# Akhil Guliani

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**SUMMARY**

Enthusiastic and results-driven Senior Software Engineer with 7+ years of comprehensive experience across system software development, high-performance computing (HPC), and distributed systems, backed by Master's degrees in Computer Engineering and Computer Sciences. Highly proficient in C/C++, Python, and Linux environments, with a passion for building robust, scalable and efficient systems. Proven expertise spans low-level operating systems, advanced virtualization techniques (including recognized research with a Best Paper Award), GPU software stack development, and in designing, developing, and deploying large-scale distributed services. Adept at analyzing, scaling and optimizing system performance, architecting scalable distributed systems, leading complex technical initiatives in geo-distributed teams, cultivating test-driven development, and fostering team growth through mentorship. Eager to contribute deep system design knowledge and problem-solving skills to impactful software engineering challenges.

**SKILLS**

Python, C, C++, Java, CUDA, Linux Scripting, Databases, Linux Kernel, EBPF, Linux Power Management, Architectural Simulations, High Performance Computing, Pandas, Big Data Systems, Data Analytics, ML Pipelines, AI, Virtualization Technologies

**INDUSTRIAL EXPERIENCE**

**Oracle America, Inc. (Oracle)**, Redwood Shores, CA, USA — Sep 2021 – Current (4 Yrs)

Senior Member of Technical Staff

- As a founding engineer and senior team member, spearheaded the successful launch of the MySQL HeatWave Lakehouse platform, enabling users to run analytics queries on up to 0.5 PetaByte of data stored in object storage. We optimized the product to run using a cluster based backend that was hosted on multiple clouds (OCI & AWS) and different compute architectures (Intel, AMD and ARM).
- Designed, deployed and owned the Autopilot's AutoSchema feature, which allows users to ingest data in diverse data formats (CSV, Parquet, AVRO, ND-JSON) by inferring a table schema in realtime (within seconds for 10TB data) by adaptively sampling files in a scalable manner from object storage, improving product usability and providing a competitive edge.
- Designed, deployed and owned the Export to Object Storage feature for MySQL HeatWave query results to production. This feature enables users to write back their query results to object storage in CSV, Parquet, and ND-JSON file formats, with same runtime performance as just running the query. This feature allowed users to integrate our product with other tools in their pipeline improving product usability, facilitating post-processing, and competitive edge.
- Functioned as a Subject Matter Expert (SME) for MySQL HeatWave operations, driving customer success by resolving high-severity incidents, performing root cause analyses (RCA) and providing hands-on support including participating Proof-of-Concept (PoC) engagements when needed.
- As the team grew from 25 members, mentored and collaborated with multiple new team members spread across 3 continents accelerating their onboarding and contributions to the project.
- Actively led broad collaborations by organizing and participating in design discussions, code reviews, white boarding sessions to consistently improve designs, code quality, and documentation.
- As Release Captain, cultivated a test-driven development (TDD) methodology to enhance development speed and code quality and coordinated efforts to optimize build times and reduce build size, ensuring timely and efficient deployments.

**Advanced Micro Devices, Inc. (AMD)**, Austin, Texas, USA — Jan 2019 – Aug 2019 (0.8 Yr)

Co-Op Engineer

- Led the prototyping and bring-up of the complete GPU software stack (ROCm) for next-generation GPU architecture, including Linux kernel drivers, userspace runtime, and compiler tools.
- Developed a Python-based automation tool for builds and regression testing of internal GPU toolchains, significantly enhancing development and debugging efficiency

**GAIL (India) Ltd.**, New Delhi, India — Sep 2012 – Jul 2014 (2 Yrs)

Senior Engineer (Instrumentation)

- Project Execution engineer for Process Instrumentation Systems at Petro-Chemicals-II Expansion Project in Pata, UP, India. Coordinated and managed an indirect team of 900 workers split across 4 plant units.
- Handled procurement, inspecting delivered instruments, coordinating installation, pre-deployment testing and deployment activities.

