

RAM SAMARTH B B

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SUMMARY

Yale CS Graduate Student with spotlight publications at **ICML** and **NeurIPS**. Hands-on experience building **multimodal embedding** models evaluated and adopted across enterprise product teams. Research interests include **non-Euclidean representation learning**, **PEFT**, and **multimodal retrieval**.

EDUCATION

Master of Science, Computer Science

August 2026 – May 2028

Yale University, United States of America

Bachelor of Technology, Computer Science and Engineering

December 2021 – May 2025

IIIT Kottayam, India

CGPA: 8.79/10.00

Relevant Coursework: Calculus & Linear Algebra, Digital Signal Processing, Machine Learning, Deep Learning, Parallel & Distributed Computing, Data Structures & Algorithms.

PUBLICATIONS

- [FlatLand: Personalized Graph Federated Learning via Tailored Lorentz Space](#) (**ICML 2026 spotlight**).
- [Hyperbolic Fine-Tuning for Large Language Models](#) (**NeurIPS 2025 spotlight**).
- [Scattering Transforms For Heterophilic Graphs Using Complementary Base Filters](#) (Accepted, *ICASSP 2026*).
- Self-supervised Learning with Heterophilic Graphs Using Sheaves (*Accepted, GSP 2025*)
- [STEAM: Squeeze and Transform Enhanced Attention Module](#) (*arXiv Preprint*)
- [FedLSF: Federated Local Graph Learning via Specformers](#) (Accepted, *20th IEEE DCOSS, 2024*)
- [Privacy-Preserved Stress Detection from Wearables using Federated Learning](#) (Accepted, *5th IEEE INDISCON, 2024*)

EXPERIENCE

Research Intern

March 2026 – July 2026

[Microsoft Research India](#) (Bengaluru, India)

- Engineered a SOTA **multimodal embedding model** achieving the **#1 rank** on **ViDoRe V2 and V3** benchmarks, scaled for internal adoption across Microsoft production teams including **M365**.
- Accelerated training runs by integrating **FSDP-2**, **Liger Kernels**, **FlashAttention**, and **GradCache** to enable memory-efficient, large-batch contrastive learning.
- Enhanced embedding flexibility and downstream retrieval by implementing **Matryoshka Representation Learning (MRL)** paired with **iterative dataset curation** pipelines.
- Coordinated on **Azure cloud resources**, provisioning storage for model checkpoints and forecasting project **GPU-hour allocations** to secure compute approvals.

Visiting Student Researcher

February 2025 – February 2026

[Graph and Geometric Learning Lab](#), Yale University (Remote)

- Co-developed **HypLoRA** (**NeurIPS 2025 spotlight**) (Ref.), a PEFT method exploiting the hierarchical structure of tokens. Implemented model variants and benchmarked 4 LLM baselines, achieving **3–5% gains** in commonsense reasoning and an **11% increase** on a challenging arithmetic dataset. Conducted rebuttal experiments and case studies that elevated reviewer ratings.
- Co-developed **FlatLand** (**ICML 2026 spotlight**) (Ref.), the first Hyperbolic Personalized FL framework. Engineered the evaluation pipeline for heterophilic graphs to address secondary data heterogeneity. Conducted curvature analysis and designed a modified neighborhood aggregation mechanism, yielding **2–3% accuracy gains** and benchmarking scalability across increasing client counts and communication rounds.

Research Assistant and Kotak AI Research Intern

May 2024 – January 2026

[VISTA Lab](#), Indian Institute of Science (Bengaluru, India)

- Designing a scalable experimental and data analysis pipeline in collaboration with a research team for mule account detection on large-scale financial transaction graphs ([NPCI-IISc AML project](#)).

- Developed **CST** (Ref.), a complementary **scattering transform** mechanism that **challenges** standard **GNN** inductive biases (which favor homophilic graphs) to optimize for **heterophilic** graphs. Achieved 1–2% accuracy gains over parameterized self-supervised GNNs while improving computational efficiency over traditional Scattering Transforms.

Research Intern

October 2023 – January 2024

DISCOVER Lab, National Institute of Technology Suratkal , Karnataka (Mangalore, India)

- Reproduced the **ICML 2021 pFedHN** (PFL using Hypernetworks) architecture for the **Flower** framework baselines. [Code](#)
- Proposed **FedLSF** (Ref.) to address challenges associated with **centralized** training of **Spectral GNNs**, achieving **8–13%** improvement in classification **accuracy** on **heterophilic** graphs over existing FL-GNN baselines. [Code](#)

PROJECTS

H²DSTGNN: Hybrid Hierarchical Distributed Spatio Temporal Graph Neural Networks (Final Year BTech Project): Developed a hierarchical server-client framework for spatio-temporal traffic forecasting that eliminates the need for a global model. Implemented dynamic graph modeling at the server to capture evolving spatial dependencies while delegating temporal modeling to clients, achieving a 15.34 MAE on PEMS dataset and outperforming centralized MTGNN and federated FedASTA baselines.

Kubernetes Stack Client: Built a lightweight full-stack Kubernetes client in Go with integrated Helm-based package management. [Code](#)

Petora: Co-developed an Android application using Java, XML, and Firebase as part of a four-member team for the Google Solution Challenge 2022, addressing a UN Sustainable Development Goal focused on pet well-being. Implemented Firebase backend services (authentication, storage) and designed navigation bars. [App](#) | [Contribution](#)

TECHNICAL SKILLS

Languages	Python, C, Go
Frameworks	PyTorch, PyTorch Geometric, Hugging Face, PySpark
Cloud and DevOps	Google Cloud Platform, Docker, Kubernetes, Git

HONORS & AWARDS

- **Kotak AI Research Fellowship**: Awarded a 1-year research fellowship by the **Kotak AI-ML Center** to support ongoing undergraduate research at IISc, granted based on research performance during the initial internship period.
- **Google DeepMind Research Symposium 2025**: Selected for the Google DeepMind Research Symposium (under undergraduate category). Participated in technical networking and research discussions with **Google DeepMind** researchers.

LEADERSHIP & TEACHING

- **GDSC Technical Lead & Google Cloud Facilitator**: Selected as the Technical Lead for the Google Developer Student Club (2022–2023). Facilitated a 2-month Google Cloud program, delivering technical sessions and GCP workshops to over 100 participants, and initiated the university’s inaugural Winter Hacks hackathon.
- **Technical Tutorial**: Delivered a tutorial session on **PyTorch Geometric** and Unsupervised Learning as part of a three-day workshop for the NPCI-IISc project.
- **Intra-lab Research Collaboration (IISc)**: Initiated a focused study group within the VISTA Lab to discuss GNN literature and share technical insights, supporting the development of STEAM (Ref.). Regularly presented research updates during lab meetings to identify collaborative opportunities and facilitate peer knowledge sharing.