Justin Miron

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EDUCATION

Ph.D. Student, Cornell University August 2017 - May 2022 (Anticipated)
Department of Computer Science
Advisor: Prof. Rachit Agarwal

B.S., University of Illinois at Urbana-Champaign August 2013 - May 2017
Department of Computer Engineering
Thesis: "Fine-grained parallel computation in the cloud"
Advisor: Prof. Laxmikant V. Kalé

RELEVANT COURSEWORK

Graduate Computer Networks, Graduate Distributed Algorithms, Distributed Systems, Networking with Big Data, Algorithms and Models of Computation, Operating System Design

RESEARCH INTERESTS

Distributed systems, datacenter networking, and peer-to-peer systems

RESEARCH PROJECTS

Storage stack for storage-disaggregated datacenters
Work with Rachit Agarwal that seeks to build a storage stack for disaggregated datacenters that efficiently manages ephemeral storage on compute nodes and remote storage. Our current work involves co-designing scheduling and storage management to reduce the cost of storage IO traversing the network while maintaining near-optimal utilization.

Secure, encrypted, and compressed key-value stores
This work with Professors Rachit Agarwal and Tom Ristenpart involves building a key-value store that is secure to prevalent attacks, such as leakage-abuse, through encryption and compression techniques.

UNDERGRADUATE RESEARCH PROJECTS

Parallel object replication for scalable parallel processing Senior Thesis
This work allowed a parallel runtime system to adaptively replicate parallel processing elements and load balance requests between replicas. This work involved developing a replication cost model, identifying consistency requirements for different requests, and implementing the system in Charm++[1]

Elastic computation for high performance computing in the cloud Senior Thesis
Modified a parallel runtime system to efficiently support elastic parallel applications in the cloud. Improvements investigated the similarities between proactive fault tolerance techniques and requirements of elastic compute. Optimized these fault tolerance techniques for bulk operations to support efficiently changing the set of compute nodes.

Bounded memory-efficient concurrent lock-free queue Parallel Programming Lab
Designed a multi-producer multi-consumer lock-free queue that allowed for a configurable upper bound and memory usage linear with the queue size. Memory reclamation was handled through providing provable bounds

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[1] Charm++ is a object-based parallel programming language. The objects are the elements of execution and are distributed across machines.

on accessible memory by producers and consumers in the queue. Used as a single messaging buffer per node for symmetric multiprocessing in Charm++[1], providing a **7%** reduction on round-trip message times.

Rendezvous protocol for no-copy RDMA messaging   Parallel Programming Lab
This work augmented messaging within the Charm++[1] runtime system to utilize RDMA for asynchronous messaging through the use of a Rendezvous protocol.

Work Experience

Summer 2017	**Software Engineering Intern at Microsoft, Aliso Viejo, CA** Azure Data Warehouse Group Built a distributed query store prototype for more extensive monitoring and debugging of distributed queries.
December 2017 - May 2017	**Software Engineer at Charmworks Inc., Champaign, IL** Optimized a parallel runtime system, Charm++[1], for high performance computing applications. Modified shared memory parallel applications to operate in a distributed memory context.
February 2016 - May 2017	**Research Assistant at University of Illinois at Urbana-Champaign, Urbana, IL** Parallel Programming Lab Performed research under Professor Laxmikant Kale to reduce and improve communication patterns in parallel algorithms and runtime systems.
Summer 2016	**Software Engineer, Tools and Infrastructure Intern at Google, Seattle, WA** Google Compute Engine Worked with the Google Compute Engine infrastructure team to implement methods for network failure detection and debugging for the Google Compute Engine.
Summer 2015	**Software Engineering Intern at ViaSat Inc., Carlsbad, CA** Antenna Control Unit Group Expanded an antenna control unit simulator to support real-time message modification and support for new antenna types.

Relevant Teaching Experience

Aug 2017 - Dec 2017	**Database Systems**, Cornell University, *Teaching Assistant*
Aug 2015 - May 2017	**Data Structures**, University of Illinois at Urbana-Champaign, *Course Assistant*

Programming Skills

Languages: C, C++, C#, Python, Java
Parallel Programming & Systems: pthreads, MPI, OpenMP, Charm++, Map-Reduce, Spark