Name: **Sai Aparna Aketi**
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ACADEMIC DETAILS

04/2024 - 04/2025 **Central Applied Science, Meta** Menlo Park, USA.
Postdoctoral Researcher: Privacy Preserving ML

08/2018 - 03/2024 **Purdue University** West Lafayette, USA.
Ph.D. in Electrical and Computer Engineering
CGPA: 4/4

07/2014 - 07/2018 **Indian Institute of Technology Gandhinagar** Gujarat, India.
Bachelors of Technology, Electrical Engineering
Honors in Electrical Engineering and Minor in Computer Science
CGPA: 9.73/10

EMPLOYMENT

05/05/2025 - present **Central Applied Science, Meta** 1 Meta Way, Menlo Park, CA 94025

Job Description: I work as a Research Scientist with Privacy Preserving Machine Learning team which establishes state-of-the-art scientific advancements for Meta's products and systems. The goal is to develop and deploy modern privacy preserving techniques, such as Federated Learning, in various use-cases within Meta. This involves research: formulating and studying scientific questions, and tooling: to develop software and libraries containing modern techniques which can further be incorporated within Meta's platforms.

RESEARCH WORK

- **Privacy Preserving ML** April'24 - Present
  - Understanding the utility and developing on-device training and inference technology for various use-cases at Meta.
  - Developing an open-source Federated Learning library called FLSim.
  - Integrating Pipeline Parallelism with Opacus, an open-source differential privacy library, to enable private fine-tuning of LLMs.
- **Decentralized Learning Algorithms and Theory**
  Mentor: Prof. Kaushik Roy Aug'18 - Mar'24
  - Graduate Research Assistant at Center for Brain-inspired Computing (C-BRIC), Purdue University which is one of the six centers of JUMP funded by SRC.
  - My main focus is on designing and developing efficient peer-to-peer decentralized learning algorithms for non-IID/heterogeneous data distributions.
- **Decentralized Machine Learning**
  Mentor: Prof. Jan Rabaey Aug'20 - Dec'20
  - Worked on communication efficient decentralized distributed learning supported for directed and time-varying graphs.

- Our main goal was to enable training at the edge devices using decentralized distributed machine learning (distributed intelligence) in practical scenarios.

- **Radiation Hardening By Design for synchronous system**
  Mentor: Prof. Joycee Mekie Aug'16 - July'18

  - Proposed a new RHBD technique called Guarded Dual Modular Redundancy.
  - A mathematical approach to find the probability of error in case of Multiple Event Transients on various RHBD techniques.
  - Worked on techniques to mitigate dual node upsets in combinational logic.

INTERNSHIPS

- PhD Software Engineering ML Intern at **Meta, Menlo Park**
  (Team: Video Understanding (Infra)) May'22 - Aug'22

  - Worked on designing and training Reels Discovery Graph.

- Research Intern at **IMEC, Berkeley**
  (Mentor: Prof. Jan Rabaey) Aug'20 - Dec'20

  - Worked on efficient decentralized learning algorithms for computer vision tasks.

- Summer Research Intern at **University of Southern California**
  (Mentor: Prof. Peter A. Beerel) May'17 - July'17

  - Worked on techniques to mitigate SETs for asynchronous bundled data design.
  - Proposed a novel radiation hardened asynchronous design called **SERAD: Soft Error Resilient Asynchronous Design using a Bundled Data Protocol**. Tested using CAD simulations.

RESEARCH PUBLICATIONS

- Sai Aparna Aketi, and Kaushik Roy. "**Cross-feature Contrastive Loss for Decentralized Deep Learning on Heterogeneous Data**." IEEE/CVF Winter Conference on Applications of Computer Vision (WACV 2024). Selected for oral presentation. Link to article.

- Sai Aparna Aketi, Abolfazl Hashemi, and Kaushik Roy. "**Global Update Tracking: A Decentralized Learning Algorithm for Heterogeneous Data Distributions**." 37th Conference on Neural Information Processing Systems (NeurIPS 2023). Link to article.

- Sai Aparna Aketi, Sangamesh Kodge, and Kaushik Roy. "**Neighborhood Gradient Mean: An Efficient Decentralized Learning Method for Non-IID Data**." Transactions on Machine Learning Research (TMLR 2023). Link to article.

