Yue Cheng

Associate Professor of Data Science and Computer Science
University of Virginia

1919 Ivy Rd
Charlottesville, VA 22093
✉ mrz7dp@virginia.edu
⌨ tddg.github.io

▬▬▬ Research Interests

Distributed systems, cloud computing, serverless computing, high-performance computing, storage systems, operating systems, data compression, machine learning (ML) systems
The overarching goal of my research is to enable practical, efficient, and easy-to-use computer systems for the growing data demands of modern high-end applications running on existing as well as emerging computing platforms. My current research focuses on: (1) designing efficient stateful serverless computing systems using a full-stack approach spanning application frameworks, platforms, operating systems, and hardware; (2) building scalable and efficient data-intensive computing systems (e.g., ML systems) and (3) utilizing ML approaches to improve the computing and storage systems.

▬▬▬ Professional Experience and Employment

08/2023–present **Associate Professor**, *University of Virginia*, Charlottesville, VA.
School of Data Science and SEAS Department of Computer Science

08/2022–08/2023 **Assistant Professor**, *University of Virginia*, Charlottesville, VA.
School of Data Science and SEAS Department of Computer Science

08/2017–08/2022 **Assistant Professor**, *George Mason University*, Fairfax, VA.
Department of Computer Science

2011–2017 **Research/Teaching Assistant**, *Virginia Tech*, Blacksburg, VA.
Department of Computer Science

06/2015–12/2015 **Research Intern**, *EMC*, Princeton, NJ.
Offline flash caching

05/2014–08/2014 **Research Intern**, *IBM Research–Almaden*, San Jose, CA.
Cloud analytics storage tiering

05/2013–08/2013 **Research Intern**, *IBM Research–Almaden*, San Jose, CA.
Load balanced in-memory caching

▬▬▬ Education

2011–2017 **Virginia Polytechnic Institute and State University (Virginia Tech)**, *Blacksburg, VA*.
Ph.D. in Computer Science

2005–2009 **Beijing University of Posts and Telecommunications (BUPT)**, *Beijing, China*.
B.Eng. in Computer Science

▬▬▬ Honors & Awards

2024 **Outstanding Researcher Award**, for achievements in research at the University of Virginia

2023 **Outstanding Researcher Award**, for achievements in research at the University of Virginia

2023 **Samsung Global Research Outreach Award**, Samsung Advanced Institute of Technology and Samsung Memory Solutions Lab

2022 **IEEE CS TCHPC Early Career Researchers Award for Excellence in High Performance Computing** (*One of the most prestigious awards for junior researchers in HPC*)

2022	**Meta Research Award** of the Meta AI System Hardware/Software Codesign Competition
2022	**Best Student Paper Award Finalist** of The International Conference for High Performance Computing, Networking, Storage, and Analysis (SC 2022): *5 out of 81 accepted papers*
2022	**Outstanding Teacher Award** of the Computer Science Department at George Mason University
2022	**Award Finalist** of Facebook (Meta) Mathematical Modeling & Optimization for Large-Scale Distributed Systems Award Competition
2021	**NSF CAREER Award** for the project titled "CAREER: Harnessing Serverless Functions to Build Highly Elastic Cloud Storage Infrastructure"
2020	**Amazon Research Award** for the project titled "Distributed Large-scale Graph Deep Learning by Gradient-free Optimization"
2012–2015	**Student Travel Grant:** USENIX ATC'16, ACM HPDC'15, EuroSys'15, USENIX OSDI'14, USENIX FAST'14, ACM SoCC'13, USENIX OSDI'12
2014	**Pratt Fellowship** (**Best Teaching Assistant Award**) awarded by Computer Science at Virginia Tech
2006–2009	**University Scholarship** awarded by Beijing University of Posts and Telecommunications, China

Publication

★: Tier-1 venue.

Systems	NSDI'26, ASPLOS'26, IMC'25, ASPLOS'25, ATC'24, SIGMETRICS'24, SoCC'24, ASPLOS'23, FAST'23, FAST'20, FAST'18, ATC'21, ATC'16, SoCC'21, SoCC'20, EuroSys'15
HPC	SC'22, SC'21, SC'18, HPDC'20, HPDC'16, HPDC'15
DB, ML, Web	WWW'25, VLDB'24 ×2, VLDB'23

Number of csrankings.org publications: 16 (+ 7)

A: Students for whom I serve as the advisor; M: Students I mentor.

Refereed Conferences and Workshops

[NSDI '26]★ **ZipLLM: Efficient LLM Storage via Model-Aware Synergistic Data Deduplication and Compression**.
23rd USENIX Symposium on Networked Systems Design and Implementation (***NSDI'26***), (To appear. AR: $50/207 = 24.2\%$).
Zirui Wang[A], Tingfeng Lan[A], Zhaoyuan Su[A], Juncheng Yang, **Yue Cheng**.

[ASPLOS '26]★ **NotebookOS: A Replicated Notebook Platform for Interactive Training with On-Demand GPUs**.
ACM Conference on Architectural Support for Programming Languages and Operating Systems (***ASPLOS'26***), (To appear. AR: $20/208 = 9.6\%$).
Benjamin Carver[A], Jingyuan Zhang[A], Haoliang Wang, Kanak Mahadik, **Yue Cheng**.

[IMC '25]★ **The Decentralization Dilemma: Performance Trade-Offs in IPFS and Breakpoints**.
The ACM Internet Measurement Conference (***IMC'25***), (*To appear*).
Ruizhe Shi[M], Yuqi Fu[A], Ruizhi Cheng, Bo Han, **Yue Cheng**, Songqing Chen.

[WWW '25]★ **Centralization in Decentralized Web: Challenges and Opportunities in IPFS Data Management**.
The 2025 ACM Web Conference (***TheWebConf'25***), (AR: $409/2062 = 19.8\%$).
Ruizhe Shi[M], Ruizhi Cheng, Yuqi Fu[A], Bo Han, **Yue Cheng**, Songqing Chen.

[ASPLOS '25]★ **Concurrency-Informed Orchestration for Serverless Functions**.
ACM Conference on Architectural Support for Programming Languages and Operating Systems (*ASPLOS'25*), (AR: $160/912 = 17.5\%$).
Qichang Liu[M], **Yue Cheng**, Haiying Shen, Ao Wang, Bharathan Balaji.

