Mukund Agarwal

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Education

University of Washington Seattle, WA

Bachelor of Science in Computer Science *Expected June 2029*

- Coursework: CSE 123 (data structures, algorithms, recursion, runtime analysis); AMATH 352 (applied linear algebra and numerical analysis)

Experience

AI Intern 2023, 2024

Ambey Mining *Predictive Maintenance & Route Optimization*

- Built LSTM-based failure prediction and Ant Colony Optimization route planning for mining equipment, supporting maintenance decisions and an estimated $200K in annual savings

Data Science Intern 2023

Otan Das & Co. *Mining Operations Analytics*

- Led 15 interns analyzing equipment-downtime and safety data; modeled maintenance and operator-error drivers and translated results into operational recommendations

Projects

NeoGen | *Python, XGBoost, RDKit, SciPy, FastAPI* 2025 – Present

- Built a molecular-to-PK pipeline predicting eight ADME/pharmacokinetic endpoints from 1K–2K-dimensional RDKit features using cascaded XGBoost ensembles and a Tanimoto-similarity retrieval layer
- Built a 14-compartment PBPK ODE and enzyme-competition DDI engine; achieved roughly 80% within 2x across 30 clinically studied drug pairs; reviewed the evaluation design with Dr. Joga Gobburu, former Director of the FDA Division of Pharmacometrics
- Trained patient-level medication-response models on 40K de-identified records and built leakage audits across drug identity, molecular scaffold, and fingerprint similarity that exposed and removed a contaminated holdout

PostTrain Lab | *Python, PyTorch, Hugging Face TRL* 2026

- Built a tested SFT/DPO/GRPO harness with deterministic splits, dataset fingerprints, and promotion gates
- In a controlled Tesla T4 run, measured 21.1% lower peak allocated VRAM at fixed effective batch while held-out loss stayed within 0.0025, with a 26.1% throughput tradeoff

AxiomWeave | *Python, Pydantic, Multi-Agent Systems* 2026

- Built a typed seven-agent research runtime with tenant-scoped retrieval, adversarial hypothesis gates, claim-level grounding, approval controls, and execution traces; validated 65/65 orchestrator evals and 3/3 end-to-end tests

AI Agent City | *Python, TypeScript, Reinforcement Learning* 2026

- Built seeded Q-learning agents with prioritized replay, reward shaping, knowledge sharing, and resource/labor markets; verified deterministic and counterfactual behavior across 146 tests

Activation Functions in Neural Networks | *Python, Neural Networks* 2024

- Benchmarked six activation functions on MNIST across accuracy, training time, and loss trajectories using a three-layer neural network

Technical Skills

Languages: Python, TypeScript, JavaScript
Machine Learning & Scientific Computing: PyTorch, XGBoost, RDKit, SciPy, NumPy
Systems & Engineering: FastAPI, Docker, Linux, Git, GitHub Actions, pytest