

# Ankit Bhardwaj

Ph.D. Student  
University of Utah

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## Research Interests

Low-latency large-scale storage systems, operating systems, and cloud computing

## Education

### University of Utah

*Ph.D. in Computer Science*  
Advisor: Ryan Stutsman

*Salt Lake City, UT, USA*  
*(Aug 2018-present)*

### Indian Institute of Technology Bombay

*M.tech. in Computer Science*

*Mumbai, India*  
*(July 2013- Jun 2015)*

### Maharshi Dayanand University

*B.tech. in Computer Science*

*Rohtak, Haryana, India*  
*(July 2007- Jun 2011)*

## Professional Experience

- Research Intern at VMware Research Group *(Summer 2021)*
- Research Intern at VMware Research Group *(Summer 2020)*
- Graduate Research Assistant at Utah Scalable Computer Systems Lab *(Aug 2018 - present)*
- Research Associate at Cloud and HPC Lab, IIT Delhi *(Jan 2017 - July 2018)*
- Software Engineer at DELL EMC India Pvt. Limited *(Aug 2015 - Jan 2017)*

## Publications

1. NrOS: Effective Replication and Sharing in an Operating System  
**Ankit Bhardwaj**, Chinmay Kulkarni, Reto Achermann, Irina Calciu, Sanidhya Kashyap, Ryan Stutsman, Amy Tai, and Gerd Zellweger  
*15<sup>th</sup> USENIX Symposium on Operating Systems Design and Implementation (OSDI '21)*
2. Adaptive Placement for In-memory Storage Functions  
**Ankit Bhardwaj**, Chinmay Kulkarni, and Ryan Stutsman  
*2020 USENIX Annual Technical Conference (ATC '20)*
3. On the Impact of Isolation Costs on Locality-aware Cloud Scheduling  
**Ankit Bhardwaj**, Meghana Gupta, and Ryan Stutsman  
*12<sup>th</sup> USENIX Workshop on Hot Topics in Cloud Computing (HotCloud '20)*
4. A Preliminary Performance Model for Optimizing Software Packet Processing Pipelines  
**Ankit Bhardwaj**, Atul Shree, Bhargav Reddy V, and Sorav Bansal  
*8<sup>th</sup> ACM SIGOPS Asia-Pacific Workshop on Systems (APSys '17)*

## Research Projects

- **Bespin: Effective Replication and Sharing in an Operating System** *(Ongoing work)*
  - A novel multi-core design based on data-structure replication with operation logging. It aims to combine the best of two prevalent approaches: shared memory, monolithic kernels and multi-kernel architectures.
  - The use of a safe language (Rust) for OS implementation to gain better security and correctness guarantees at compile time, while not impacting performance negatively.

- **Safe and Efficient Extensions for Low-Latency Multitenant Storage** *(Ongoing work)*
  - A multi-tenant in-memory key-value store that operates on microsecond time scales with millions of operation per second while letting mutually distrusting tenants push extensions to it at runtime to customize its operations and data model.
  - Currently, we are looking for different ways to provide isolation among tenants and use of such techniques for our key-value store and also for serverless frameworks.
- **Modeling and optimization of software packet processing pipelines**
  - The goal of the project is to model the software based packet processing pipelines and use the model to reason about the optimizations transformation for compilers.
  - Used P4(DSL) to write network processing pipelines and transformed into optimized DPDK based applications with the help of a compiler.

## Conference Presentations

- NrOS: Effective Replication and Sharing in an Operating System, presented at 15<sup>th</sup> USENIX Symposium on Operating Systems Design and Implementation (OSDI '21).
- Adaptive Placement for In-memory Storage Functions, presented paper at 2020 USENIX Annual Technical Conference (ATC '20).
- A Preliminary Performance Model for Optimizing Software Packet Processing Pipelines, presented both the paper and poster at 8<sup>th</sup> Asia-Pacific Workshop on Systems (APSys '17).

## Teaching Assistantships

- Distributed Systems, University of Utah *(Fall 2020)*
- Operating Systems, University of Utah *(Spring 2020)*
- Operating System Lab, IIT Bombay *(Spring 2015)*
- Implementation Techniques for Relational Database Systems, IIT Bombay *(Fall 2014)*
- Computer Programming and Utilization, IIT Bombay *(Fall 2013 and Spring 2014)*

## Software Contributions and Distributions

- NrOS: Effective Replication and Sharing in an Operating System:  
<https://github.com/vmware-labs/node-replicated-kernel>.
- Node Replication and Concurrent Node Replication Rust crates:  
<https://github.com/vmware/node-replication>.
- Splinter Multi-tenant Extensible Key-Value Store:  
<https://github.com/utah-scs/splinter>.

## Honors and Awards

- Named 2022 Meta PhD Research Fellowship finalist.
- Awarded with **Excellence@Dell Silver level award** for my work in VASA Project.
- Secured All India Rank 57 among 2,24,160 candidates appeared in Graduate Aptitude Test in Engineering, 2013 CSE.