- Sakshi Choudhary, Sai Aparna Aketi, & Kaushik Roy, "**SADDLe: Sharpness-Aware Decentralized Deep Learning with Heterogeneous Data**." IEEE/CVF Winter Conference on Applications of Computer Vision (WACV 2025).

- Sakshi Choudhary, Sai Aparna Aketi, Gobinda Saha, & Kaushik Roy, **CoDeC: Communication-Efficient Decentralized Continual Learning**." Transactions on Machine Learning Research (TMLR 2024). Link to article.

- Ravikumar, Deepak, Gobinda Saha, Sai Aparna Aketi, and Kaushik Roy. "**Homogenizing Non-IID datasets via In-Distribution Knowledge Distillation for Decentralized Learning**." Transactions on Machine Learning Research (TMLR 2024). Link to article.

- Sai Aparna Aketi, Sangamesh Kodge, and Kaushik Roy. "**Low precision decentralized distributed training over IID and non-IID data**." Neural Networks (2022). - Link to article.

- Sai Aparna Aketi, Sourjya Roy, Anand Raghunathan, and Kaushik Roy, **"Gradual Channel Pruning while Training using Feature Relevance Scores for Convolutional Neural Networks"**, Journal of IEEE Access, Volume 8, Sept 2020. – Link to article.
- Priyadarshini Panda, Aparna Aketi and Kaushik Roy, **"Towards Scalable, Efficient and Accurate Deep Spiking Neural Networks with Backward Residual Connections, Stochastic Softmax, and Hybridization"**, Frontiers in Neuroscience, Volume 14, Jun 2020. – Link to article.
- Sai Aparna Aketi, Smriti Gupta, Humei Cheng, Joycee Mekie and Peter Beerel, "**SERAD: Soft Error Resilient Asynchronous Design using a Bundled Data Protocol**", IEEE Transactions on Circuits and Systems I: Regular Papers, Jan 2020. – Link to article.
- Sai Aparna Aketi, Joycee Mekie, and Hemal Shah, **"Single-error hardened and multiple-error tolerant guarded dual modular redundancy technique,"** in Proceedings of IEEE, **31st International Conference on VLSI Design**, Jan 2018. – Link to article.

WORKSHOP PAPERS

- Sai Aparna Aketi, Sakshi Choudhary, and Kaushik Roy. "**Averaging Rate Scheduler for Decentralized Learning on Heterogeneous Data**." Tiny Paper at ICLR, 2024. Link to article
- Sai Aparna Aketi, Sangamesh Kodge, and Kaushik Roy. "**Neighborhood Gradient Clustering: An Efficient Decentralized Learning Method for Non-IID Data**." Federated Learning and Analytics in Practice workshop at ICML, 2023. Link to article

PREPRINTS

- Sai Aparna Aketi, Abolfazl Hashemi and Kaushik Roy. "**AdaGossip: Adaptive Consensus Stepsize for Decentralized Deep Learning with Communication Compression.**" Link to article.
- Sai Aparna Aketi, Amandeep Singh, and Jan Rabaey. "**Sparse-Push: Communication-& Energy-Efficient Decentralized Distributed Learning over Directed & Time-Varying Graphs with non-IID Datasets.**" arXiv preprint arXiv:2102.05715 (2021). – Link to article.

ACADEMIC ACHIEVEMENTS

- Purdue's Google Fellowship nominee 2022
- Purdue's Apple Scholars in AI/ML Fellowship nominee 2022
- Received **President's Gold Medal**, **Institute Gold Medal** and an award for the best performance in the core courses of Physics, Chemistry, and Life Sciences at the 7th convocation of IIT Gandhinagar
- Awarded **"Academic Excellence Scholarship"** for the academic year 2016-17 and academic year 2017-18, Indian Institute of Technology Gandhinagar.
- Awarded the prestigious Dr. JL Nayyar Scholarship for the academic year 2017-18
- Selected for prestigious **VITERBI-INDIA program 2017**.

TECHNICAL SKILLS

- **Research:** Privacy Preserving Machine Learning, Federated Learning, Decentralized Optimization, and Energy-Efficient Training.
- **Programming languages**: Python (PyTorch)

SERVICES

- **Reviewer:** ICML, NeurIPS, CVPR, ECCV, AAAI, AISTATS, TMLR, WACV
- **Area Chair:** ICLR tiny papers (2024)
- **Action Editor:** TMLR