[SDM '25] **Staleness-Alleviated Distributed GNN Training via Online Dynamic-Embedding Prediction**.
SIAM International Conference on Data Mining (*SDM'25*), (AR: $61/228 = 26.7\%$, to appear).
Guangji Bai, Ziyang Yu, Zheng Chai[A], **Yue Cheng**, Liang Zhao.

[SoCC '24]★ **FedCaSe: Enhancing Federated Learning with Heterogeneity-aware Caching and Scheduling**.
ACM Symposium on Cloud Computing (*SoCC'24*), (AR: $63/209 = 30.1\%$).
Redwan Ibne Seraj Khan[M], Arnab K. Paul, **Yue Cheng**, Xun Jian, Ali R. Butt.

[VLDB '24]★ **Everything You Always Wanted to Know About Storage Compressibility of Pre-Trained ML Models but Were Afraid to Ask**.
50th International Conference on Very Large Data Bases (*VLDB'24*).
Zhaoyuan Su[A], Ammar Ahmed, Zirui Wang[A], Ali Anwar, **Yue Cheng**.

[VLDB '24]★ **Algorithmic Complexity Attacks for Dynamic Learned Indexes**.
50th International Conference on Very Large Data Bases (*VLDB'24*).
Rui Yang[A], Evgenios M. Kornaropoulos, **Yue Cheng**.

[ATC '24]★ **ALPS: An Adaptive Learning, Priority OS Scheduler for Serverless Functions**.
2024 USENIX Annual Technical Conference (*ATC'24*), (AR: $77/488 = 15.8\%$).
Yuqi Fu[A], Ruizhe Shi[M], Haoliang Wang, Songqing Chen, **Yue Cheng**.

[SIGMETRICS '24]★ **A Closer Look into IPFS: Accessibility, Content, and Performance**.
ACM SIGMETRICS / IFIP Performance (*SIGMETRICS'24*), (AR: $54/338 = 16\%$).
Ruizhe Shi[M], Ruizhi Cheng, Bo Han, **Yue Cheng**, Songqing Chen.

[ASPLOS '23]★ **λFS: A Scalable and Elastic Distributed File System Metadata Service using Serverless Functions**.
ACM Conference on Architectural Support for Programming Languages and Operating Systems (*ASPLOS'23*), (AR: $151/600 = 25.2\%$).
Benjamin Carver[A], Runzhou Han, Jingyuan Zhang[A], Mai Zheng, **Yue Cheng**.

[VLDB '23]★ **InfiniStore: Elastic Serverless Cloud Storage**.
49th International Conference on Very Large Data Bases (*VLDB'23*).
Jingyuan Zhang[A], Ao Wang[A], Xiaolong Ma, Benjamin Carver[A], Nicholas John Newman[A], Ali Anwar, Vasily Tarasov, Lukas Rupprecht, Dimitrios Skourtis, Feng Yan, **Yue Cheng**.

[FAST '23]★ **SHADE: Enable Fundamental Cacheability for Distributed Deep Learning Training**.
USENIX Conference on File and Storage Techniques (*FAST'23*), (AR: $28/123 = 22.8\%$).
Redwan Ibne Seraj Khan[M], Ahmad Hossein Yazdani[M], Yuqi Fu[A], Arnab K. Paul, Bo Ji, Xun Jian, **Yue Cheng**, Ali R. Butt.

[SC '22]★ **SFS: Smarter OS Scheduling for Serverless Functions**.
The International Conference for High Performance Computing, Networking, Storage, and Analysis (*SC'22 – Best Student Paper Award Finalist*), (AR: $81/320 = 25.3\%$).
Yuqi Fu[A], Li Liu[M], Haoliang Wang, **Yue Cheng**, Songqing Chen.

[SoCC '21]★ **Mind the Gap: Broken Promises of CPU Reservations in Containerized Multi-tenant Clouds**.
ACM Symposium on Cloud Computing (*SoCC'21*), (AR: $46/145 = 31.7\%$).
Li Liu[M], Haoliang Wang, An Wang, Mengbai Xiao, **Yue Cheng**, Songqing Chen.

[SC '21]★ **FedAT: A High-Performance and Communication-Efficient Federated Learning System with Asynchronous Tiers**.
The International Conference for High Performance Computing, Networking, Storage, and Analysis (**SC'21**), (AR: $86/365 = 23.6\%$).
Zheng Chai[A], Yujing Chen, Ali Anwar, Liang Zhao, **Yue Cheng**, Huzefa Rangwala.

[ATC '21]★ **FaaSNet: Scalable and Fast Provisioning of Custom Serverless Container Runtimes at Alibaba Cloud Function Compute**.
2021 USENIX Annual Technical Conference (**ATC'21**), (AR: $64/341 = 18.8\%$).
Ao Wang[A], Shuai Chang, Huangshi Tian, Hongqi Wang, Haoran Yang, Huiba Li, Rui Du, **Yue Cheng**.

[OPT '21] **Community-based Layerwise Distributed Training of Graph Convolutional Networks**.
NeurIPS 2021 Workshop on Optimization for Machine Learning (**OPT'21**).
Hongyi Li, Junxiang Wang, Yongchao Wang, **Yue Cheng**, Liang Zhao.

[ICDM '20] **Toward Model Parallelism for Deep Neural Network based on Gradient-free ADMM Framework**.
20th IEEE International Conference on Data Mining (**ICDM'20**), (AR: $91/930 = 9.8\%$).
Junxiang Wang, Zheng Chai[A], **Yue Cheng**, Liang Zhao.

[SoCC '20]★ **Wukong: A Scalable and Locality-Enhanced Framework for Serverless Parallel Computing**.
ACM Symposium on Cloud Computing (**SoCC'20**), (AR: $35/143 = 24.5\%$).
Benjamin Carver[A], Jingyuan Zhang[A], Ao Wang[A], Ali Anwar, Panruo Wu, **Yue Cheng**.

