Alex Fuerst

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RESEARCH INTERESTS

- I am focused on systems research, specifically Operating Systems, Cloud Computing, and Virtualization. I intend on creating and working on such systems in industry after finishing my degree.

EDUCATION

PhD Student in Intelligent Systems Engineering — Expected 2023
Indiana University — GPA 3.9

Computer Science, Bachelor of Science — May 2017
Xavier University — Major GPA 3.6

PUBLICATIONS

Alexander Fuerst, and Prateek Sharma. Locality-aware Load-Balancing For Serverless Clusters. *HPDC 2022.*

Alexander Fuerst, Stanko Novakovic, Inigo Goiri, Gohar Irfan Chaudhry, Prateek Sharma, Kapil Arya, Kevin Broas, Eugene Bak, Mehmet Iyigun, and Ricardo Bianchini. Memory-Harvesting VMs in Cloud Platforms. *Submitted, ASPLOS 2022.*

Alexander Fuerst, and Prateek Sharma. FaasCache: Keeping Serverless Computing Alive With Greedy-Dual Caching. *ASPLOS 2021.*

Alexander Fuerst, Ahmed Ali-Eldin, Prashant Shenoy, and Prateek Sharma. Cloud-scale VM-deflation for Running Interactive Applications On Transient Servers. *HPDC 2020.*

EXPERIENCE

Microsoft Research — *Redmond, Washington*
Research Intern — Summer 2021

- Analyzed modern hypervisors performance under various runtime conditions
- Modifed hypervisor and guest OS to improve guest VM memory resizing
- Designed and ran experiments that prioritized project focus

Indiana University — *Bloomington, Indiana*
Assistant Instructor — 2019-Present

- Engineering Cloud Computing & Engineering Distributed Systems
- Create assignments and exams
- Host lab and office hours to discuss project design and assist with student questions

Hyland Software — *Westlake, Ohio*
Developer 1 — 2017-2018
Developer 2 — 2017-2019

- Develop a cloud application capable of handling thousands of daily users
- Troubleshoot complex issues of multi-service application running in production
- Transition system from internally hosted cloud to hybrid public-private cloud
- Upgrade application to run cross-platform on Windows and Linux

Salisbury University *Salisbury, Maryland*
NSF REU Researcher 2016

- Applied emerging parallel computing models using GPU and CPU parallelism with NVIDIA's CUDA
- Tackled data and compute-intensive problems in geographic information systems
- Presented findings to GIS professionals and Salisbury Faculty

PRESENTATIONS

Locality-aware Load-Balancing For Serverless Clusters. HPDC 2022. Slides Video
Memory-Harvesting VMs in Cloud Platforms. ASPLOS 2022. Slides Video
FaasCache: Keeping Serverless Computing Alive With Greedy-Dual Caching. ASPLOS 2021. Slides Video
Cloud-scale VM-deflation for Running Interactive Applications On Transient Servers. HPDC 2020. Slides Video

PROJECTS

FaasCache

Introduced caching insights into the Function-As-A-Service paradigm. Enhanced the open source FaaS application OpenWhisk using Greedy-Dual caching. Reduced cold-start overhead for functions by up to 3x and can reduce constrained system resources by up to 30%.

Tensorflow NanoParticle Simulator

Implementation of the Lennard-Jones potential in a simulated cube and electrostatic forces of colliding ions in a confined nano-channel. THe simulator Achieved performance similar to MPI/C++ code performing the same simulation.

Kaya OS

Wrote a complete operating system from scratch. The final product, in addition to support a multitude of peripheral devices, successfully ran eight concurrent processes, each running in their own virtual address space.

COURSE WORK

- Engineering Cloud Computing
- Engineering Distributed Systems
- Deep Learning Systems
- Engineering Compilers
- Engineering Operating System
- Graph Analytics

SKILLS

Languages	Python, C, C++, Scheme, C#, SQL, LaTeX
Programming	Debugging, Problem Solving, Code Optimization, Git, Agile
Technologies	Tensorflow, GDB, OpenWhisk, OpenMP, MPI

AWARDS

ACM Travel Grant $1000 to travel to ASPLOS 2022
Boy Scouts of America Eagle Scout