# Zhuozhao Li

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## Research Interest

My research interests include High-performance Computing, Distributed Computing, Cloud/Edge Computing, Networked Systems, and Internet of Things.

## Education

**University of Virginia**, Charlottesville, VA, USA *May, 2018*

Ph.D., Computer Science

- Advisor: **Dr. Haiying Shen**
- Dissertation: Scheduling Techniques in Different Architectures of Data-parallel Clusters for High Performance
- Committee: Andrew Grimshaw, Mary Lou Soffa, David Evans, Zongli Lin

**University of Southern California**, Los Angeles, CA, USA *May, 2012*

M.S., Electrical Engineering

**Zhejiang University**, Hangzhou, Zhejiang, China *July, 2010*

B.E., Information Engineering

## Academic Experience

**University of Chicago/Argonne National Laboratory**
*Postdoctoral Scholar* *July, 2018 - Present*
*Advisors:* **Dr. Ian Foster** and **Dr. Kyle Chard**
Conduct research on distributed computing, high-performance computing, and resource management. Design and implement cyberinfrastructure to facilitate scientific research. Featured projects include Parsl (`http://parsl-project.org/`), DLHub (`https://www.dlhub.org/`), and funcX (`https://funcx.org/`).

**University of Virginia / Clemson University**
*Graduate Research Assistant* *May, 2012 - May, 2018*
Ph.D. research projects and graduate level coursework. Focused on the research about cloud computing, distributed computing, resource management, and big data systems.

*Graduate Teaching Assistant*
CS6501-010 Cloud Computing (Graduate) 2018 Spring
CS4740 Cloud Computing (Undergraduate) 2017 Fall
CS6501-010 Cloud Computing (Graduate) 2017 Spring

**University of Southern California**, Los Angeles, CA, USA
*Grader* *August, 2011 - May, 2012*
Duties included grading homework, exams and final for the courses of EE441 Linear Algebra and EE531 Nonlinear Optics.

## Publication

**Journal**

[5] **Z. Li**, R. Chard, L. Ward, K. Chard, T. J. Skluzacek, Y. Babuji, A. Woodard, S. Tuecke, B. Blaiszik, M. J. Franklin, I. Foster. DLHub: Simplifying Publication, Discovery, and Use of Machine Learning Models in Science. Journal of Parallel and Distributed Computing (**JPDC**), 2021

[4] **Z. Li**, H. Chandler and H. Shen. Analysis of Knowledge Sharing Activities on a Social Network Incorporated Discussion Forum: a Case Study of DISboards. IEEE Transactions on Big Data (**TBD**), vol. 4, no. 4, pp. 432-446, 1 Dec. 2018

[3] **Z. Li** and H. Shen. Measuring Scale-up and Scale-out Hadoop with Remote and Local File Systems and Selecting the Best Platform. IEEE Transactions on Parallel and Distributed Systems (**TPDS**), Vol. 28, No. 11, pp: 3201 - 3214, 2017

[2] **Z. Li**, H. Shen, W. Ligon and J. Denton. An Exploration of Designing a Hybrid Scale-Up/Out Hadoop Architecture Based on Performance Measurements. IEEE Transactions on Parallel and Distributed Systems (**TPDS**), vol. 28 no. 2, pp. 386-400, 2017

[1] H. Shen and **Z. Li**, New Bandwidth Sharing and Pricing Policies to Achieve a Win-Win Situation for Cloud Provider and Tenants, IEEE Transactions on Parallel and Distributed Systems (**TPDS**), vol. 27, no. 9, pp. 2682-2697, 2016

**International Conference**

[27] A Serverless Framework for Distributed Bulk Metadata Extraction. T. J. Skluzacek, R. Wong, **Z. Li**, R. Chard, K. Chard, and I. Foster. In Proceedings of the 30th International Symposium on High-Performance Parallel and Distributed Computing (**HPDC**), 2021

[26] Lightweight Function Monitors for Fine-Grained Management in Large Scale Python Applications. T. Shaffer, **Z. Li**, B. Tovar, Y. Babuji, T. J. Dasso, Z. Surma, K. Chard, I. Foster, and D. Thain. In Proceedings of 2021 IEEE International Parallel and Distributed Processing Symposium (**IPDPS**), 2021

