# Dr. Sandeep **Kumar**

Research Scientist @ Intel, Bengaluru, India

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## Interest

Memory management of modern workloads including VectorDB, LLM, and large memory footprint applications in a heterogeneous system.

## Selected Publications

1. *TierScape: 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. *Hardware-Assisted Mechanisms to Enforce Control Flow Integrity: A Comprehensive Survey*
   **Sandeep Kumar**, Diksha Moolchandani, Smruti R. Sarangi. In Journal of Systems Architecture (JSA)
8. *SecureLease: Maintaining Execution Control in The Wild using Intel SGX*
   **Sandeep Kumar**, Abhisek Panda, and Smruti R. Sarangi. In **Middleware**, Quebec City, Canada, 2022.
9. *SGXGauge: A Comprehensive Benchmark Suite for Intel SGX*
   **Sandeep Kumar**, Abhisek Panda, and Smruti R. Sarangi. In **ISPASS**, Singapore, 2022.
10. *SecureFS: A Secure File System for Intel SGX*
    **Sandeep Kumar** and Smruti R. Sarangi. In **RAID**, Spain, 2021.
11. *Page Table Management for Heterogeneous Memory Systems*
    **Sandeep Kumar**, Aravinda Prasad, Smruti R. Sarangi, and Sreenivas Subramoney. In **ISMM**, Canada, 2021.
12. *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.
13. *Towards a Portable Human Gait Analysis & Monitoring System*
    **Sandeep Kuma**r, Poorna Talkad Sukumar, K. Gopinath, Dr. Jayanth Sampath, Laura Rocchi, and Suyameendra Kulkarni..In **IEEE ICSigSys**, Bali, Indonesia, 2018.
14. *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.

## Patents

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

**Indian Institute of Technology Delhi** — *New Delhi, India*
Doctor of Philosophy — *Jul. 2017 - Jun 2024*
- Advised by Prof. S. R. Sarangi

**Indian Institute of Science** — *Bangalore, India*
Master of Engineering in Computer Science — *Jul. 2011 - Aug. 2013*
- Advised by Prof. K. Gopinath

**Guru Gobind Singh Indraprastha Univeristy** — *New Delhi, India*
Bachelor of Technology in Computer Science — *Jul. 2007 - Aug. 2011*

## Work Experience

**Intel Labs** — *Bangalore, Karnataka*
Research Scientist — *March 2022 – Current*
- Working on developing methods and tools for a better synergy between the hardware and the software.

**Intel Labs** — *Bangalore, Karnataka*
Graduate Research Intern — *July 2020- Jan 2021*
- Developed and optimized memory tiering strategies for page table pages, enhancing efficiency and performance in a heterogeneous memory system.

**Indian Institute of Science** — *Bangalore, Karnataka*
Research Associate — *Sept 2014- July 2017*
- Implemented and refined auto-tuning of Hadoop MapReduce workflows using advanced stochastic algorithms, driving performance optimization and efficiency.
- Designed and developed advanced models for human gait analysis leveraging Inertial Measurement Unit (IMU) sensors, enabling precise motion tracking and insights.

**Dell R&D** — *Bangalore, India*
Software Development Engineer — *Jul 2013-Jun 2014*
- Responsible for BIOS configuration and system management tools, DCC (Dell Command Configure) and OMCI (Open Manage Client Instrumentation) respectively

## Interests & Activities

**Reading**
Goodreads profile:
`https://goodreads.com/sandeep007734`

**Running, Cycling, and Hiking**
Strava profile:
`https://www.strava.com/athletes/sandeep007734`

## References

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*Indian Institute of Technology Delhi, New Delhi, India*

**Prof. K. Gopinath**
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