## Shashank Gugnani


**Contact Information**

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**Research Interests**

High performance filesystems and storage, distributed computing, big data, high performance networking, and network-based computing

**Education**

**The Ohio State University**, Columbus, OH — 2015 - 2021
Ph.D., Computer Science
Thesis: Designing Scalable Storage Systems for Non-Volatile Memory

**BITS-Pilani**, India — 2011 - 2015
B.E., Computer Science
Thesis: Evaluation And Implementation of Utilizing Hadoop in a Scientific Gateway Environment

**Work Experience**

**Oracle**, Redwood Shores, CA — 2021 - present
Engineering Manager — Dec 2023 - present
Role: I lead a team working on the design and development of application development technologies in the Oracle database

Senior Software Engineer — Feb 2021 - Dec 2023
Role: Design and development of next-generation Oracle database products

**The Ohio State University**, Columbus, OH — Aug 2015 - Dec 2020
Graduate Research Associate, Department of Computer Science
Role: Designing storage systems for next-generation cloud environments

**IBM Research**, Almaden, CA — June 2020 - Aug 2020
Research Intern, Storage Systems Research Group — May 2019 - Aug 2019
Role: Designing software to make persistent memory easier to use

**University of Westminster**, London, UK — Jun 2014 - Dec 2014
Visiting Researcher, Center for Parallel Computing
Role: Extending scientific workflow systems to support big data workloads

**Achievements and Activities**

- Reviewer for SIGMOD'26, IEEE TPDS, MASCOTS'19, IPDPS'18, and ICS'17
- Selected for ACM Student Research Competition at SC'18 and SC'17
- Awarded student travel grant for SC'18, SC'17, NVMW'18, and HiPC'17
- Presented talks at VLDB'25, SIGMOD'25, GraphQLConf'24, VLDB'21, HPDC'21, IPDPS'21, Data Works Summit'18, HiPC'17, CloudCom'16, and IDCS'14
- Presented tutorials at IISWC'20 and SC'18

**Research Projects**

***Memory Fabric: Data Management for Large-Scale Hybrid Memory Systems*, National Science Foundation, Oct'18 - Dec'20**
Role: Designing new abstractions and mechanisms to allow storage systems to efficiently utilize non-volatile memory.

***NeuroHPC: Advanced Computational Neuroscience*, National Science Foundation, Sep'16 - May'19**

Role: Developing scalable solutions for linear fascicle evaluation of the brain connectomme with MPI. Resulting designs are publicly available on docker hub (link).

***HiBD: Scalable Middleware for Managing and Processing Big Data on Next Generation HPC Systems*, National Science Foundation, Aug'15 - Aug'17**
Role: High-performance designs for HBase and Hadoop with RDMA. Developed designs were distributed as publicly available software releases (link).

***Chameleon: A Large-Scale, Reconfigurable Experimental Environment for Cloud Research*, National Science Foundation, Aug'15 - Sep'17**
Role: Design and development of high-performance Big Data middleware and appliances for next-generation cloud environments. Developed appliances were made publicly available through the Chameleon appliance catalog (link).

***CloudSME: Cloud-based Simulation Platform for Manufacturing and Engineering*, European Commission FP7 Capacities, Jun'14 - Dec'14**
Role: Extended scientific workflow systems to support MapReduce based applications in the cloud. As part of the project, optimal strategies for infrastructure management and integration with workflows were developed (link).

## Patents

1. **S. Gugnani**, A. Mylavarapu, S. Pendse, T. Lahiri, S. Ahmed, S. Gowda, B. Hammerschmidt, Z. Liu, "Automated migration from a document database to a relational database", US Patent 20250147936A1
2. Z. Liu, J. Loaiza, S. Abraham, S. Bose, H. Chang, **S. Gugnani**, B. Hammerschmidt, T. Lahiri, Y. Lu, D. McMahon, A. Mishra, A. Mylavarapu, S. Pendse, A. Raghavan, "Natively supporting JSON duality view in a database management system", US Patent 12287777B2
3. **S. Gugnani**, S. Guthridge, F. Schmuck, T. Anderson, and D. Bhagwat, "Fine-Grained Forced Cache Eviction", US Patent 201909738

## Posters

1. **S. Gugnani**, X. Lu, and D.K. Panda, "Accelerating Big Data Processing in the Cloud with Scalable Communication and I/O Schemes", SC 2018

## Tutorials

1. X. Lu, H. Shi, and **S. Gugnani**, "Benchmarking and Accelerating Big Data Systems With RDMA, PMEM, and NVMe-SSD", IISWC 2020
2. D.K. Panda, X. Lu, and **S. Gugnani**, "Exploiting HPC Technologies for Accelerating Big Data Processing and Associated Deep Learning", SC 2018

## Select Publications

1. **S. Gugnani**, Z. Liu, H. Chang, B. Hammerschmidt, S. Kareenhalli, K. Kumar, T. Lahiri, Y. Lu, D. McMahon, A. Mylavarapu, S. Pendse, and A. Raghavan, "JSON Relational Duality: A Revolutionary Combination of Document, Object, and Relational Models", SIGMOD 2025
2. **S. Gugnani** and X. Lu, "DStore: A Fast, Tailless, and Quiescent-Free Object Store for PMEM", HPDC 2021
3. **S. Gugnani**, T. Li, and X. Lu, "NVMe-CR: A Scalable Ephemeral Storage Runtime for Checkpoint/Restart with NVMe-over-Fabrics", IPDPS 2021
4. **S. Gugnani**, A. Kashyap, and X. Lu, "Understanding the Idiosyncrasies of Real Persistent Memory", VLDB 2021

5. T. Li, D. Shankar, **S. Gugnani**, and X. Lu, "RDMP-KV: Designing Remote Direct Memory Persistence based Key-Value Stores with PMEM", SC 2020
6. **S. Gugnani**, X. Lu, H. Qi, L. Zha, and D.K. Panda, "Characterizing and Accelerating Indexing Techniques on Distributed Ordered Tables", IEEE Big Data 2017
7. X. Lu, D. Shankar, **S. Gugnani**, and D.K. Panda, "High-Performance Design of Apache Spark with RDMA and Its Benefits on Various Workloads", IEEE BigData 2016
8. **S. Gugnani**, C. Blanco, T. Kiss, and G. Terstyanszky, "Extending Science Gateway Frameworks to Support Big Data Applications in the Cloud", Journal of Grid Computing, 2016

## Software Skills

- C, C++, Java, Bash, and SQL

## Teaching Experience

- Instructor for OSU CSE 1223: Introduction to Programming in Java, Spring 2020
- Instructor for OSU CSE 1223: Introduction to Programming in Java, Fall 2019
- Grader for OSU CSE 3421: Computer Architecture, Spring 2016
- Grader for OSU CSE 2331: Algorithms, Fall 2015

## Mentorship Experience

Mentored the following junior PhD students at OSU:

- Tianxi Li
- Arjun Kashyap

Mentored the following interns and coworkers at Oracle:

- Yundi Bao
- Sarvesh Tandon
- Jainam Shah
- Shubham Pednekar
- Revathi Ari

## References

Available upon request