[25] Time-Efficient Geo-Obfuscation to Protect Worker Location Privacy over Road Networks in Spatial Crowdsourcing. C. Qiu, A. Squicciarini, **Z. Li**, C. Pang, and L. Yan. In Proceedings of the 29th ACM International Conference on Information and Knowledge Management (**CIKM**), 2020

[24] **Z. Li**, T. Sen, H. Shen, and M. C. Chuah. Impact of Memory DoS Attacks on Cloud Applications and Real-Time Detection Schemes. In Proceedings of 49th International Conference on Parallel Processing (**ICPP**), 2020

[23] R. Chard, Y. Babuji, **Z. Li**, T. Skluzacek, A. Woodard, B. Blaiszik, I. Foster, K. Chard. funcX: A Federated Function Serving Fabric for Science. In Proceedings of ACM International Symposium on High-Performance Parallel and Distributed Computing (**HPDC**), 2020.

[22] **Z. Li** and H. Shen. JobPacker: Job Scheduling for Data-Parallel Frameworks with Hybrid Electrical/Optical Datacenter Networks. In Proceedings of 48th International Conference on Parallel Processing (**ICPP**) August 5-8, 2019, Kyoto Research Park, Kyoto, Japan [acceptance rate: 26%]

[21] **Z. Li** and H. Shen. Accelerating Big Data Analytics Using Scale-up/out Heterogeneous Clusters. In Proceedings of the 28th International Conference on Computer Communications and Networks (**ICCCN**), July 29 - August 1, 2019, Valencia, Spain [acceptance rate: 29%]

[20] C. Wu, T. Summer, **Z. Li**, A. Woodard, R. Chard, M. Baughman, Y. Babuji, K. Chard, J. Pitt, I. Foster. ParaOpt: Automated Application Parameterization and Optimization for the Cloud. In Proceedings of the 8th IEEE International Conference on Cloud Computing Technology and Science (**CloudCom**), December 11-13, 2019, Sydney, Australia

[19] Y. Babuji, A. Woodard, **Z. Li**, D. S. Katz, B. Clifford, I. Foster, M. Wilde, and K. Chard. Scalable Parallel Programming in Python with Parsl. In Proceedings of the Practice

and Experience in Advanced Research Computing (**PEARC**), 2019

[18] R. Chard, L. Ward, **Z. Li**, Y. Babuji, A. Woodard, S. Tuecke, K. Chard, B. Blaiszik, and I. Foster. Publishing and Serving Machine Learning Models with DLHub. In Proceedings of the Practice and Experience in Advanced Research Computing (**PEARC**), 2019

[17] Y. Babuji, A. Woodard, **Z. Li**, B. Clifford, R. Kumar, L. Lacinski, R. Chard, J. Wozniak, I. Foster, M. Wilde, D. Katz, and K. Chard. Parsl: Pervasive parallel programming in Python. In Proceedings of ACM International Symposium on High-Performance Parallel and Distributed Computing (**HPDC**), 2019 [acceptance rate: 20.7%] [**Best Paper Nominees**]

[16] L. Kang, H. Shen, and **Z. Li**. Road Gradient Estimation Using Smartphones: Towards Accurate Estimation on Fuel Consumption and Air Pollution Emission on Roads. In Proceedings of the 39th IEEE International Conference on Distributed Computing Systems (**ICDCS**), July 7-10, 2019, Dallas, Texas, USA [acceptance rate: 19.6%]

[15] **Z. Li** and H. Shen. Co-scheduler: Accelerating Data-Parallel Jobs in Datacenter Networks with Optical Circuit Switching. In Proceedings of the 39th IEEE International Conference on Distributed Computing Systems (**ICDCS**), July 7-10, 2019, Dallas, Texas, USA [acceptance rate: 19.6%]

[14] R. Chard, **Z. Li**, K. Chard, L. Ward, Y. Babuji, A. Woodard, S. Tuecke, B. Blaiszik, M. J. Franklin, and I. Foster. DLHub: Model and Data Serving for Science. In Proceedings of 33rd IEEE International Parallel and Distributed Processing Symposium (**IPDPS**), May 20-24, 2019, Rio de Janeiro, Brazil