[ICML WS '20] **Tunable Subnetwork Splitting for Model-parallelism of Neural Network Training**.
ICML 2020 Workshop on Beyond First-Order Methods in ML systems (**ICML WS'20**).
Junxiang Wang, Zheng Chai[A], **Yue Cheng**, Liang Zhao.

[HPDC '20]★ **TiFL: A Tier-based Federated Learning System**.
ACM Symposium on High-Performance Parallel and Distributed Computing (**HPDC'20**), (AR: $16/71 = 22.5\%$).
Zheng Chai[A], Ahsan Ali, Syed Zawad, Ali Anwar, Stacey Truex, Nathalie Baracaldo, Yi Zhou, Heiko Ludwig, Feng Yan, **Yue Cheng**.

[FAST '20]★ **InfiniCache: Exploiting Ephemeral Serverless Functions to Build a Cost-Effective Memory Cache**.
USENIX Conference on File and Storage Techniques (**FAST'20**), (AR: $23/138 = 16.7\%$).
Ao Wang[A]*, Jingyuan Zhang[A]*, Xiaolong Ma, Ali Anwar, Vasily Tarasov, Lukas Rupprecht, Dimitrios Skourtis, Feng Yan, **Yue Cheng**.
*: co-first authors

[PDSW '19] **In Search of a Fast and Efficient Serverless DAG Engine**.
The 4th International Parallel Data Systems Workshop (**PDSW'19**).
Benjamin Carver[A], Jingyuan Zhang[A], Ao Wang[A], **Yue Cheng**.

[Cloud '19] **Bolt: Towards a Scalable Docker Registry**.
The IEEE International Conference on Cloud Computing (**Cloud'19**), (AR: 20.8%).
Michael Littley, Ali Anwar, Hannan Fayyaz[M], Zeshan Fayyaz[M], Vasily Tarasov, Lukas Rupprecht, Dimitrios Skourtis, Mohamed Mohamed, Heiko Ludwig, **Yue Cheng**, Ali R. Butt.

[OpML '19] **Towards Taming the Resource and Data Heterogeneity in Federated Learning**.
2019 USENIX Conference on Operational Machine Learning (**OpML'19**), (AR: $16/30 = 53.3\%$).
Zheng Chai[A], Hannan Fayyaz[M], Zeshan Fayyaz[M], Ali Anwar, Yi Zhou, Nathalie Baracaldo, Heiko Ludwig, **Yue Cheng**.

[VEE '19] **vCPU as a Container: Towards Accurate CPU Allocation for VMs**.
The 15th ACM SIGPLAN/SIGOPS International Conference on Virtual Execution Environments (**VEE'19**), (AR: $15/33 = 45.5\%$).
Li Liu[M], Haoliang Wang, An Wang, Mengbai Xiao, **Yue Cheng**, Songqing Chen.

[BigData '18] **Analyzing Alibaba's Co-located Datacenter Workloads**.
IEEE International Conference on Big Data (*BigData'18*), (AR: 38.8%).
Yue Cheng, Ali Anwar, Xuejing Duan.

[SC '18]★ **BespoKV: Application Tailored Scale-Out Key-Value Stores**.
The International Conference for High Performance Computing, Networking, Storage, and Analysis (*SC'18*), (AR: $68/288 = 23.6\%$).
Ali Anwar, **Yue Cheng**, Hai Huang, Jingoo Han, Hyogi Sim, Dongyoon Lee, Fred Douglis, and Ali R. Butt.

[APSys '18] **Characterizing Co-located Datacenter Workloads: An Alibaba Case Study**.
The 9th ACM SIGOPS Asia-Pacific Workshop on Systems (*APSys'18*), (AR: $21/50 = 42\%$).
Yue Cheng, Zheng Chai*, Ali Anwar.

[IPDPS '18] **Chameleon: An Adaptive Wear Balancer for Flash Clusters**.
IEEE International Parallel & Distributed Processing Symposium (*IPDPS'18*), (AR: $113/461 = 24.5\%$).
Nannan Zhao, Ali Anwar, **Yue Cheng**, Mohammed Salman, Daping Li, Jiguang Wan, Changsheng Xie, Xubin He, Feiyi Wang, and Ali R. Butt.

[FAST '18]★ **Improving Docker Registry Design based on Production Workload Analysis**.
USENIX Conference on File and Storage Techniques (*FAST'18*), (AR: $23/140 = 16.4\%$).
Ali Anwar, Mohamed Mohamed, Vasily Tarasov, Michael Littley, Lukas Rupprecht, **Yue Cheng**, Nannan Zhao, Dimitrios Skourtis, Amit S. Warke, Heiko Ludwig, Dean Hildebrand, Ali R. Butt.

[ATC '16]★ **Erasing Belady's Limitations: In Search of Flash Cache Offline Optimality**.
The 2016 USENIX Annual Technical Conference (*ATC'16*), (AR: $47/266 = 17.7\%$).
Yue Cheng, Fred Douglis, Philip Shilane, Michael Trachtman, Grant Wallace, Peter Desnoyers, and Kai Li.

[HotStorage '16] **ClusterOn: Building Highly Configurable and Reusable Clustered Data Services using Simple Data Nodes**.
The 8th USENIX Workshop on Hot Topics in Storage and File Systems (*HotStorage'16*), (AR: $24/65 = 36.9\%$).
Ali Anwar, **Yue Cheng**, Hai Huang, and Ali R. Butt.

[HPDC '16]★ **MOS: Workload-aware Elasticity for Cloud Object Stores**.
The 25th ACM Symposium on High-Performance Parallel and Distributed Computing (*HPDC'16*), (AR: $20/129 = 15.5\%$).
Ali Anwar, **Yue Cheng**, Aayush Gupta, and Ali R. Butt.

[VarSys '16] **Towards Managing Variability in the Cloud**.
The 1st IEEE International Workshop on Variability in Parallel and Distributed Systems (*VarSys'16*).
Ali Anwar, **Yue Cheng**, and Ali R. Butt.

[PDSW '15] **Taming the Cloud Object Stores with MOS**.
The 10th ACM Parallel Data Storage Workshop (*PDSW'15*), (AR: $9/25 = 36\%$).
Ali Anwar, **Yue Cheng**, Aayush Gupta, and Ali R. Butt.

