

Vinay S Banakar

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EDUCATION

University of Wisconsin-Madison
Ph.D in Computer Science

2020 (ongoing)
Advisors: Prof. Andrea Arpaci-Dusseau
Prof. Remzi Arpaci-Dusseau

PES University
B.E in Computer Science and Engineering

2013-2017
CGPA: 8.26/10

AREAS OF INTEREST

Non-volatile memory, Data-Intensive computing, storage systems and systems for ML.

PUBLICATIONS

- [1] **Understanding and Benchmarking the Impact of GDPR on Database Systems** *Vldb'20*
Supreeth Shastri, *Vinay Banakar*, Melissa Wasserman,
Arun Kumar, and Vijay Chidambaram
- [2] **CIED - Rapid Composability of Rack Scale Resources Using Capability Inference Engine Across Datacenters** *IEEE Infra'20*
Vinay Banakar, Pavan Upadhy, and Maneesh Keshavan
- [3] **Analyzing the Impact of GDPR on Storage Systems** *HotStorage'19*
Vinay Banakar, Aashaka Shah, Supreeth Shastri,
Melissa Wasserman, and Vijay Chidambaram

PATENTS

- [1] **Intent driven hardware placement using rack capability inference engine across datacenters, 2019** *US20210014998A1*
Vinay Banakar, Pavan Upadhy, and Maneesh Keshavan
- [2] **Intelligent orchestration of disaggregated applications based on class of service, 2019** *US20200249999A1*
Tom Golway, *Vinay Banakar*, and Sandeep Panda
- [3] **Preemptive compatibility failure detection using graph structure learning in datacenters, 2018** *US10938623B2*
Vinay Banakar, Pavan Upadhy, and Maneesh Keshavan
- [4] **Topology based root cause triangulation of hardware issues** *US10831587B2*
Pavan Upadhy, Maneesh Keshavan, Naveena Kedlaya, and *Vinay Banakar*

ONGOING WORK

UW Madison	- Concurrency control mechanisms on persistent memory The aim is to evaluate feasibility of existing scale-up architectures on pmem and propose new efficient concurrency models.
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RECENT PROJECTS

- *RecoverKV*: Strongly consistent, partition tolerant Key-Value (kv) store built in golang using custom quorum protocol [Spring'21].
- *DIAS*: Distributed machine learning Inference as A Service [Spring'21].
- Improved lookup in learned LSM based KV store (*Bourbon*, *OSDI'20*) by replacing piece-wise linear regression with different ML indexes (radixSpline and PGM) [Fall'20].
- *AutoTune-IO*: Optimizing Linux IO scheduler parameters using Bayesian Optimization [Fall'20]

TEACHING EXPERIENCE

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| • CS537: Intro to Operating Systems | Teaching Assistant (UW Madison, Fall 2021) |
| • ECE252: Intro to Computer Organization | Teaching Assistant (UW Madison, Spring 2021) |
| • CS220: Data programming | Teaching Assistant (UW Madison, Fall 2020) |

RESEARCH EXPERIENCE

UW Madison Research Assistant <i>Summer 2021</i>	Advisors: Prof. Remzi Arpaci-Dusseau and Prof. Andrea Arpaci-Dusseau - Conducted performance characterization of Intel Optane DC (pmem). - Evaluated fast copying mechanisms on pmem. - Designing and building Large-Scale Data-Intensive computing architectures on persistent memory.
HPE RnD Labs Systems Engineer 2 <i>2017-2020</i>	Advisors: <i>Dr. Kimberly Keeton and Dr. Sharad Singhal</i> Focus: Disaggregated memory and resource orchestration - Developed applications+benchmarks for disaggregated persistent Fabric Attached Memory (<i>openFAM</i>) to evaluate it against traditional cluster-based HPC programming models (<i>openSHMEM</i>). - Designed and built large scale datacenter infrastructure management software (HPE OneView). - Developed a Redfish compliant server hardware simulator.
UT Austin Research Fellow <i>2018-2019</i>	Advisor: <i>Prof. Vijay Chidambaram</i> - Investigated the impact of privacy policies (<i>GDPR</i>) on storage systems. We modified Redis, Postgres and OracleDB to strictly comply with GDPR requirements and found up to 20x drop in throughput. This illustrated how retro fitting existing storage designs to work efficiently with new privacy policies is inadequate, and demonstrated how GDPR is really a compliance spectrum. - We built <i>GDPRBench</i> , a GDPR specific benchmark that allow users to assess compliance level of a storage system and helps evaluate compliance-performance tradeoff.
HPE RnD Labs Research intern <i>2017</i>	Implemented a virtual host simulation platform that mimics ESXi instances as hosts in a VMware vCenter cluster. Scaled up to 1000+ simulated hosts which were leveraged for performance evaluation in OneView. These instances also supported mock network configurations.

AWARDS AND ACCOMPLISHMENTS

- Silver award for innovation at Hewlett Packard Enterprise: \$3000, 2020
- First prize in TechnoBiz track at *8th IEEE conference on Cloud Computing in Emerging Markets*, 2019.
- Awarded 2018 ReportBee Research Fellowship.
- Multiple certificate of Appreciations – HPE RnD group
- Distinction Award at PESIT, Semester wise cash prizes for excellent academic performance.
- 2nd place at MyWired Open hack 2016, by *Cowrks*.
- 2nd place at SimpliHack'15, hackathon by *Simplilearn*.

CONTRIBUTIONS

- Review committee: *HPE TechCon 2020*
- Artifact Evaluation Committee: *ASPLOS 2020, SOSP 2019*
- Book Contribution: **Effective Cybersecurity: Understanding and Using Standards and Best Practices**, Dr William Stallings 2018.
- Open source contributions: *Apache Ratis, Postgresql and YCSB*
- Invited Talks: Virtue insight Blockchain 2019 conference *How GDPR is a double edged sword for Blockchain*, *HPE Technical Symposium'18 and 19*.