[13] H. Wang, H. Shen and **Z. Li**. Approaches for Resilience Against Cascading Failures in Cloud Datacenters. In Proceedings of 38th IEEE International Conference on Distributed Computing Systems (**ICDCS**), July 2-5, 2018, Vienna, Austria

[12] **Z. Li**, H. Shen and C. Miles. PageRankVM: A PageRank Based Algorithm with Anti-Collocation Constraints for Virtual Machine Placement in Cloud Datacenters. In Proceedings of 38th IEEE International Conference on Distributed Computing Systems (**ICDCS**), July 2-5, 2018, Vienna, Austria

[11] **Z. Li**, H. Shen, and A. Sarker. A Network-aware Scheduler in Data-parallel Clusters for High Performance. In Proceedings of 18th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (**CCGrid**), May 1-4, 2018, Washington, DC, USA [acceptance rate: 20.8%]

[10] L. Yan, H. Shen, **Z. Li**, A. Sarker, J. A. Stankovic, C. Qiu, J. Zhao and C. Xu. Employing Opportunistic Charging for Electric Taxicabs to Reduce Idle Time. In Proceedings of ACM International Joint Conference on Pervasive and Ubiquitous Computing (**UbiComp**), Oct 8-12, 2018, Singapore, Singapore

[9] A. Sarker, **Z. Li**, W. Kolodzey and H. Shen. Opportunistic Energy Sharing Between Power Grid And Electric Vehicles: A Game Theory-based Nonlinear Pricing Policy. In Proceedings of the 37th International Conference on Distributed Computing Systems (**ICDCS**), June 5-8, 2017, Atlanta, GA, USA

[8] **Z. Li**, H. Shen, J. Denton and W. Ligon. Comparing Application Performance on HPC-based Hadoop Platforms with Local Storage and Dedicated Storage. In Proceedings of the 2016 IEEE International Conference on Big Data (**BigData**), December 5-8, 2016,

Washington D.C., USA [acceptance rate: 18.68%]

[7] H. Shen, L. Yu, L. Chen and **Z. Li**. Goodbye to Fixed Bandwidth Reservation: Job Scheduling with Elastic Bandwidth Reservation in Clouds. In Proceedings of the 8th IEEE International Conference on Cloud Computing Technology and Science (**CloudCom**), December 12-15, 2016, Luxembourg [acceptance rate: 50/193]

[6] A. Ghavami, **Z. Li** and H. Shen. Game Theory-Based Nonlinear Bandwidth Pricing for Congestion Control in Cloud Networks. In Proceedings of the 8th IEEE International Conference on Cloud Computing Technology and Science (**CloudCom**), December 12-15, 2016, Luxembourg [acceptance rate: 50/193]

[5] **Z. Li**, H. Shen and K. Chen. Learning Network Graph of SIR Epidemic Cascades Using Minimal Hitting Set based Approach. In Proceedings of the 25th International Conference on Computer Communications and Networks (**ICCCN**), 2016

[4] A. Ghavami, **Z. Li**, and H. Shen. On-Demand Bandwidth Pricing for Congestion Control in Core Switches in Cloud Networks. In Proceedings of the 9th IEEE International Conference on Cloud Computing (**CLOUD**) short paper, 2016

[3] **Z. Li**, H. Shen, W. Ligon and J. Denton. Performance Measurement on Scale-up and Scale-out Hadoop with Remote and Local File Systems. In Proceedings of the 9th IEEE International Conference on Cloud Computing (**CLOUD**), 2016 [acceptance rate: 16.7%]

[2] **Z. Li** and H. Shen. Designing A Hybrid Scale-Up/Out Hadoop Architecture Based on Performance Measurements for High Application Performance. In Proceedings of IEEE International Conference on Parallel Processing (**ICPP**), 2015 [acceptance rate: 32.5%]