[HotCloud '15] **Pricing Games for Hybrid Object Stores in the Cloud: Provider vs. Tenant**.
The 7th USENIX Workshop on Hot Topics in Cloud Computing (*HotCloud'15*),(AR: $21/64 = 32.8\%$).
Yue Cheng, M. Safdar Iqbal, Aayush Gupta, and Ali R. Butt.

[HPDC '15]★ **Cast: Tiering Storage for Data Analytics in the Cloud**.
The 24th ACM Symposium on High-Performance Parallel and Distributed Computing (*HPDC'15*), (AR: $19/116 = 16.4\%$).
Yue Cheng, M. Safdar Iqbal, Aayush Gupta, and Ali R. Butt.

[EuroSys '15]★ **An In-Memory Object Caching Framework with Adaptive Load Balancing**.
The 10th ACM European Conference on Computer Systems (***EuroSys'15***), (AR: $32/154 = 20.8\%$).
Yue Cheng, Aayush Gupta, and Ali R. Butt.

Technical Reports

[VT technical report] **MOANA: Modeling and Analyzing I/O Variability in Parallel System Experimental Design**.
Kirk Cameron, Ali Anwar, **Yue Cheng**, Li Xu, Bo Li, Uday Ananth, Yili Hong, Layne T. Watson, and Ali R. Butt.

Posters and Demos

[NSDI '19] **HyperFaaS: A Truly Elastic Serverless Computing Framework**.
USENIX Symposium on Networked Systems Design and Implementation (***NSDI'19***), (Poster).
Jingyuan Zhang*, Ao Wang*, Min Li, Yuan Chen, **Yue Cheng**.

[APSys '15] **Taming the Cloud Object Stores with MOS**.
The 6th ACM SIGOPS Asia-Pacific Workshop on Systems (***APSys'15***), (Poster).
Ali Anwar, **Yue Cheng**, Aayush Gupta, and Ali R. Butt.

[SoCC '13] **High Performance In-Memory Caching through Flexible Fine-Grained Services**.
2013 ACM Symposium on Cloud Computing (***SoCC'13***), (Poster).
Yue Cheng, Aayush Gupta, Anna Povzner, and Ali R. Butt.

Book Chapters

[Book chapter] **SDN helps Big Data to optimize storage**.
Big Data and Software Defined Networks, editor: Javid Taheri. IET, ISBN 978-1-78561-304-3. 2018.
Ali R. Butt, Ali Anwar, and **Yue Cheng**.

Refereed Journals

[ACM CSUR] **Beyond Efficiency: A Systematic Survey of Resource-Efficient Large Language Models**.
ACM Computing Surveys (***ACM CSUR***) (*Under revision*).
Guangji Bai, ᴬZheng Chai, Chen Ling, Shiyu Wang, Jiaying Lu, Nan Zhang, Tingwei Shi, Ziyang Yu, Mengdan Zhu, Yifei Zhang, Carl Yang, **Yue Cheng**, Liang Zhao.

[TNNLS] **Community-based Distributed Training of Graph Convolutional Networks via ADMM**.
IEEE Transactions on Neural Networks and Learning Systems (***TNNLS***) (*Under review*).
Hongyi Li, Junxiang Wang, Yongchao Wang, **Yue Cheng**, Liang Zhao.

[TNNLS] **Towards Quantized Model Parallelism for Graph-Augmented MLPs Based on Gradient-Free ADMM Framework**.
IEEE Transactions on Neural Networks and Learning Systems (***TNNLS***).
Junxiang Wang, Hongyi Li, Zheng Chaiᴬ, Yongchao Wang, **Yue Cheng**, Liang Zhao.

[TPDS] **Customizable Scale-Out Key-Value Stores**.
IEEE Transactions on Parallel and Distributed Systems (***TPDS***), Volume: 31, Issue: 9, Pages: 2081-2096, Apr. 25 2020, (Impact Factor $= 3.402$).
Ali Anwar, **Yue Cheng**, Hai Huang, Jingoo Han, Hyogi Sim, Dongyoon Lee, Fred Douglis, Ali R. Butt.

[TPDS] **MOANA: Modeling and Analyzing I/O Variability in Parallel System Experimental Design**.
IEEE Transactions on Parallel and Distributed Systems (***TPDS***), Volume: 30, Issue: 8, Pages: 1843-1856, Aug. 1 2019, (Impact Factor $= 3.402$).
Kirk Cameron, Ali Anwar, **Yue Cheng**, Li Xu, Bo Li, Uday Ananth, Yili Hong, Layne T. Watson, and Ali R. Butt.

[Internet Computing]	**Provider versus Tenant Pricing Games for Hybrid Object Stores in the Cloud**. IEEE Internet Computing's special issue on Cloud Storage: May/June 2016, Pages: 28-35, vol. 20. **Yue Cheng**, M. Safdar Iqbal, Aayush Gupta, and Ali R. Butt.

Research Funding

8 NSF grants, 8 industry awards/gifts (Samsung, Adobe, Meta, and Amazon), 1 4-VA initiatives project, 7 time allocation cloud credit awards, and 1 hardware donation. Total funding amount: around $5.9 M; Total personal share: around $2.4 M.

