

# Hamidreza Zare

CSE GRAD STUDENT AT PENN STATE UNIVERSITY  
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## Education

### Pennsylvania State University

State College, PA

MASTER OF SCIENCE IN COMPUTER SCIENCE AND ENGINEERING, GPA: 3.85/4.0

Aug. 2019 - Dec. 2021

- **Advisors:** Professor Bhuvan Ugaonkar and Professor Viveck Cadambe — *Working on methods to operate geo-distributed consistent storage systems cost-effectively on the public cloud*
- **Relevant Graduate Courses:** Fundamentals of Computer Architecture, Algorithm Design and Analysis, Distributed algorithms, Operating System Design, Cloud Computing, Performance Evaluation

### Sharif University of Technology

Tehran, Iran

BACHELOR OF SCIENCE IN COMPUTER ENGINEERING, GPA: 18.73/20.00 (3.94/4.00)

Sept. 2015 - Jun. 2019

- **Thesis:** A new architecture for Die-Stacked DRAM considering both dynamic and static behavior of modern big-data applications; Using Die-Stacked DRAM partly as a part of memory and partly as a cache — *In HPCAN lab under the supervision of Professor Hamid Sarbazi-Azad*

### NODET (National Organization for Exceptional Talents), Dastgheib 1

Shiraz, Iran

DIPLOMA IN PHYSICS AND MATHEMATICS, GPA: 19.44/20.00 (4.00/4.00)

Sept. 2011 - Jun. 2015

## Work Experience

### Yugabyte, Inc.

Sunnyvale, CA

INTERN - SOFTWARE ENGINEER

Aug. 2021 - Present

My responsibility is to design and implement methods to resize the VMs in a cluster that runs YugabyteDB. Leveraging the fault tolerance of YugabyteDB, the clients' operations must be able to progress and finish successfully at the same time. Another major part of this role included finding the root cause for bugs caught during testing and resolving them. This required good understanding of not just software programming but also the architectural aspects of distributed systems and cloud.

### Scientific Green Co. Ltd

Tehran, Iran

INTERN - SYSTEM SOFTWARE DEVELOPER

Jul. 2018 - Sept. 2018

The company was developing an infrastructure based on LoRaWAN to offer IoT services. I had the responsibility of customizing the device authentication code in lorasever.io (an open-source LoRa server stack) to use their own protocol.

### NAAD

Tehran, Iran

SYSTEM SOFTWARE DEVELOPER

Jun. 2017 - Sept. 2017

My contribution to this work was in developing a logger module in C++ for the HSM that the company was creating, as well as writing Python scripts to automate the whole process of the integration tests of the HSM.

## Research Experience

### Penn State University

State College, PA

RESEARCH ASSISTANT

Aug. 2019 - Present

- **Under the supervision of Professor Bhuvan Ugaonkar and Professor Viveck Cadambe**
- Public clouds are an ever-emerging technology solution to users' needs of computing engines and storage services. Having several big public cloud providers, each offering a broad range of VM options with different price structures, presents the users with a bewildering choice of VM types. A poor choice of VMs can have significant implications on performance and costs. Moreover, storage services that present a linearizable memory consistency model to users are an essential sub-class of storage services. There are several methods based on replication and erasure coding to implement these storage systems, bringing more options for users to pick. My colleagues and I developed an optimization framework to compute the near-optimal configuration among replication and erasure coding as well as among various data center placements based on the public cloud pricing structure and characteristics of the workload. Furthermore, we developed a cost-effective geo-distributed linearizable key-value store over the public cloud that uses our optimization framework to periodically compute the optimal configuration and reconfigure the key-value store to the found configuration in order to capture dynamism in workloads' characteristics while maintaining linearizability. We have developed the optimizer in Python3 and the key-value store in C++11. Our key-value store leverages RocksDB for its persistent storage needs. It has been tested over nine datacenters in Google Cloud Platform.

## Sharif University of Technology

RESEARCH ASSISTANT

Tehran, Iran

Jan. 2017 – Jun. 2019

- **Under the supervision of Professor Hamid Sarbazi-Azad**
- Die-stacked DRAM is a promising solution to the memory bandwidth bottleneck of multi-core processors. Still, it cannot accommodate the entire dataset of modern big-data applications. Prior works have tried to use it as a large cache in the memory hierarchy or as a part of the main memory. Works that use it as a cache while adapting to dynamism in applications but suffer from the tag storage/latency/bandwidth overhead. On the other hand, works that use Die-stacked DRAM as a part of main memory while eliminating the need for tags, and hence, providing efficient access to data, lack adapting to dynamism in applications. Considering both the dynamic and static behavior of modern big-data applications, we proposed a new architecture to use the Die-Stacked DRAM partly as a portion of the main memory and partly as a cache. The paper is available at [arxiv.org/abs/1809.08828](https://arxiv.org/abs/1809.08828).

## Teaching Experience

### Penn State University

TEACHING ASSISTANT

State College, PA

FALL 2020

- **Distributed systems (CSE513)**
- Instructed by Professor Bhuvan Urgaonkar

### Penn State University

TEACHING ASSISTANT

State College, PA

SPRING 2020

- **Introduction to Systems Programming Course (CMPSC311)**
- Instructed by Professor Patrick McDaniel

### Sharif University of Technology

TEACHING ASSISTANT

Tehran, Iran

FALL 2018

- **Computer Language and Structure**
- Dr. Hossein Asadi

### Sharif University of Technology

TEACHING ASSISTANT

Tehran, Iran

FALL 2017

- **Computer Language and Structure**
- Dr. Hossein Asadi

### Sharif University of Technology

TEACHING ASSISTANT

Tehran, Iran

SPRING 2017

- **Logical Circuit**
- Dr. Siavash Bayat-Sarmadi

### Sharif University of Technology

TEACHING ASSISTANT

Tehran, Iran

FALL 2016

- **Fundamentals of Programming**
- Dr. Omid Gheibi

## Honors

**Ranked 365th** Among the 180000+ participants in the National Universities Entrance Exam

**Admitted to NODET** Passing an exam with an acceptance rate below 2%

## Skills

<b>Programming</b>	Expert in (C and C++), Python, Bash, SQL, Node.js (familiar), X86 Assembly, Verilog (HDL)
<b>Frameworks &amp; Tools</b>	Git, Linux, GDB, Valgrind, Ansible, gRPC, GCP, AWS, Postgres, ZSim, GAP Benchmark Suite, Modelsim, Quartus
<b>Type Setting</b>	L <sup>A</sup> T <sub>E</sub> X, Microsoft Office

## References

### Bhuvan Urgaonkar

PROFESSOR OF COMPUTER SCIENCE AND ENGINEERING DEPARTMENT AT PENN STATE UNIVERSITY

- **Website:** [cse.psu.edu/~buu1](https://cse.psu.edu/~buu1)
- **Email:** [buu1@psu.edu](mailto:buu1@psu.edu)

**Viveck Cadambe**

ASSOCIATE PROFESSOR IN THE DEPARTMENT OF ELECTRICAL ENGINEERING AT PENN STATE UNIVERSITY

- **Website:** [ee.psu.edu/viveck](http://ee.psu.edu/viveck)
- **Email:** [viveck@psu.edu](mailto:viveck@psu.edu)

**Siavash Bayat-Sarmadi**

ASSOCIATE PROFESSOR WITH THE DEPARTMENT OF COMPUTER ENGINEERING AT SHARIF UNIVERSITY OF TECHNOLOGY

- **Website:** [sharif.edu/~sbayat](http://sharif.edu/~sbayat)
- **Email:** [sbayat@sharif.edu](mailto:sbayat@sharif.edu)