

# Rakesh Bal

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## Education

### University of California Los Angeles (UCLA)

M.S. in Computer Science | GPA - 3.81/4.0

Los Angeles, CA

Sep'21 - Jun'23

### Indian Institute of Technology (IIT) Kharagpur

B.Tech. in Computer Science and Engineering | GPA - 9.04/10.0

Kharagpur, India

Jul'16 - May'20

## Work Experience and Internships

### Amazon Web Services (AWS)

Applied Scientist Intern [\[Code\]](#)

San Francisco, US

Jun'22 - Sep'22

- Analysed the performance of Protein LLMs (from Transformers - BERT, T5, GPT) on Drug Target Interaction (DTI) problem
- Obtained 20% & 12% improvement with ProtBERT over two datasets compared to the baseline with significant cost reductions
- Employed large AWS GPU Clusters, EC2, SageMaker for training pipelines; published the work in Amazon ML conference

### Goldman Sachs

Software Engineer

Bangalore, India

Aug'20 - Sep'21

- Integrated two internal bug & issue tracking softwares as a full-stack development project and worked on their cloud migration
- Implemented backend (with RESTful APIs) using Java/SpringBoot and frontend using TypeScript/Angular & Redux
- Coordinated with end-users for the entire SDLC; deployed project to production and handled adoption by over **10000** users

### Kanini Software Solutions

DevOps Engineer

Los Angeles, US

Aug'23 - Current

- Migrating scalable infrastructure for a healthcare application using Terraform and AWS services EC2, S3, Lambda, & RDS

### Scalable Analytics Institute (ScAI), UCLA

Research Assistant, Advisor: [Prof. Wei Wang](#)

Los Angeles, US

Jan'23 - Sep'23

- Augmented Protein & Molecule contact maps using Diffusion Docking and AlphaFold to DTI models and attained 10% boost
- Experimented with different novel cross-attention and contrastive loss architectures for modeling Drug-Protein Interaction

### Accenture Technology Labs

Research Intern

Bangalore, India

May'19 - Aug'19

- Designed stock price prediction models using news articles and knowledge graphs to incorporate real-world domain knowledge
- Applied GCNs with events for real-world stock scenarios leading to performance improvement of 5% over the baseline models

### Autonomous Underwater Vehicle (AUV)

Artificial Intelligence Engineer

Kharagpur, India

Feb'17 - Apr'19

- Leveraged MobileNet & ORB-SLAM for real-time underwater buoy detection & navigation; optimized model inference by 20%
- Used ROS packages like Actionlib and Smach to implement the Mission Planner Stack; participated in SAVe at NIOT, Chennai

### University of California Los Angeles

Graduate Teaching Associate

Los Angeles, US

Sep'21 - Jun'23

- Managed and led discussions/office hours for 500 undergrads in CS32 & Chem 20A, totaling over 500 hours in 5 quarters

## Publications

### Analysing the Extent of Misinformation in Cancer Related Tweets | Rakesh Bal et al.

[\[Link\]](#)

- 14th International AAAI Conference on Web and Social Media (**ICWSM 2020**) | [30 citations](#)

### Two-Sided Fairness in Non-Personalised Recommendations | Rakesh Bal et al.

[\[Link\]](#)

- 35th AAAI Conference on AI (**AAAI 2021**) Student Abstract and Poster Program | [9 citations](#)

### PGraphDTA: Improving DTI Prediction using Protein Language Models & Contact Maps | Rakesh Bal et al.

[\[Link\]](#)

- Accepted in 37th Advances in Neural Information Processing Systems Workshop (**NeurIPS - W 2023**)

## Relevant Projects

### CLIP for Visual Question Answering (VQA)

[\[Link\]](#)

- Harnessed OpenAI [CLIP](#) in VQA models like MCAN and Pythia in both zero-shot and finetune settings with 2% upgrade
- Added Language Driven Semantic Segmentation ([LSeg](#)) to pipeline for answering number-based questions in VQA2.0 dataset

### Text Graph Convolutional Networks (GCNs)

[\[Link\]](#)

- Investigated TextGCN by reproducing the model's results and adding new components on 5 different text classification datasets
- Designed new graph construction algorithms and improved the time cost of graph construction in TextGCN model by 5 times

### Stereo Vision based NeRF

- Built NeRF framework for rectified stereo vision on [NeRF synthetic dataset](#), with superior performance over monocular vision

## Skills

**Languages:** Python, Java, C, C++, C#, JavaScript, TypeScript, R, Go, Matlab, Lisp

**Frameworks:** PyTorch, Tensorflow, Azure, AWS, Angular, React, Spark, Node.js, Terraform, SpringBoot, Kafka, MySQL, Docker