

# Rajath Shashidhara

✉ [rajaths@cs.washington.edu](mailto:rajaths@cs.washington.edu) • 🌐 [homes.cs.washington.edu/~rajaths](https://homes.cs.washington.edu/~rajaths)

## Education

### University of Washington

*Ph.D. Computer Science*

Advisor: Dr. Simon Peter

Areas: Systems & Networking

**Seattle, WA**

2022–Present

### The University of Texas at Austin

*M.S. + Ph.D. Computer Science, GPA: 4.0/4.0*

Coursework: Operating Systems, Datacenters, Virtualization, Distributed Systems

**Austin, TX**

2019–2021

### Birla Institute of Technology and Science

*M.Sc. Physics + B.E. Computer Science, GPA: 9.01/10 Distinction Class*

Awarded **Best Student of Batch 2017**

Advisors: Dr. Tapomoy Guha Sarkar & Prof. Sundar Balasubramaniam

**Pilani, India**

2012–2017

## Research

### Google, Systems Research Group

*Ph.D. Intern*

Advisor: Dr. Kimberly Keeton

Analyzing impact of tiered memory management on datacenter application performance and cluster scheduling.

**Seattle, WA**

Summer 2022

### University of Washington

*Graduate Research Assistant*

Advisor: Dr. Simon Peter

- Flexible high-performance transport protocol offload to programmable network devices.
- Scaling client-local NVM distributed filesystems using in-network replication, coordination and coherence services.
- In-network acceleration of data ingestion for large-scale ML training.

**Seattle, WA**

2022–Present

### The University of Texas at Austin

*Graduate Research Assistant*

Advisor: Dr. Simon Peter

#### Flexible TCP offload with Fine-Grained Parallelism (NSDI '22)

- Full stateful offload of TCP data-path to SmartNIC – frees CPU cores from TCP overhead.
- Fine-grained parallelization of the TCP data-path to achieve high performance on wimpy SmartNIC cores.
- Highly extensible offload with support for eBPF-based extensions.
- Memcached scales up to 38% better versus TAS kernel-bypass TCP stack by saving 50% per-request CPU cycles.

**Austin, TX**

2019–2021

#### Distributed file systems with Client-Local NVMs

- Scaling client-local NVM filesystems like Assise beyond rack-scale.
- In-network caching, coordination and coherence mechanisms on programmable switches.

#### Distributed key-value store with co-located Serverless compute

- Aggregate compute and storage to exploit data locality.
- Improves execution time of serverless compilation workloads by 1.6x and 5x reduction in data movement compared to conventional disaggregated deployments.

**Samsung Research***Senior Software Engineer (Research)*

Advisors: Anshuman Nigam &amp; Dr. Dojun Byun

**Bangalore, India & Suwon, South Korea**

2017–2019

**5G Radio Access Network data-plane R&D**

- Involved in the development of world's first pre-5G mobile user equipment.
- Data-plane technical support for the 5G demo at *Winter Olympics (South Korea, 2018)*.
- *Parallelization, memory management and flow control* research: improved throughput, ultra-low latency reliable transport, and reduced memory footprint on 5G Distributed Units.

**Reinforcement Learning based radio-resource schedulers (GLOBECOM '20)**

- Modeled scheduling as a Partially Observable Markov Decision Process to solve multi-objective optimization in stochastic input-driven environments.

**Birla Institute of Technology and Science***Research Student*

Advisor: Dr. Tapomoy Guha Sarkar

**Pilani, India**

2015–2016

**Studying Quantum Chaos in Aubry-André-Harper electron systems (PhysRevA '16)**

- Studied phase transitions in Hofstadter's butterfly under time-varying magnetic field and the relationship between topological invariants and Hall conductivity.
- Simulated and computationally evaluated solutions to Schrodinger's equation for special quantum systems using perturbation methods and computational physics algorithms.

Advisor: Prof. Sundar Balasubramaniam

**Fast semantic matching of strings in Context-Free Grammars**

- Designed a framework to develop semantic hash functions of parse trees in domain-specific CFGs.
- Demonstrated the efficiency and expressiveness by finding semantic duplicates in a large XML DB.