[1] H. Shen and **Z. Li**. New Bandwidth Sharing and Pricing Policies to Achieve A Win-Win Situation for Cloud Provider and Tenants. In Proceedings of IEEE Conference on Computer Communications (**INFOCOM**), 2014 [acceptance rate: 19.4%]

**Workshop and Poster**

[3] Coding the Computing Continuum: Fluid Function Execution in Heterogeneous Computing Environments. R. Kumar, M. Baughman, R. Chard, **Z. Li**, Y. Babuji, I. Foster, and K. Chard. In Proceedings of 2021 IEEE International Parallel and Distributed Processing Symposium Workshops (**IPDPSW**), 2021

[2] T. Skluzacek, R. Chard, R. Wong, **Z. Li**, Y. Babuji, L. Ward, B. Blaiszik, K. Chard, and I. Foster. Serverless Workflows for Indexing Large Scientific Data. In 5th Workshop on Serverless Computing (**WoSC**). ACM, New York, NY, USA, vol. 6, pp. 9-13. 2019.

[1] **Z. Li** and H. Shen. Job Scheduling for Data-Parallel Frameworks with Hybrid Electrical/Optical Datacenter Networks. In ACM Symposium on Cloud Computing (**SoCC**) Poster, 2017

## Honors and Awards

- ACM HPDC Best Paper Finalist, 2019
- IEEE MASS Service Award, 2019
- Outstanding Graduate Research Assistant, awarded by University of Virginia, 2018
- IEEE/ACM CCGrid Student Travel Award, awarded by NSF, 2018
- ACM SoCC Student Scholarship, 2017
- Outstanding Graduate Research Assistant (Honorable Mentioned), awarded by University of Virginia, 2017

- IEEE BigData Student Travel Award, awarded by NSF, 2016
- IEEE ICPP Student Travel Award, awarded by NSF, 2015
- Scholarship, awarded by Zhejiang University, 2007
- First Class, National High/Middle School Mathematics League, awarded by Chinese Mathematical Society, 2005/2002

## Professional Services

Conference Organizations:

- Workshops Proceedings Vice-chair, IEEE International Parallel and Distributed Processing Symposium (IPDPS), 2019, 2020, 2021
- Program chair, IEEE International Workshop on Mobile Systems and Networks (IWMSN), 2019
- Publicity Chair, IEEE International Conference on Mobile Ad-Hoc and Smart Systems (MASS), 2019
- Publicity Chair, IEEE International Conference on Fog and Edge Computing (ICFEC), 2019, 2020
- Web Chair, IEEE International Conference on Network, Storage and Architecture (NAS), 2017
- Web Chair, IEEE International Conference on Computer Communications and Networks (ICCCN), 2017

Reviewer (Conferences):

- The First IEEE Workshop on Smart Edge-Cloud Computing Networks (co-located with IEEE MASS), 2019
- IEEE/ACM International Symposium in Cluster, Cloud, and Grid Computing (CCGrid), 2019
- IEEE International Conference on Fog and Edge Computing (ICFEC), 2019

Reviewer (Journals):

- IEEE Internet of Things Journal (IoTJ), 2019, 2020
- IEEE Transactions on Network and Service Management (TNSM), 2019, 2020
- IEEE Transactions on Parallel and Distributed Systems (TPDS), 2018, 2019, 2020

External Reviewer (Conferences):

- The International Conference on Parallel Processing (ICPP), 2019
- The International Conference for High Performance Computing, Networking, Storage, and Analysis (SC), 2019
- IEEE Global Communications Conference (GLOBECOM), 2018
- ACM Symposium on High-Performance Parallel and Distributed Computing (HPDC), 2018
- IEEE International Conference on Computer Communications and Networks (ICCCN), 2014, 2015, 2017
- IEEE International Conference on Mobile Ad-hoc and Sensor Systems (MASS), 2014, 2015
- IEEE International Conference on Network Protocols (ICNP), 2014 - 2017
- IEEE International Conference on Computer Communications (INFOCOM), 2013 - 2018

External Reviewer (Journals):

- IEEE Transactions on Big Data (TBD), 2017
- IEEE Transactions on Networking (ToN), 2016
- ACM Transaction on Cyber-Physical Systems (TCPS), 2016