- Kulkarni, P., Azizi, V., Wang, L., & Hu, G. (2021). Analysis of decision making and information sharing strategies in a two-echelon supply chain. *International Journal of Supply Chain and Inventory Management*, 4(1), 81-106.
- Mehr, M. N., Kulkarni, P., Wang, L., & Hu, G. (2017). Production Planning of a Three-echelon Supply Chain with Information Sharing. In *IIE Annual Conference. Proceedings* (pp. 1823-1828). Institute of Industrial and Systems Engineers (IISE).
- Kulkarni, P. (2015). Evaluation of mechanical properties of AL 2024 based hybrid metal composites. *IOSR Journal of Mechanical and Civil Engineering (IOSR JMCE)*, 2278-1684.