

# Ramnath Kumar

◊ [ramnathkumar181.github.io](https://ramnathkumar181.github.io) ◊ [Google Scholar](#) ◊

## RESEARCH INTERESTS & SUMMARY

My research centers on Deep Learning, with a particular emphasis on developing **robust** and **efficient** methods for building practical, real-world systems. I am especially interested in *representation learning* and in rethinking the optimization strategies that underpin modern training paradigms - seeking approaches that are not only scalable and generalizable but also adaptive to the diverse demands of deployment environments.

## EDUCATION

### University of California, Los Angeles (UCLA)

*Ph.D. in Computer Science*

- . Advisor: [Prof. Cho-Jui Hsieh](#)

Los Angeles, USA

09/2024 – 06/2028

### BITS Pilani, Hyderabad Campus

*B.E. in Computer Science, MSc. in Economics*

- . CGPA in Computer Science major: **9.65/10.0** (Top 10 in class of 255)
- . Overall CGPA: 8.92/10.0

Hyderabad, India

08/2016 – 08/2021

## SELECTED RESEARCH/WORK EXPERIENCE

### Google DeepMind

*Pre-Doctoral Researcher*

India

07/2022 – 08/2024

- . Mentors: [Prateek Jain](#) and [Inderjit S. Dhillon](#)
- . Led a cross-functional team in developing and deploying RGD in product-driven research, improving performance of ViT by up to **1.01%** on ImageNet-1K [3].
- . Developed an End-to-End efficient retrieval architecture (EHI), that improved upon prior retrieval benchmarks by up to **1.45%** at a fixed compute budget. This effort is slated for integration into various Google products [4].
- . Received recognition for efforts in improving related product retrieval for users across the world. Took initiative in proposing a novel end-to-end retrieval architecture, improving efficiency and robustness in ongoing projects, with contributions recognized in .

### Google Research

*Research Associate*

India

04/2022 – 07/ 2022

- . Mentor: [Dheeraj Nagaraj](#)
- . Developed Introspective Experience Replay (IER), a novel replay buffer sampling strategy inspired by Reverse Experience Replay (RER), demonstrating up to **7×** faster convergence in Reinforcement Learning algorithms such as DQN and TD3 [7].

### Mila - Quebec Artificial Intelligence Institute

*Consultant*

Canada

07/2021 – 03/2022

- . Mentor: [Yoshua Bengio](#)
- . Initiated and led a project exploring the impact of diversity in meta-learning, collaborating closely with his group. Designed and executed experiments, leading to an oral presentation at the “*Association for the Advancement of Artificial Intelligence*” (AAAI) that challenged the conventional wisdom of diversity being strictly useful to meta-learning [5].

### Amazon ML

*Applied Scientist Intern*

India

01/2021 – 06/2021

- . Mentor: [Gokul Swamy](#)
- . Led a study on causal attribution within Amazon’s sales model as first author, with findings presented at Amazon’s internal conference (AMLC 2021).

- . Mentors: [Amit P. Sheth](#) and [Krishnaprasad Thirunarayan](#)
- . Collaborated with a cross-functional research team across multiple time zones as first author on the *eDarkFind* project, where I developed an unsupervised multi-view framework for Sybil detection, specifically targeting Darknet market activities [6].

## PUBLICATIONS

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\* Indicates that the authors contributed equally to this work.

- [1] [Towards Building efficient Routed systems for Retrieval](#)  
**Ramnath Kumar**, Prateek Jain, and Cho-Jui Hsieh  
*Under preparation, ICML*.
- [2] [Flex-Act: Why Learn when you can Pick?](#)  
**Ramnath Kumar**, Kyle Ritscher, Junmin Zhu, Lawrence Liu, and Cho-Jui Hsieh  
*Under Review, TMLR*.
- [3] [Stochastic Re-weighted Gradient Descent via Distributionally Robust Optimization](#)  
**Ramnath Kumar**, Kushal Alpesh Majmundar, Dheeraj Mysore Nagaraj, and Arun Suggala  
*Transactions on Machine Learning Research, 2024*.  
[Google AI Blog Coverage](#).
- [4] [EHI: End-to-end Learning of Hierarchical Index for Efficient Dense Retrieval](#)  
**Ramnath Kumar\***, Anshul Mittal\*, Nilesh Gupta, Aditya Kusupati, Inderjit Dhillon, and Prateek Jain  
*Transactions on Machine Learning Research, 2024*.
- [5] [The Effect of diversity in Meta-Learning](#)   
**Ramnath Kumar**, Tristan Deleu, and Yoshua Bengio  
*Association for the Advancement of Artificial Intelligence (AAAI), 2023 (Oral Paper)*.  
[SyncedReview Blog Coverage](#).
- [6] [eDarkFind: Unsupervised Multi-view Learning for Sybil Account Detection](#)   
**Ramnath Kumar**, Shweta Yadav, Raminta Daniulaityte, Francois Lamy, Krishnaprasad Thirunarayan, Usha Lokala, and Amit Sheth  
*The Web Conference (WWW), 2020*.
- [7] [Introspective Experience Replay: Look Back When Surprised](#)   
**Ramnath Kumar** and Dheeraj Nagaraj  
*Transactions on Machine Learning Research, 2024*.  
[Google Research Blog Coverage](#).
- [8] [Rethinking Learning Dynamics in RL using Adversarial Networks](#)   
**Ramnath Kumar**, Tristan Deleu, and Yoshua Bengio  
*NeurIPS Workshop on DeepRL, 2022*.
- [9] [Temporal Dynamics and Spatial Content in IoT Malware detection](#)   
**Ramnath Kumar** and G Geethakumari  
*IEEE TENCON, 2019*.

## SELECTED AWARDS AND HIGHLIGHTS

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**Quad Fellowship**, Took part in a summit at the White House (U.S.A.) to discuss emerging technologies and their policy implications.  2024

**Graduate Dean's Scholars Award**, UCLA scholarship. 2024

Awardee, NTSE Scholar (India). 2014-2020