**National Central University***Undergraduate Research Assistant*

Advisor: Dr. Ko Chung-Ming

**Zhongli, Taiwan**

Summer 2015

**Gravitational lensing in elliptical galaxies**

- Analytically derived the gravitational lensing equation for elliptical galaxies.
- Developed a *distributed recursive sub-gridding* algorithm to numerically simulate the lensing.

## Industry Experience

**Confluent***Software Engineering Intern*

Kubernetes control plane for deployment life-cycle management of Kafka clusters.

Designed *safe and seamless live migration* of Kafka deployments with no service disruption.**Mountain View, CA**

Summer 2020

**Symantec***Software Engineering Intern*

Designed a proof-of-concept cloud-ready web application to automate purchase, delivery &amp; installation of SSL certificates for services hosted on Amazon AWS.

**Bangalore, India**

Spring 2017

**Microsoft R&D***Software Engineering Intern*

Integrated Azure AD cloud authentication/authorization service into ASP.NET Core.

**Hyderabad, India**

Summer 2016

**Bhaskaracharya Institute for Space Applications and Geoinformatics***Summer Intern*

Developed image processing software for stitching and geo-registration of large satellite images.

**Gujarat, India**

Summer 2014

**Google Summer of Code***Open-source Intern*

Document version-control toolbar integrated with cloud repositories in Apache OpenOffice.

**Apache Software Foundation**

Summer 2013

## Publications

---

- Rajath Shashidhara, Timothy Stamler, Antoine Kaufmann, and Simon Peter.  
**FlexTOE: Flexible TCP Offload with Fine-Grained Parallelism.**  
*USENIX Symposium on Networked Systems Design and Implementation (NSDI 22)*, Apr 2022.  
arXiv: 2110.10919, Oct 2021.
- Jitender Singh Shekhawat, Rishabh Agrawal, K Gautam Shenoy, and Rajath Shashidhara.  
**A Reinforcement Learning framework for QoS-driven radio resource scheduler.**  
*IEEE Global Communications Conference (GLOBECOM 20)*, Dec 2020.  
DOI: 10.1109/GLOBECOM42002.2020.9322182
- Tridev Mishra, Rajath Shashidhara, Tapomoy Guha Sarkar and Jayendra N. Bandyopadhyay.  
**Phase transition in an Aubry-André system with a rapidly oscillating magnetic field.**  
*APS Physical Review A*, Nov 2016.  
DOI: 10.1103/PhysRevA.94.053612

## Theses

---

- **TASNIC: a flexible TCP offload with programmable SmartNICs.**  
Master's Thesis, *The University of Texas at Austin*, May 2021.  
DOI: 10.26153/tsw/14442
- **Driven Aubry-André-Harper systems.**  
Master's Thesis, *Birla Institute of Technology and Science, Pilani*, Dec 2016.

## Talks

---

- **FlexTOE: Flexible TCP Offload with Fine-Grained Parallelism**
  - Google Networking Research Summit, March 2022
  - VMware, March 2022
  - USENIX Symposium on Networked Systems Design and Implementation (NSDI 22), April 2022
  - SmartNICs Summit 2022, San Jose, CA

## Awards

---

**Best Student of Batch 2017:** adjudged by Dept. of Physics, BITS Pilani  
**BITS Pilani MCN Scholarship:** 80% tuition fee waiver for all semesters (top 5% of 800 students)  
**Prof. I J Nagrath Student Project Fund:** awarded by BITSAA & Dept. of EE, BITS Pilani  
**Samsung Annual Excellence Awards:** organization-wide award for technical excellence  
**Samsung Professional Software Competency:** held by < 10% employees globally when obtained

## Service

---

- **EuroSys 2022:** Shadow PC
- **OSDI 2022:** Artifact Evaluation Committee
- **USENIX ATC 2022:** Artifact Evaluation Committee

## Teaching

---

- **Datacenters:** Spring 2022, University of Washington
- **Cloud Computing:** Spring 2020, The University of Texas at Austin (Score: 4.8/5)

## Skills

---

**Languages:** C/C++, Java, Python (+numpy/matplotlib/PyTorch), Go, Julia,  $\text{\LaTeX}$ , P4, JavaScript

**Frameworks:** MPI, OpenMP, Pthreads, DPDK, NodeJS, Kubernetes

**Tools:** git, gdb, make, valgrind, strace, perf, qemu-kvm