

# Gefei Zuo

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## Education

- University of Michigan Sep.2018 – present  
**Ph.D. student in Computer Science and Engineering**  
• GPA 3.95/4.00
- University of Science and Technology of China (USTC) Sep.2014 – Jun.2018  
**B.E. in Computer Science, in the Special Class for the Gifted Young (SCGY)**  
• Cumulative GPA 3.75/4.30, Rank 15/140  
• Enrolled in the Talent Program in Computer and Information Science and Technology
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## Research Experience

- Graduate Student Research Assistant, advised by Prof. [Baris Kasikci](#) UNIVERSITY OF MICHIGAN  
**FPGA Record/Replay Tool for Heterogeneous Systems** May.2021 – present  
Record and replay concurrent communication across the boundary of CPU/FPGA systems while preserving the happen-before relation.
- FPGA bug survey and new debugging tools**[1] Mar.2021 – Dec.2021  
Study and classify bugs in existing FPGA designs, according to their symptoms, root causes, etc. Propose a collection of hybrid static/dynamic program analysis tools to help developers better understand and localize FPGA bugs.
- Hardware-assisted Debugging**[3] May.2019 – May.2021  
Combine record & replay (online, heavyweight) and symbolic execution (offline, computation intensive) to recover execution history from crash reports.
- NVM File-Indexing Structures Analysis**[4] Dec.2018 – Feb.2021  
Current NVM file systems mainly reuse file-indexing structures designed with decades-old assumptions. We should rethink the design space with NVM's unique properties in mind.
- Hypervisor for Shared-Memory FPGA Platforms**[5] Oct.2018 – Jan.2020  
A virtualization solution for emerging FPGA platforms. It enables processes in guest VM to share the same view of virtual memory with circuits on FPGA.
- System Group Intern, instructed by [Lintao Zhang](#) MICROSOFT RESEARCH ASIA  
**Efficient and Scalable Total-Order Message Scattering in Datacenter Network**[2,6] Jul.2017 – Oct.2017  
• Offload reordering and buffering to endhost: separate control plane from data plane.  
• Readily deployable: applicable to programmable switches, commodity switches or endhosts only.
- Soft Robot Lab, instructed by [Xiaoping Chen](#) UNIV. OF SCIENCE AND TECH. OF CHINA  
**Whole manipulator control in constrained environments**[7] Dec.2016 – Mar.2017  
• Extend traditional Jacobians method with new constraints, take obstacle's information into account.  
• Enable our softrobot work in environments with obstacles.
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## Publications

- [1] **Debugging in the Brave New World of Reconfigurable Hardware**  
*Jiacheng Ma, Gefei Zuo, Kevin Loughlin, Haoyang Zhang, Andrew Quinn, Baris Kasikci*  
International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS). Feb 2022 (to appear)
- [2] **1Pipe: scalable total order communication in data center networks**  
*Bojie Li, Gefei Zuo, Wei Bai, Lintao Zhang*  
Conference of the ACM Special Interest Group on Data Communication (SIGCOMM). Aug 2021
- [3] **Execution Reconstruction: Harnessing Failure Reoccurrences for Failure Reproduction**  
*Gefei Zuo, Jiacheng Ma, Andrew Quinn, Pramod Bhatotia, Pedro Fonseca, and Baris Kasikci*  
Conference on Programming Language Design and Implementation (PLDI). June 2021
- [4] **Rethinking File Mapping Structures for Persistent Memory**  
*Ian Neal, Gefei Zuo, Eric Shiple, Tanvir Ahmed Khan, Youngjin Kwon, Simon Peter, Baris Kasikci*  
USENIX Conference on File and Storage Technologies (FAST). Feb 2021
- [5] **A Hypervisor for Shared-Memory FPGA Platforms**  
*Jiacheng Ma, Gefei Zuo, Kevin Loughlin, Xiaohe Cheng, Yanqiang Liu, Abel Mulugeta Eneyew, Zhengwei Qi, and Baris Kasikci*  
International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS). Mar 2020
- [6] **Near-Optimal Total Order Message Scattering in Data Center Networks**

*Gefei Zuo*

SOSP'17 Student Research Competition

[7] **Whole manipulator control in constrained environments**

*Dengyuan Wang, Xiaotong Chen, Gefei Zuo, Xinghua Liu, Zhanchi Wang, Hao Jiang and Xiaoping Chen*

RiTA 2017

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## Work Experience

Facebook Inc.

MENLO PARK, CA

**Performance and Capacity Engineer Intern**

*May.2020 – Aug.2020*

Profile memory footprint for hierarchical memory systems. (Advisor: Abhishek Dhanotia)

USTC Freeshell

UNIV. OF SCIENCE AND TECH. OF CHINA

**Maintainer**

*Sep.2014 – Jul.2017*

- An IaaS service for students to learn and use Linux, supporting various Linux distributions.
- Utilize OS level virtualization (OpenVZ), distributed storage (Ceph), dynamic routing (RIP).

USTC Open Source Software Mirror

UNIV. OF SCIENCE AND TECH. OF CHINA

**Maintainer**

*Jul.2015 – Mar.2017*

- It is one of the largest open-source software mirrors in China.
  - It hosts 25 TiB+ content and generates 10 TiB+ network traffic per day.
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## Honors and Awards

SOSP'17 Student Research Competition (Undergraduate Category), the Second Place

*Oct.2017*

USTC Outstanding Student Scholarship (Grade 2)

*2016, 2017*

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## Skills

**Programming:** C/C++, Python, Matlab, Bash, (System)Verilog

**Github:** <https://github.com/Alkaid-Benetrash>