

Zheng Chai

571-363-0224 | zchai2@gmu.edu | [Google Scholar](#)

EDUCATION

George Mason University

Ph.D. in Computer Science (GPA: 4.0)

Research Interests: Distributed Machine Learning, Model Parallelism, Flash Cache

Fairfax, VA

Aug. 2018 – present

Georgetown University

Master in Computer Science

Washington, D.C.

Aug. 2016 – May 2018

Beijing Jiaotong University

B.E. in Software Engineering

Beijing, China

Sep. 2005 – July 2009

EXPERIENCE

Graduate Research Assistant

Dec. 2019 – Present

Computer Science, George Mason University

- Federated Learning: developed Tier based Federated Learning and Asynchronous Federated Learning frameworks, which could mitigate the impact of stragglers and achieve higher performance for learning on edge devices.
- Model Parallelism: Gradient-free ADMM based framework for Deep Neural Networks, which could achieve large speedup for training large-scale deep neural networks, and outperforms most of the comparison methods.
- Flash Cache(Working on): A machine learning based cache algorithm for online data. It is expected to beat currently commonly used online caching algorithms such as Least Recently Used (LRU) in terms of read hit ratio and the number of flash erasures.

Graduate Teaching Assistant

Aug. 2018 – Dec. 2019

Computer Science, George Mason University

- Courses: Object-Oriented Programming(Java), Analysis of Algorithms

Software Test Engineer

Aug. 2015 – Aug. 2016

KangSeed Tech LTD.

Beijing, China

- Responsible for developing and executing test plans to ensure the delivery of quality software application.
- Responsible for testing Pregnancy Health Management Application on iOS and Android.
- Collected and analyzed data for software process evaluation and improvement.

Software Test Engineer

Mar. 2014 – Aug. 2015

AutoNavi Holding LTD.(Alibaba Group)

Beijing, China

- Collaborated with software developer and project manager to develop the Auto-Navi Map on iOS; responsible for the functional test, navigation test, activity page test, interface test and offline map test.
- Responsible for testing business management software on both desktop PCs and mobile phones, including functional test and performance test.

Quality Assurance Engineer

May 2012 – Mar. 2014

Asiainfo-Linkage Inc.

Beijing, China

- Developed and executed system test protocols in 6 different cities of China, and monitored the operation center with analysis on the test results.
- Managed a test group in China Telecom with six people, developed test protocol, executed tests, analyzed test reports, bugs and provided possible solutions.

Software Test Engineer

July 2009 – May 2012

China Chengxin Credit Management Co., LTD.

Beijing, China

- Tested softwares used in technical assets management system and financial information terminal.
- Performed analysis on the bugs reports and provided possible solutions.

PUBLICATIONS

- **Zheng Chai**, Yujing Chen, Liang Zhao, Yue Cheng and Huzefa Rangwala. *FedAT: A Communication-Efficient Federated Learning Method with Asynchronous Tiers under Non-IID Data*. Under Review.
- Junxiang Wang, **Zheng Chai**, Yue Cheng, Liang Zhao. *Toward Model Parallelism for Deep Neural Network based on Gradient-free ADMM Framework*. 20th IEEE International Conference on Data Mining (ICDM). IEEE, 2020. (Acceptance Rate: 9.8%)
- Yujing Chen, Yue Ning, **Zheng Chai**, and Huzefa Rangwala. *Federated Multi-task Hierarchical Attention Model for Sensor Analytics*. In 2020 International Joint Conference on Neural Networks (IJCNN). IEEE, 2020.
- Junxiang Wang, **Zheng Chai**, Yue Cheng, Liang Zhao. *Tunable Subnetwork Splitting for Model-parallelism of Neural Network Training*. Workshop on "Beyond first-order methods in ML systems" of the 37 th International Conference on Machine Learning(PMLR). 2020.
- **Zheng Chai**, Ahsan Ali, Syed Zawad, Stacey Truex, Ali Anwar, Nathalie Baracaldo, Yi Zhou, Heiko Ludwig, Feng Yan, Yue Cheng. *TiFL: A Tier-Based Federated Learning System*. In Proceedings of the 29th International Symposium on High-Performance Parallel and Distributed Computing(HPDC). ACM, 2020. (Acceptance Rate: 22%)
- **Zheng Chai**, Hannan Fayyaz, Zeshan Fayyaz, Ali Anwar, Yi Zhou, Nathalie Baracaldo, Heiko Ludwig, Yue Cheng. *Towards taming the resource and data heterogeneity in federated learning*. Conference on Operational Machine Learning (OpML 19). USENIX, 2019.
- Yue Cheng, **Zheng Chai**, Ali Anwar. *Characterizing co-located datacenter workloads: An alibaba case study*. Proceedings of the 9th Asia-Pacific Workshop on Systems (APSys). ACM, 2018.

TECHNICAL SKILLS

Languages: Python, Java

AWARDS

2019 Research Initiation Award

George Mason University, May 2019