

# Dr. Sandeep Kumar

RESEARCH SCIENTIST @ INTEL, BENGALURU, INDIA

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## Professional Summary

Systems researcher specializing in **AI/ML performance optimization** and **memory tiering**. Expertise in memory management for DNN training (PyTorch), including Transformer and CNN architectures, LLM inference, and RAG systems. Proven track record of optimizing memory-intensive workloads through tiered memory architectures, kernel-level enhancements, and hands-on experience with hardware accelerators (Intel IAA, DSA).

Contributor to the **Linux kernel** (memory management subsystem) with upstream patches. Currently leading a research team at Intel focused on AI infrastructure optimization, CXL memory technologies, and next-generation memory tiering solutions.

## Selected Publications

1. *TierScope: Harnessing Multiple Compressed Tiers to Tame Server Memory TCO*  
**Sandeep Kumar**, Aravinda Prasad, and Sreenivas Subramoney. In **EuroSys**, 2026.
2. *TierTrain: Proactive Memory Tiering for CPU-Based DNN Training*  
Sathvik Swaminathan, **Sandeep Kumar**, Aravinda Prasad, and Sreenivas Subramoney. In **ISMM**, Seoul, South Korea, 2025.
3. *A Tug-of-War between Static and Dynamic Memory in Intel SGX*  
**Sandeep Kumar**, Abhisek Panda, Advait Nerlikar and Smruti R. Sarangi. In **VLSID, Bangalore, India**, 2024.
4. *Telescope: Telemetry for Gargantuan Memory Footprint Applications*  
Alan Nair, **Sandeep Kumar**, Aravinda Prasad, Ying Huang, Andy Rudoff, Sreenivas Subramoney. In **USENIX, ATC, USA**, 2024.
5. *Enabling Migration of Large SGX Enclaves in a Data Center*  
**Sandeep Kumar**, Abhisek Panda, Smruti R. Sarangi. In **arXiv**, 2024.
6. *Perspector: Benchmarking Benchmark Suites*  
**Sandeep Kumar**, Abhisek Panda, Smruti R. Sarangi. In **DATE**, Antwerp, Belgium, 2023.
7. *SecureLease: Maintaining Execution Control in The Wild using Intel SGX*  
**Sandeep Kumar**, Abhisek Panda, and Smruti R. Sarangi. In **Middleware**, Quebec City, Canada, 2022.
8. *SGXGauge: A Comprehensive Benchmark Suite for Intel SGX*  
**Sandeep Kumar**, Abhisek Panda, and Smruti R. Sarangi. In **ISPASS**, Singapore, 2022.
9. *SecureFS: A Secure File System for Intel SGX*  
**Sandeep Kumar** and Smruti R. Sarangi. In **RAID**, Spain, 2021.
10. *Page Table Management for Heterogeneous Memory Systems*  
**Sandeep Kumar**, Aravinda Prasad, Smruti R. Sarangi, and Sreenivas Subramoney. In **ISMM**, Canada, 2021.
11. *F-LaaS: A Control-Flow-Attack Immune License-as-a-Service Model*  
**Sandeep Kumar**, Diksha Moolchandani, Takatsugu Ono, and Smruti Sarangi. In **IEEE SCC**, Milan, Italy, 2019.
12. *Scalable Performance Tuning of Hadoop MapReduce: A Noisy Gradient Approach*  
**Sandeep Kumar**, Sindhu Padakandla, Chandrashekar L, Priyank Parihar, Gopinath K, and Shalabh Bhatnagar. In **IEEE Cloud**, Hawaii, USA, 2017.

Complete list here: <https://sandeep007734.github.io/publications/>

## Patents

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1. Context-aware memory tiering for machine learning training  
Sathvik Swaminathan, Sandeep Kumar, Aravinda Prasad, and Sreenivas Subramoney
2. Methods and apparatus to profile page tables for memory management.  
Aravinda Prasad, Sandeep Kumar, Sreenivas Subramoney, and Andy Rudoff

## Education

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### Indian Institute of Technology Delhi

DOCTOR OF PHILOSOPHY

- Advised by Prof. [S. R. Sarangi](#)

New Delhi, India

Jul. 2017 - Jun 2024

### Indian Institute of Science

MASTER OF ENGINEERING IN COMPUTER SCIENCE

- Advised by Prof. [K. Gopinath](#)

Bangalore, India

Jul. 2011 - Aug. 2013

### Guru Gobind Singh Indraprastha University

BACHELOR OF TECHNOLOGY IN COMPUTER SCIENCE

New Delhi, India

Jul. 2007 - Aug. 2011

## Work Experience

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### Intel Labs

RESEARCH SCIENTIST

- Performance optimization for AI/ML training and inference workloads; memory tiering for LLMs and RAG systems
- Linux kernel: zswap multi-tier support (TierScape), DAMON telemetry extensions (Telescope); Author: Sreenivas Subramoney
- Hardware accelerator integration (Intel IAA, DSA) for memory compression and data movement

Bangalore, Karnataka

March 2022 – Current

### Intel Labs

GRADUATE RESEARCH INTERN

Bangalore, Karnataka

July 2020- Jan 2021

### Indian Institute of Science

RESEARCH ASSOCIATE

Bangalore, Karnataka

Sept 2014- July 2017

### Dell R&D

SOFTWARE DEVELOPMENT ENGINEER

Bangalore, India

Jul 2013-Jun 2014

## Interests & Activities

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### Reading

<https://goodreads.com/sandeep007734>

Goodreads Profile

### Running, Cycling, Hiking

<https://www.strava.com/athletes/3569697>

Strava Profile

## References

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### Prof. Smruti R. Sarangi

PROFESSOR, DEPARTMENT OF COMPUTER SCIENCE

[srsarangi@cse.iitd.ac.in](mailto:srsarangi@cse.iitd.ac.in)

IIT Delhi, India

### Prof. K. Gopinath

PROFESSOR, COMPUTER SCIENCE AND AUTOMATION

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