

**Sai Aparna Aketi**  
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School of Electrical and Computer Engineering,  
Purdue University.

## ACADEMIC DETAILS

|                   |   |                      |
|-------------------|---|----------------------|
| 08/2018 - Present | <b>Purdue University</b><br>Ph.D. in Electrical and Computer Engineering<br>CGPA: 4/4   | West Lafayette, USA. |
| 07/2014 - 07/2018 | <b>Indian Institute of Technology Gandhinagar</b><br>Bachelors of Technology, Electrical Engineering<br>Honors in Electrical Engineering and Minor in Computer Science<br>CGPA: 9.73/10 | Gujarat, India.      |

## RESEARCH WORK

- **Decentralized Learning Algorithms and Theory**

*Mentor: Prof. Kaushik Roy*

Aug'18 - Present

- 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. Joyce Mekie*

Aug'16 - July'18

- Proposed a new RHBD technique called Guarded Dual Modular Redundancy.
- A mathematical approach to find 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.
- Summer Intern at **Indian Institute of Technology-Bombay**  
(Mentor: Prof. M.B.Patil) May'16 - June'16
  - Designed a circuit to automate the input-output characterization of 3 terminal devices.

## 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). [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](#).
- 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](#).

## PREPRINTS

- Sakshi Choudhary, Sai Aparna Aketi, Gobinda Saha, & Kaushik Roy, **CoDeC: Communication-Efficient Decentralized Continual Learning**." arXiv preprint (2023). [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**." Under review at AAAI 2024. [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](#).

## WORKSHOP PAPERS

- 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](#)

## 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. J.L. Nayyar Scholarship for the academic year 2017-18
- Selected for prestigious **VITERBI-INDIA program 2017**.

## TECHNICAL SKILLS

- **Research:** Decentralized Optimization, Federated Learning, Energy-Efficient Training
- **Programming languages:** Python (PyTorch), C (basics), MATLAB
- **Reviewer:** WACV (2024), AISTATS (2024), Journal of Neural Networks