NSF: OAC-2411009	**"Elements: A Sustainable, Resource-Efficient Cyberinfrastructure for Notebook Interactive ML Training Workloads"**. Grant amount: $600,000; My personal share: $300,000 (50% share); PI: Yue Cheng (UVA); Co-PI: Geoffrey Fox (UVA); Duration: 09/15/2024–8/31/2027.
NSF: OAC-2403313	**"Collaborative Research: OAC Core: Distributed Graph Learning Cyberinfrastructure for Large-scale Spatiotemporal Prediction"**. Grant amount: $599,547; My personal share: $299,973 (50% share); PI: Yue Cheng (UVA); Duration: 10/01/2024–9/30/2027.
NSF: SMA-2349503	**"REU Site: The Data Justice Academy"**. Grant amount: $481,232; PI: Claudia Scholz (UVA); Co-PI: Yue Cheng (UVA); Duration: 09/01/2024–8/31/2027.
Samsung GRO	**"Highly Efficient Pre-Trained LLM Storage with Near-Storage Compression and CXL Memory Integration"**. Total: $250,000; My personal share: $125,000; Role: PI: Yue Cheng (UVA), Co-PI: Ali Anwar (UMN); Duration: 04/2024–09/2025.
Adobe Gift	**"Serverless GPU and Storage Management for Large-scale, Interactive Machine Learning Training Workloads"**. Total: $25,000; My personal share: $25,000; Role: PI: Yue Cheng (UVA); Duration: 02/2024–present.
Adobe Gift	**"Serverless GPU and Storage Management for Large-scale, Interactive Machine Learning Training Workloads"**. Total: $20,000; My personal share: $20,000; Role: PI: Yue Cheng (UVA); Duration: 06/2023–present.
4-VA Collaborative Grant	**"Near-Data Processing for Machine Learning Workloads Acceleration"**. Total: $35,000; My personal share: $5,000; Role: PI: Huaicheng Li (VT); Co-PI: Yue Cheng (UVA); Duration: 05/2023–present.
Meta Research Awards	**"Serverless and Scalable GNN Training with Disaggregated Compute and Storage"**. Total: $50,000; Role: PI: Yue Cheng (UVA); Co-PI: Liang Zhao (Emory); Duration: 09/2022–08/2023.
Hardware	**Western Digital Zoned Namespaces SSDs**. Two 4TB Western Digital ZN540 SSDs; Role: PI: Yue Cheng (UVA).
Adobe Gift	**"Serverless GPU and Storage Management for Large-scale, Interactive Machine Learning Training Workloads"**. Total: $30,000; My personal share: $30,000; Role: PI: Yue Cheng (UVA); Duration: 05/2022–present.
Adobe Gift	**"Serverless GPU and Storage Management for Large-scale, Interactive Machine Learning Training Workloads"**. Total: $10,000; My personal share: $10,000; PI: Yue Cheng (UVA); Duration: 09/2021–present.
NSF: CMMI-2134689	**"FMSG: Cyber: Federated Deep Learning for Future Ubiquitous Distributed Additive Manufacturing"**. Grant amount: $498,762; My personal share: $189,949 (38% share); PI: Jia Liu (Auburn); Co-PI: Yue Cheng (UVA); Duration: 10/01/2021–9/30/2023.
Adobe Gift	**"Achieving Predictable Performance for FaaS Workloads via OS-Transparent Serverless Function Scheduling"**. Total: $10,000; My personal share: $10,000; PI: Yue Cheng (UVA); Duration: 03/2021–present
NSF: CNS-2045680	**"CAREER: Harnessing Serverless Functions to Build Highly Elastic Cloud Storage Infrastructure"**. Grant amount: $572,897 + $16,000 REU; My personal share: $572,897 + $16,000 REU (100% share); PI: Yue Cheng (UVA); Duration: 02/15/2021–02/14/2026.

Amazon Research Award	**"Distributed Large-scale Graph Deep Learning by Gradient-free Optimization"**. Grant amount: $75,000; My personal share: $37,500; PI: Liang Zhao (Emory); Co-PI: Yue Cheng (UVA); Duration: 11/01/2020–10/31/2022.
NSF: MRI-2018631	**"MRI: Acquisition of an Adaptive Computing Infrastructure to Support Compute- and Data-Intensive Multidisciplinary Research"**. Grant amount: $750,000; PI: Elise Miller-Hooks (GMU); Co-PIs: Jayshree Sarma, Yue Cheng, Shobita Satyapal, Maria Emelianenko (GMU); Involved in designing Hopper, GMU's next-generation on-campus HPC Infrastructure; Duration: 08/01/2020–7/31/2023.
NSF: OAC-2007976	**"OAC Core: SMALL: DeepJIMU: Model-Parallelism Infrastructure for Large-scale Deep Learning by Gradient-Free Optimization"**. Grant amount: $498,609; My personal share: $249,302 (50% share); PI: Liang Zhao (Emory); Co-PI: Yue Cheng (UVA); Duration: 10/01/2020–9/30/2023.
NSF: CCF-1919075	**"SPX: Collaborative Research: Cross-stack Memory Optimizations for Boosting I/O Performance of Deep Learning HPC Applications"**. Grant amount: $1,273,487; UVA share: $320,603 (25% share); Role: PI: Yue Cheng (UVA); Duration: 10/01/2019–9/30/2023.

Time Allocation Grants

NSF CloudBank	**"CAREER: Harnessing Serverless Functions to Build Highly Elastic Cloud Storage Infrastructure"**. Total: $44,827 AWS credit; PI: Yue Cheng (UVA); Duration: 07/21/2022–06/30/2024.
Google Cloud Platform	**"Towards a GPU-efficient Serverless Notebook Platform"**. Total: $5,000; PI: Yue Cheng (UVA); Duration: 01/08/2024–01/07/2025.
IBM Cloud	**"InfiniStore: Elastic Serverless Cloud Storage"**. Total: $4,000; PI: Yue Cheng (UVA); Duration: 12/30/2020–12/29/2021.
Google Cloud Platform	**"Building a Purely Serverless Parallel Computing Framework"**. Total: $5,000; PI: Yue Cheng (UVA); Duration: 08/10/2020–08/09/2021.
Amazon Web Services	**"LambDAG: A Lambda-aware DAG Engine"**. Total: $36,000; PI: Yue Cheng (UVA); Duration: 10/01/2019–10/31/2020.
Google Cloud Platform	**"Building a Generic Serverless DAG Engine"**. Total: $10,000; PI: Yue Cheng (UVA); Duration: 08/20/2019–02/19/2020.
Google Cloud Platform	**"Towards Serverless Computational Science"**. Total: $5,000; PI: Yue Cheng (UVA); Duration: 10/01/2018–07/31/2019.
Amazon Web Services	**"Building a Virtual Serverless Cloud OS"**. Total: $36,000; PI: Yue Cheng (UVA); Duration: 08/01/2018–07/31/2019.