**University of Wisconsin-Madison** — Oct 2016 – Dec 2018, Sep 2019 – Aug 2021 (4.5 Yrs)

- Conducted research in resource management in operating systems and built a Python utility to manage power delivery for applications running under power limits, demonstrating practical solutions for power-aware computing system [4].
- Conducted research on GPU power management policies to boost application performance in GPU-powered large-scale High Performance Computing clusters [3].
- Explored Big Data systems, building Map-Reduce applications (Hadoop, Spark) and real-time streaming applications (Apache Storm, Flink); investigated graph analysis using GraphX.
- Managed and facilitated learning for classes with enrollments ranging from 100 to 800 students and led teams of up to 27 course staff, including regular 1-on-1 mentoring sessions. Designed lessons, course materials, feedback mechanisms, and developed automation scripts to efficiently distribute students and manage communications.

**Northwestern University** — Jul 2015 – Mar 2016 (0.7 Yrs)

- Built a proof of concept for user-space virtualization at the linux device file boundary for Virtual Machine Monitors (VMMs) such as Palacios VMM, allowing Guest Linux OS to access devices in the Host OS without any modifications, recognized with a Best Paper Award [6].
- Researched and developed ML-based thermal prediction for runtime thermal management across system components using architectural simulations (GEM5) and application performance monitoring in HPC clusters [1]. Used a variation of the mechanism to implement a thru-silicon-via (TSV) placement algorithm for better thermal performance in 3D die stacked chipsets [5].

**EDUCATION**

**M.Sc. in Computer Sciences** | **University of Wisconsin-Madison**, Madison, WI, USA — Aug 2016 – Aug 2021

**M.Sc. in Computer Engineering** | **Northwestern University**, Evanston, IL, USA — Sep 2014 – Mar 2016

**B.E. in Instrumentation & Control** | **University of Delhi**, New Delhi, India — Aug 2008 – Jun 2012

**JOURNAL PUBLICATIONS**

[1] Kaicheng Zhang, Akhil Guliani, Seda Ogrenci-Memik, Gokhan Memik, Kazutomo Yoshii, Rajesh Sankaran, Pete Beckman, "Machine Learning-Based Temperature Prediction for Runtime Thermal Management across System Components",*IEEE Trans. Parallel Distrib. Syst.*, 2018

[2] Renu Guliani, Amit Jain, Swati Sharma, Davinder Kaur, Akhil Guliani, Avinashi Kapoor, "Analysis of Electrical Characteristics using a Lambert W-Function Technique and MATLAB Simulation for Dye Sensitised ZnO Solar Cell", *The Open Renewable Energy Journal*, 2013

**CONFERENCE PUBLICATIONS**

[3] Prasoon Sinha, Akhil Guliani, Rutwik Jain, Brandon Tran, Matthew D Sinclair, Shivaram Venkataraman "Not all GPUs are created equal: characterizing variability in large-scale, accelerator-rich systems", in *SC22: International Conference for High Performance Computing, Networking, Storage and Analysis*, Dallas, USA Nov 2022

[4] Akhil Guliani, Michael Swift "Per-Application Power Delivery", in *Eurosys 2019*, Dresden, Germany, Mar 2019

[5] Dawei Li, Kaicheng Zhang, Akhil Guliani, Seda Ogrenci-Memik "Adaptive Thermal Management for 3D ICs with Stacked DRAM Caches", in *DAC 2017*, Austin, Texas, USA, Jun 2017

[6] Peter Dinda, Akhil Guliani "Dark Shadows: User-level Guest/Host Linux Process Shadowing", in *IEEE IC2E 2017*, Vancouver, Canada, Apr 2017 **[Best Paper]**

[7] Akhil Guliani "The Study and Implementation of Natural User Interface using Kinect", in *IEEE Indicon*, Kochi, Kerala, India, Dec 2012