Justin Miron

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EDUCATION

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

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

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-aware scheduling for disaggregation
Building a system that efficiently utilizing ephemeral storage on compute nodes in disaggregated datacenters we can reduce the cost of all storage traffic traversing the network. This work with Rachit Agarwal involves co-designing scheduling and storage management to optimize for bandwidth reduction and average job completion time.

Frequency-attack resilient databases
This work with Rachit Agarwal and Tom Ristenpart involves augmenting encryption techniques to build a frequency-attack resilient database.

UNDERGRADUATE RESEARCH PROJECTS

Parallel object replication for scalable parallel processing   Senior Thesis
By allowing a parallel runtime systems to adaptively replicate overloaded processing elements and load balance requests between replicas, the system may reduce the overhead of any given element. This work involved developing a replication cost model, identifying consistency requirements for different requests, and implementing the system in Charm++[1]

Elastic distributed computation for hpc 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 allowing for elastic compute.

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 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.

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

Rendezvous protocol for no-copy RDMA messaging   Parallel Programming Lab

This work seeked to realize the capabilities of RDMA as a basis for asynchronous messaging operations on CRAY super computers in Charm++[1] without the need for message copy operations.

Work Experience

Software Engineering Intern at Microsoft   Aliso Viejo, CA - Summer 2017

Worked with Azure Data Warehouse team to build a prototype of a distributed query store for more extensive query monitoring and debugging of distributed queries.

Software Engineer at Charmworks Inc.   Champaign, IL - December 2017 to May 2017

Optimized a parallel runtime system, Charm++, for performance. Modified shared memory parallel applications to operate scalably in a distributed memory context.

Research Assistant at Parallel Programming Lab   Urbana, IL - February 2016 to May 2017

Performed research with the Parallel Programming Lab under Professor Laxmikant Kale to reduce and improve communication patterns in parallel algorithms and runtime systems.

Software Engineer, Tools and Infrastructure Intern at Google   Seattle, WA - Summer 2016

Worked with the Google Compute Engine infrastructure team to implement methods for network failure detection and debugging for the Google Compute Engine.

Software Engineering Intern at ViaSat Inc.   Carlsbad, CA - Summer 2015

Expanded an antenna control unit simulator to support real-time message modification and support for new antenna types.

Relevant Teaching Experience

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

Programming Skills

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