ASHABARI MAJUMDAR

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EDUCATION

University of Notre Dame Notre Dame, IN
Doctor of Philosophy in Physics, GPA 3.8 May 2025
Indian Institute of Technology Kanpur, India
Master of Science in Physics Jun 2017

PROFESSIONAL EXPERIENCE

Data Scientist (Contract), NPC Worldwide LLC Jun 2024 – Present
- Developing a collaborative Multi-Agent System by integrating multiple GenAI models (GPT, Ollama, Gemini, Claude) to optimize task execution and enhance output quality.

Graduate Researcher, University of Notre Dame Jul 2017 – May 2025
- Designed and deployed a **scalable end-to-end ETL pipeline** to **ingest, process, and analyze 5+ TB** of nuclear physics data; applied **anomaly detection, statistical modeling, and signal processing** on peak-derived features using **Python and SQL**, enabling accurate identification and classification of key signal peaks.
- Built and automated a scalable **pattern recognition pipeline** on high performance computing (**HPC**) systems, applying **feature engineering** with **Python** and **Bash (Linux)** scripting, and generating **1,000+ data visualizations** for internal and external collaboration.
- Parallelized large-scale nuclear simulations in a **distributed environment using MPI and job arrays**, reducing processing time by **40%**.

Data Science Trainee, Argonne National Laboratory Oct 2024 – Nov 2024
- Developed a healthcare cost prediction pipeline with **Python, Pandas, scikit-learn, Plotly, and GitHub**; implemented **data engineering (ingestion, validation, feature engineering)**, Linear Regression and **Random Forest Quantile Regression**.
- Built an image-based skin fold anomaly detection tool using computer vision techniques, including **image preprocessing and a convolutional neural network (CNN)** for images and **XGBoost** for tabular data, trained on labeled data.
- Applied **Large Language Model (LLM)** embeddings to unstructured healthcare claim texts, improving efficiency with dimensionality reduction while preserving accuracy.

Summer Intern, Lawrence Livermore National Laboratory May 2023 – Aug 2023
- Integrated and parallelized detector simulations in high performance computing (HPC) system using C++ language, improving performance across scientific workflows.

SELECTED PUBLICATIONS

- '*A quantum semantic framework for natural language processing*', QNLP (accepted) 2025: demonstrating skills in natural language processing.
- '*Neutron capture of UO_2 targets prepared by spin-coating assisted combustion synthesis*', NIMA 2023: showcasing anomaly detection, signal processing and statistical analysis to extract insights from noisy datasets.

TECHNICAL SKILLS

- Applications: Fine-tuning LLMs (Hugging Face), NLP (Transformers, embeddings), Supervised/unsupervised learning, XGBoost, anomaly detection, dimensionality reduction.
- Tools: Python (PyTorch, Scikit-learn, MPI, Matplotlib, Pandas, SciPy, NumPy), C++, SQL, Version Control/ Git, CI/CD, Shell scripting (Bash), APIs, Tableau, Google Colab.

- Cloud & Data: Cloud Computing (AWS, GCP), HPC clusters, distributed computing, batch processing, parallel pipelines.

AWARDS AND HONORS

Graduate Professional Development Awardee   2022, 2019, 2018
- Obtained $10,000 for presenting research findings in international conferences in Switzerland, Italy and South Africa.

Annual Midwest Imaging and Microanalysis Workshop – Best poster winner   2022
- Awarded for presenting complex research findings with compelling data visualization and clear, engaging communication, recognized by a broader scientific audience.

Leadership Advancing Socially Engaged Research (LASER) Scholar   2019
- Jointly funded by the National Science Foundation and the University of Notre Dame, this experiential training program is intended to develop leadership proficiencies and aptitude as well as to explore and build skills for socially engaged research.

American Institute of Physics (AIP) Science Communication Grant Winner   2019
- Secured a $1,500 grant to participate in a science communication workshop in Washington, D.C., recognizing a consistent record of effectively communicating scientific research to broad and diverse non-technical audiences.

INSPIRE scholarship   2011-2016
- Awarded by the Government of India in recognition of top 1% academic excellence among ~15 million students; fully funded bachelor's and master's studies.

LEADERSHIP AND COLLABORATION

Graduate Researcher, University of Notre Dame   2017-2025
- Led 3 cross-institutional research projects with 15+ multidisciplinary collaborators, managing all phases from planning through execution including budget and timeline management which resulted in 4 first author and 7 co-authored publications.

Quality of Life chair (health division), Graduate Student Union   2019-2020
- Organized 6 campus wide events advocating for the on-campus healthcare resources representing Notre Dame graduate students which led to 60% increased participation in the on-campus wellness activities from the graduate community.

Organizer, Women in Science Conference   2018
- Provided a professional development platform for female graduate students in STEM leading to participation from 80+ graduate students from the 7 leading universities in the Midwest.

Communication Director, American Association of University Women (AAUW) Campus Initiative Program   2018-2019
- Served as the direct liaison among 40 faculty/senior administrative staff members and 70 graduate/postdoctoral fellows across multiple disciplines fostering strong professional network for the women on campus.