Talks

2025	**Concurrency-informed Serverless Function Orchestration** Conference talk: ACM Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2025), Rotterdam, The Netherlands (04/2025)
2025	**Flex: Fast, Accurate DNN Inference on Low-Cost Edges Using Heterogeneous Accelerator Execution** Conference talk: ACM European Conference on Computer Systems (EuroSys 2025), Rotterdam, The Netherlands (04/2025)
2024	**Everything You Always Wanted to Know About Storage Compressibility of Pre-Trained ML Models but Were Afraid to Ask** Conference talk: 50th International Conference on Very Large Data Bases (VLDB 2024), Guangzhou, China (08/2024)

2024	**Algorithmic Complexity Attacks on Dynamic Learned Indexes**
	Conference talk: 50th International Conference on Very Large Data Bases (VLDB 2024), Guangzhou, China (08/2024)
2024	**Stateful Computing in a Serverless Way**
	Invited talk: McDaniel College, MD (05/2024)
2023	**SHADE: Enable Fundamental Cacheability for Distributed Deep Learning Training**
	Invited talk: The GenAI and ML Systems Efficiency Workshop, Adobe Research, virtual (10/2023)
2023	**Stateful Computing in a Serverless Way**
	Invited talk: The University of Edinburgh, Scotland, virtual (04/2023)
2022	**Computing in a Serverless Way for Fun and Profit**
	Invited talk: Virginia Tech Northern Virginia Center, Falls Church, VA (10/2022)
2022	**Scaling Data Analytics on Serverless Clouds**
	Invited talk: McDaniel College, MD (03/2022)
2018	**Analyzing Alibaba's Co-located Datacenter Workloads**
	Conference talk: IEEE BigData 2018, Seattle, WA (12/2018)
2018	**The hardware, they are a-changin**
	Breakout summary talk: Workshop on Data Storage Research 2025, San Jose, CA (05/2018)
2018	**Breaking the Monolith: Rethinking Storage System Design**
	Invited talk: Virginia Tech Northern Virginia Center, Falls Church, VA (03/2018)
2018	**Erasing Belady's Limitations: In Search of Flash Cache Offline Optimality**
	Invited talk: HPDC'18 TPC Workshop, Berkeley, CA (03/2018)
2017	**Breaking the Monolith: Rethinking Storage System Design**
	George Mason University, Fairfax, VA (11/2017)
	George Mason University, Fairfax, VA (04/2017)
2016	**Erasing Belady's Limitations: In Search of Flash Cache Offline Optimality**
	Conference talk: USENIX ATC'16, Denver, CO (06/2016)
	Internship talk: The CTO Office of EMC CTD, Princeton, NJ (06/2016)
2015	**Pricing Games for Hybrid Object Stores in the Cloud: Provider vs. Tenant**
	Conference talk: USENIX HotCloud'15, Santa Clara, CA (06/2015)
	The CTO Office of EMC CTD, Princeton, NJ (05/2015)
2015	**CAST: Tiering Storage for Data Analytics in the Cloud**
	Conference talk: ACM HPDC'15, Portland, OR (06/2015)
2015	**An In-Memory Object Caching Framework with Adaptive Load Balancing**
	Conference talk: ACM EuroSys'15, Bordeaux, France (04/2015)
2014	**An In-Memory Object Caching Framework with Adaptive Load Balancing**
	Internship talk: IBM Almaden Research Center, San Jose, CA (08/2014)
2013	**High Performance, Flexible Memory Caching**
	Internship talk: IBM Almaden Research Center, San Jose, CA (08/2013)

Teaching

At University of Virginia

Fall 2025	**CS6501 Serverless AI**
	Enrollment: 21
Spring 2025	**DS5110 Big Data Systems**
	Enrollment: 62
Fall 2024	**CS4740 Cloud Computing**
	Enrollment: 69

Spring 2024	**CS/DS5110 Big Data Systems** Enrollment: 97
Spring 2023	**DS5110 Big Data Systems** Enrollment: 64

At George Mason University

Spring 2022	**CS571 Operating Systems** Enrollment: 23, (overall instructor rating and course rating cancelled starting Spring 2022)
Fall 2021	**CS475 Concurrent & Distributed Systems** Enrollment: 58, Instructor rating: 4.36/5, course rating: 4.16/5
Spring 2021	**CS571 Operating Systems** Enrollment: 18, Instructor rating: 4.93/5, course rating: 4.64/5
Fall 2020	**Teaching leave**
Spring 2020	**CS675 Distributed Systems** Enrollment: 9 (formal teaching evaluation cancelled due to COVID-19)
Spring 2020	**CS571 Operating Systems** Enrollment: 34 (formal teaching evaluation cancelled due to COVID-19)
Fall 2019	**CS471 Operating Systems** Enrollment: 68, Instructor rating: 4.33/5, Course rating: 3.98/5
Spring 2019	**CS471 Operating Systems** Enrollment: 66, Instructor rating: 4.63/5, Course rating: 4.06/5
Fall 2018	**CS795 Cloud Computing** Enrollment: 8, Instructor rating: 4.88/5, Course rating: 4.88/5
Fall 2017	**CS471 Operating Systems** Enrollment: 59, Instructor rating: 2.94/5, Course rating: 2.81/5

Student Advising

PhD Dissertation Advisor

1. Yuqi Fu, PhD, Computer Science, University of Virginia, started 2020, expected to graduate Fall 2025
   Topic: Serverless resource scheduling
   Internships:
   - Google, Spring–Fall 2024.
   - Adobe, Summer 2023.
   - ByteDance, Summer 2022.

2. Rui Yang, PhD, Computer Science, University of Virginia, started 2021, expected to graduate Fall 2025
   Topic: Systems for ML and AI systems
   Internships:
   - AWS, Summer 2025.

3. Zhaoyuan (Alex) Su, PhD, Computer Science, University of Virginia, started 2021
   Topic: AI systems
   Internships:
   - Samsung, Summer 2024.
   - Argonne National Laboratory, Summer 2022.

