Alex Fuerst

fuersta.2013@gmail.com | linkedin.com/in/alex-fuerst | https://afuerst.github.io/

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

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

PUBLICATIONS

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

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

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.*

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
- 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

Cloud-scale VM-deflation for Running Interactive Applications On Transient Servers. HPDC 2020. Slides Video

FaasCache: Keeping Serverless Computing Alive With Greedy-Dual Caching. ASPLOS 2021. 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.

Multithreaded GIS Raster Calculator
Developed a tool combining CPU based parallelism and NVIDIA's CUDA technology for GPU calculation for performing GIS raster calculations. Achieved 2 - 5 times performance increase over traditional analysis tools due to GPU performance.

Jae OS
Just Another Educational Operating System. A port of the Kaya OS project to the new μARM emulator. Wrote the student guide and the canonical implementation of Jae OS.

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
- Simulating Nanoscale Systems
- Graph Analytics
- High Performance Computing

SKILLS

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

AWARDS

Boy Scouts of America	Eagle Scout
Xavier University	John F. Niehaus Award