

Alex Fuerst

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RESEARCH INTERESTS

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

EDUCATION

PhD Student in Intelligent Systems Engineering

Indiana University

Expected Summer 2024

GPA 3.9

Computer Science, Bachelor of Science

Xavier University

May 2017

Major GPA 3.6

PUBLICATIONS

Alexander Fuerst, Abdul Rehman, and Prateek Sharma. FaasMeter: Energy Profiling for Serverless Functions. *Submitted, EuroSys 2023*.

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. *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

Google, Inc.

Mountain View, California

Software Engineering Intern

Summer 2023

- Worked on advanced KVM-based virtualization technologies
- Explored techniques to seamlessly upgrade VMMs and hypervisors
- Created proof-of-concept to examine feasibility of these

Microsoft Research

Redmond, Washington

Research Intern

Summer 2021

- Analyzed modern hypervisors performance under various runtime conditions
- Modified 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

Developer 1

Developer 2

Westlake, Ohio

2017-2018

2018-2019

- 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

PRESENTATIONS

Ilúvatar: A Fast Control Plane for Serverless Computing. HPDC 2023. Slides

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

Ilúvatar FaaS Control Plane

An open-source, fast, jitter-free control plane for Serverless function execution written in Rust. Ilúvatar provides a significant reduction in overhead compared to popular open-sourced examples. Additionally, it enables unique usability and extensibility, to accelerate FaaS research.

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%.

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

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|-----------------------------------|--|
| • Engineering Cloud Computing | • Engineering Operating System |
| • Engineering Distributed Systems | • Simulating Nanoscale Systems |
| • Graph Analytics | • High Performance Computing |
| • Deep Learning Systems | • Computational Modeling Methods for Virtual Tissues |
| • Engineering Compilers | |

SKILLS

<i>Languages</i>	Rust, Python, C, C++, Scheme, C#, SQL, \LaTeX
<i>Programming</i>	Debugging, Problem-Solving, Code Optimization, Git, Agile
<i>Technologies</i>	Linux, KVM, GDB, Tensorflow, OpenWhisk, MPI