





# Utkarsh Sharma

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## Education

### University of Illinois Urbana-Champaign

Master of Science in Computer Science | CGPA 3.86/4.00

Urbana-Champaign, IL

Jan 2024 – May 2025

**Coursework:** Data Mining Principles, Deep Learning with Graphs, Algorithmic Genomic Biology, Market Microstructure

### Guru Gobind Singh Indraprastha University

Bachelor of Technology in Computer Science and Engineering | CGPA: 9.1/10.0

Delhi, India

Aug 2017 – Jun 2021

## Experience

### Molecule Maker Lab Institute

Research Assistant

Urbana-Champaign, IL

Apr 2024 – Present

- Developing **EquiCat** an equivariant graph neural network that learns rich molecular representations via self-supervised contrastive learning on 3D conformers; currently scaling training and inference on **Argonne's Polaris supercomputer** to build a foundation model for molecular science.
- Demonstrated EquiCat's effectiveness on the downstream task of enantioselectivity ( $\Delta\Delta G$ ) prediction for asymmetric catalysis, achieving an  $R^2 > 0.9$  with just **20-40%** of the labeled dataset.

### ION Group

Rotational Analyst - Cleared Derivatives

Noida, India

Aug 2021 – Dec 2023

- **Led development of PATSAnalytics**, designed **scalable data extraction pipeline** and **interactive PowerBI dashboards** for real-time order metrics, volume distribution, and multi-exchange activity insights. Analyzed trading events, modeled **user behavior across platforms**, and optimized execution latency, enabling **30% faster decision-making** for senior management.
- **Re-engineered an Alert Monitoring System** post-cyber-attack, analyzed system logs from **16 components** within 3 weeks. Designed a **triage function** that reduced false alerts by 5% and enhanced **incident response time by 20%**, ensuring operational resilience in critical trading environments.
- **Built UAT trading environments** for major global exchanges (**SGX, DGCX, SFE**), simulating **100K+** trades to enhance platform robustness. Improved market structure testing, reduced system downtime, and drove a **15% increase in revenue** by optimizing trading capabilities.
- **Resolved 600+ critical trading system and market data feed issues**, conducted **root cause analysis**, and implemented optimizations that **reduced customer-reported issues by 10%** and enhanced platform reliability for high-frequency trading environments.

### Centre for Artificial Intelligence and Robotics

Research Assistant

Bengaluru, India

Dec 2019 – Jan 2020

- Built and trained advanced statistical and neural-language models (**n-gram, bi-directional, LSTM, Bi-LSTM**) on biomedical text to analyze **protein-protein interactions** between brain regions.

### Queen's University Belfast

Visiting Research Associate

Belfast, United Kingdom

Jul 2019 – Sep 2019

- Engineered an NLP pipeline for **80k+ feedback comments**, extracting key entities and relationships. Developed a knowledge graph with **1M+ entities** using Dgraph and GraphQL to structure insights.

### Defence Research and Development Organisation

Research Intern

Delhi, India

Dec 2018 – Feb 2019

- Analyzed air quality data (**SO<sub>2</sub>, NO<sub>2</sub>, SPM**) across Delhi, generating **spatial patterns** and applying **hierarchical cluster analysis** to identify groupings among 12 pollution control stations.

## Projects

### Joint Optimization of Multiple Complementary Determining Regions in Antibody Design

Aug 2024 – Dec 2024

- Developed a novel deep learning framework extending MEAN for **co-designing multiple CDRs** in antibodies, improving binding affinity by **72%** (-19.638 kcal/mol vs. -11.387 kcal/mol).

### Improving Quantization using SPADE for Vehicle Audio Classification

Jan 2024 – May 2024

- Designed and implemented **DualQuanv**, a **novel quantization heuristic** for spectrogram-based vehicle audio classification, achieving **85% accuracy** in adaptable multi-precision settings while reducing **model footprint by 25%** for edge deployments.

### Does U.S. Corporate Income Tax Policies Influence Economic Disparities Between the Ultra-Affluent and the General Population?

Jan 2024 – May 2024

- Applied **difference-in-difference regression** and **interrupted time series analysis** on **30 years of data**, uncovering **wealth accumulation trends** and evaluating the empirical validity of trickle-down economics.

## Publications

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### **EquiCat: An Equivariant Neural Network Architecture for Predicting Enantioselectivity in Asymmetric Catalysis**

Utkarsh Sharma, Elena Burlova, Alexander Shved, Scott Denmark, and Ganesh Sivaraman

Under Submission

2024

### **Flattening the Curve of COVID-19 Outbreak by Early Forecasting**

Arushi Uppal\*, Utkarsh Sharma\*, Bharat Bhushan (\* = Equal Contribution)

Computational Intelligence for Managing Pandemics, De Gruyter

2021

## Skills

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**Programming and Development:** Python (Pandas/NumPy), C++, SQL, Bash, Git, Linux

**Machine Learning:** PyTorch, Bayesian Optimization, Natural Language Processing, A/B Testing, Time Series Analysis

**Data Engineering and Tools:** PySpark, Hadoop, ETL Pipelines, AWS (S3, EC2), Power BI, Tableau, MongoDB, PostgreSQL

**Statistical Analysis:** Hypothesis Testing, Stochastic Calculus, Signal Processing, Causal Inference, Probability Theory

**Quantitative Finance:** Risk Management, Trading Strategies, Portfolio Optimization, Asset Pricing, Bloomberg Terminal

**Trading Operations:** ION Suite, Fidessa, Trade Support, Incident and Change Management, FIX/ITCH/OUCH Protocols, JIRA

## Awards

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Molecule Maker Lab Institute Scientific Poster Competition, 1<sup>st</sup>/21 participants

Dec 2024

CME Group's Step Into Commodities Trading Challenge, 85<sup>th</sup>/4267 participants

May 2024

ION Contribution Run, Winner 10 KM

Mar 2023

techstart Northern Ireland, Concept Grant £10k for GranLab

Nov 2022

Academic Excellence Award, Ranked in top 5% of 200 students; Rank 1/64 in 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup>, and 7<sup>th</sup> semesters

Aug 2021