4. Zirui Wang, PhD, Computer Science, University of Virginia, started 2024
   Topic: Storage systems for AI

5. Tingfeng Lan, PhD, Computer Science, University of Virginia, started 2024
   Topic: AI systems and systems for AI
6. Yusen Wu, PhD, Computer Science, University of Virginia, starting 2025
   Topic: AI systems and systems for AI

On-leave Ao Wang, PhD, George Mason University, 2018–2020 (on leave) –> Technical Expert @ Alibaba Cloud Function Compute

Graduated PhD Students

1. Jingyuan Zhang, PhD, George Mason University, 2023 –> Software Engineer, Cloud native infrastructure team @ ByteDance
2. Zheng Chai, PhD, CS, University of Virginia, 2024 –> Machine Learning Engineer
3. Benjamin Carver, PhD, CS, George Mason University, 2025 –> Research Scientist, AI networking infrastructure team @ Meta

Master Research

1. Benjamin Carver, Accelerated BS/MS Program@GMU, *2 papers published*
   Topic: Designing a Serverless Data Analytics Framework
2. Rafael Madrid MS, CS,
   Topic: Designing NVM Storage for Serverless Workloads
3. Anne Martine Augustin (MS, SWE, Spring'19–Summer'19)

Undergraduate Research

Junho Lee, CS@UVA, REU support

Huarui Liu, CS@UVA, REU support

Chinmay Gowda, CS@UVA

Matthew Haid, CS@UVA

Sherry Zhao, CS@UVA

Jingzhou Qiu, CS@UVA

Shengming Gao, CS@UVA

Michael Somarriba, CS@GMU

Daniel Meneses, CS@GMU

Yuanqi Du, CS@GMU

Benjamin Carver, CS@GMU, REU support

Isaiah King, CS@GMU, REU support

Dawen Yang, CS@GMU

Mark Boehen, ECE@GMU

Prajith Pandrate, CS, University of Illinois Urbana Champaign

Hannan Fayyaz, CS, York University, Canada

Zeshan Fayyaz, CS, Ryerson University, Canada

PhD Dissertation Committee Member

Shohaib Mahmud, PhD, CS@UVA

Defense Suraiya, PhD, CS@UVA

Marshall Clyburn, PhD, CS@UVA

Tanmoy Sen, PhD, CS@UVA

Guangji Bai, PhD, CS@Emory

Redwan Ibne Seraj Khan, PhD, CS@VT

Samuel S. Ogden, PhD, CS@WPI

Hengrun Zhang, PhD, CS@GMU
Li Liu, PhD, CS@GMU
Robert Lorentz, PhD, ECE@GMU

Open-source Software

INFINICACHE: https://github.com/ds2-lab/infinicache

INFINISTORE: https://github.com/ds2-lab/infinistore

λFS: https://github.com/ds2-lab/LambdaFS

WUKONG: https://github.com/ds2-lab/Wukong

FAASNET: https://github.com/ds2-lab/FaaSNet

SFS: https://github.com/ds2-lab/SFS

ALPS: https://github.com/ds2-lab/ALPS

ELF: https://github.com/ds2-lab/ELF

Algorithmic complexity attacks for dynamic learned indexes: https://github.com/ds2-lab/aca-dlis

BESPOKV: https://github.com/tddg/bespokv

SHADE: https://github.com/R-I-S-K-han/SHADE

CIDRE: https://github.com/nzc5ve/cidre_asplos25

ZipLLM: https://github.com/JerryW35/ZipLLM

Professional Services

University, College, and Department Service

2024–2025	Faculty search committee, School of Data Science, UVA
2024–2025	Ph.D. admissions committee, Computer Science, UVA
2024–2025	Master's admissions committee, Computer Science, UVA
2021–2022	Faculty search committee, Computer Science, GMU
2017–2019	Ph.D. admissions committee, Computer Science, GMU

Conference Organizer and Community Services

2025	**ICDCS**, Cloud Computing Track TPC Chair, IEEE International Conference on Distributed Computing Systems
2024	**HotStorage**, General co-chair, ACM Workshop on Hot Topics in Storage and File Systems
2023	**HotStorage**, Publication chair, ACM Workshop on Hot Topics in Storage and File Systems
2023	**HPDC**, Workshop co-chair, ACM International Symposium on High-Performance Parallel and Distributed Computing
2022	**HotStorage**, Publication chair, ACM Workshop on Hot Topics in Storage and File Systems
2021-present	**IEEE STCOS**, Co-chair, IEEE Special Technical Community on Operating Systems
2021	**ICDCS**, Local arrangement chair, IEEE International Conference on Distributed Computing Systems
2019	**SEC**, Local arrangement chair, ACM/IEEE Symposium on Edge Computing

Journal Editorship

2024-present	Topic Editor for Frontiers in Computer Science: Serverless Computing for Stateful Applications
2023-present	Review Editor for Frontiers in High Performance Computing

Award Committee

2023   Committee for IEEE CS TCHPC Early Career Researchers Award for Excellence in High Performance Computing

Technical Program Committee

2026   **EuroSys**, European Conference on Computer Systems: Spring + Fall cycle

2026   **FAST**, 24th USENIX Conference on File and Storage Technologies: Spring + Fall cycle

2025   **BigMem**, The International Workshop on Big Memory (co-located with ACM SOSP 2025)

2025   **SoCC**, ACM Symposium on Cloud Computing

2025   **NeurIPS**, 39th Annual Conference on Neural Information Processing Systems

2025   **SC**, International Conference for High Performance Computing, Networking, Storage, and Analysis

2025   **HotStorage**, ACM Workshop on Hot Topics in Storage and File Systems

2025   **HPDC**, ACM International Symposium on High-Performance Parallel and Distributed Computing

2025   **ATC**, 2025 USENIX Annual Technical Conference

2025   **FAST**, 23rd USENIX Conference on File and Storage Technologies

2025   **PPoPP**, ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming

2025   **NSDI**, 22nd USENIX Symposium on Networked Systems Design and Implementation: Spring cycle + Fall cycle

2024   **SoCC**, ACM Symposium on Cloud Computing

2024   **HiPC**, 31st IEEE International Conference on High Performance Computing (HPC), Data, and Analytics

2024   **IEEE Cloud**, IEEE International Conference on Cloud Computing

2024   **HPDC**, ACM International Symposium on High-Performance Parallel and Distributed Computing

2024   **IPDPS**, IEEE International Parallel and Distributed Processing Symposium

2023   **SoCC**, ACM Symposium on Cloud Computing

2023   **HotStorage**, ACM Workshop on Hot Topics in Storage and File Systems

2023   **IEEE Cloud**, IEEE International Conference on Cloud Computing

2023   **HPDC**, ACM International Symposium on High-Performance Parallel and Distributed Computing

2023   **IPDPS**, IEEE International Parallel and Distributed Processing Symposium

2022   **NAS** (storage track), IEEE International Conference on Networking, Architecture, and Storage

2022   **KDD** (ERC), ACM SIGKDD International Conference on Data Mining

2022   **HiPS**, Workshop on High Performance Serverless Computing@HPDC 2022

2022   **SEC**, ACM/IEEE Symposium on Edge Computing

2022   **HPDC**, ACM International Symposium on High-Performance Parallel and Distributed Computing

2021   **REX-IO**, Workshop on Re-envisioning Extreme-Scale I/O for Emerging Hybrid HPC Workloads

2021   **ICDCS**, 41st IEEE International Conference on Distributed Computing Systems

2021   **SEC**, ACM/IEEE Symposium on Edge Computing

2021   **HPDC**, ACM International Symposium on High-Performance Parallel and Distributed Computing

2020   **PDSW-DISCS**, 5th International Parallel Data Systems Workshop

2020   **HPDC**, ACM International Symposium on High-Performance Parallel and Distributed Computing

2020   **ICDCS**, 40th IEEE International Conference on Distributed Computing Systems

2020   **SC**, International Conference for High Performance Computing, Networking, Storage, and Analysis

2020   **MSST**, 36th International Conference on Massive Storage Systems and Technology

2020   **CCGrid**, IEEE/ACM International Symposium in Cluster, Cloud, and Grid Computing

2019 **PDSW-DISCS**, 4th International Parallel Data Systems Workshop

2019 **MASCOTS**, 27th IEEE International Symposium on the Modeling, Analysis, and Simulation of Computer and Telecommunication Systems

2019 **IPDPS** (ERC), IEEE International Parallel and Distributed Processing Symposium

2019 **CCGrid** (ERC), IEEE/ACM International Symposium in Cluster, Cloud, and Grid Computing

2019 **BlockDM**, First IEEE International Workshop on Blockchain and Data Management

2019 **MSST**, 35th International Conference on Massive Storage Systems and Technology

2019 **HPDC**, ACM International Symposium on High-Performance Parallel and Distributed Computing

2018 **HPDC**, ACM International Symposium on High-Performance Parallel and Distributed Computing

2018 **ICS** (ERC), ACM International Conference on Supercomputing

2018 **IPDPS** (ERC), IEEE International Parallel and Distributed Processing Symposium

2018 **ICCCN**, International Conference on Mobile Systems and Pervasive Computing

2018 **MobiSPC**, International Conference on Computer Communications and Networks

2017 **BDCAT**, IEEE/ACM International Conference on Big Data Computing, Applications and Technologies

Proposal Review Panels

2025 **DOE**, Office of Science, Advanced Scientific Computing Research (ASCR) Program

2025 **NSF**, Division of the Office of Advanced Cyberinfrastructure (OAC)

2025 **NSF**, Computer Systems Research (CSR) under the division of Computer and Network Systems (CNS)

2024 **RGC**, Research Grants Council (RGC) of Hong Kong: Proposal reviewer

2023 **DOE**, Office of Science, Advanced Scientific Computing Research (ASCR) Program

2021 **NSF**, Computer Systems Research (CSR) under the division of Computer and Network Systems (CNS)

2020 **NSF**, Computer Systems Research (CSR) under the division of Computer and Network Systems (CNS)

2019 **NSF**, Computer Systems Research (CSR) under the division of Computer and Network Systems (CNS)

2019 **NSF**, Software and Hardware Foundations (SHF) under the division of Computing and Communication Foudations (CCF)

Shadow Technical Program Committees

2018 **EuroSys**, ACM European Conference on Computer Systems

2017 **EuroSys**, ACM European Conference on Computer Systems

2016 **EuroSys**, ACM European Conference on Computer Systems

Journal Reviews

2025 **Nature Machine Intelligence**

2019 **TC**, IEEE Transactions on Computers

2019 **JPDC**, Journal of Parallel and Distributed Computing

2019 **TPDS**, IEEE Transactions on Parallel and Distributed Systems

2019 **TCC**, IEEE Transactions on Cloud Computing

2018 **TPDS**, IEEE Transactions on Parallel and Distributed Systems

2018 **TOS**, ACM Transactions on Storage

2018 **TCC**, IEEE Transactions on Cloud Computing

2017 **TOS**, ACM Transactions on Storage

2017 **TC**, IEEE Transactions on Computers

2017 **TAAS**, ACM Transactions on Autonomous and Adaptive Systems

2017 **JPDC**, Journal of Parallel and Distributed Computing

2016 **TPDS**, IEEE Transactions on Parallel and Distributed Systems

2015 **TPDS**, IEEE Transactions on Parallel and Distributed Systems

Conference Reviews

2017 **HPDC**, ACM International Symposium on High-Performance Parallel and Distributed Computing

2017 **Cluster**, IEEE Cluster Conference

2017 **NAS**, International Conference on Networking, Architecture, and Storage

2017 **ICS**, ACM International Conference on Supercomputing

2017 **ICDCS**, IEEE International Conference on Distributed Computing Systems

2016 **HPDC**, ACM International Symposium on High-Performance Parallel and Distributed Computing

2016 **ICDCS**, IEEE International Conference on Distributed Computing Systems

2016 **SC**, International Conference for High Performance Computing, Networking, Storage, and Analysis

2016 **BigData**, IEEE International Conference on Big Data

2016 **ICPP**, International Conference on Parallel Processing

2015 **HPDC**, ACM International Symposium on High-Performance Parallel and Distributed Computing

2015 **SC**, International Conference for High Performance Computing, Networking, Storage, and Analysis

2014 **HPDC**, ACM International Symposium on High-Performance Parallel and Distributed Computing

2014 **BigData**, IEEE International Conference on Big Data