

Qianlin Liang

165 Brittany Manor Drive, Amherst, MA, 01002
qliang@cs.umass.edu • (413) 404-8659 •

EDUCATION

University of Massachusetts, Amherst, MA, USA

Ph.D in Computer Science

Aug. 2018 – Present

- Research Direction: Distributed Systems for Artificial Intelligence, Edge Computing and Energy Informatics

M.S. in Computer Science

Aug. 2018 – Dec. 2020

- Cumulative GPA: 3.94/4.00

The Pennsylvania State University, University Park, PA, USA

B.S.(Hons.) in Computer Science

Aug. 2012 – May 2016

- Minor in Mathematics
- Thesis: A Study of Price and Capacity Trade-Offs of Replicating Computation on the Public Cloud
- Cumulative GPA: 3.91/4.00

ACADEMIC EXPERIENCE

University of Massachusetts, Amherst

Research Assistant in the Laboratory for Advanced Software Systems

Aug. 2018 – Present

- Developed runtime system for energy-efficient execution of DNN-based IoT applications on shared edge accelerators
- Designed and implemented cluster resource management algorithms to intelligently manage multiple applications on edge accelerators while respecting their runtime SLOs
- Analyzed the architecture benefits and limitations of specialized edge accelerators when compare to traditional edge and cloud-based systems
- Explored distributed processing capabilities, such as split processing for deep learning models, of edge and cloud
- Designed and implemented carbon-efficient system for elastic ML training workloads

The Pennsylvania State University, University Park

Undergraduate Research Assistant in Computer Systems Lab

May 2015 – May 2016

- Analyzed Amazon EC2 Spot market history price and developed statistic model to predict EC2 Spot market price
- Implemented controller to launch, terminate and run jobs on EC2 instances programactically
- Designed and implemented algorithm for EC2 users to lessen their cost while maintaining high reliability

INDUSTRY EXPERIENCE

Adobe Research

Research Scientist Intern

May 2022 – Aug. 2022

- Designed and implemented an analytic system using a novel GNN-based approach to estimate DNN inference latency across various GPU resource allocations
- Evaluated the system and expressed results and findings in the form of a research paper

Shanghai Rajax Information Technology Co., Ltd

Data Scientist

Aug. 2016 – May 2018

- Performed feature engineering to create features which improved forecast accuracy of various predictive models.
- Designed supply and demand pricing model to improve service quality during peak time
- Developed algorithms to cluster operating area and improve operating efficacy and efficiency

PUBLICATIONS

- [1] Walid Hanafy, **Qianlin Liang**, Noman Bashir, David Irwin, Prashant Shenoy. CarbonScaler: Leveraging Cloud Workload Elasticity for Optimizing Carbon-Efficiency, *under review at ACM Special Interest Group on Measurement and Evaluation (SIGMETRICS)*, 2024.
- [2] **Qianlin Liang**, Walid Hanafy, Noman Bashir, David Irwin, Prashant Shenoy. Energy Time Fairness: Balancing Fair Allocation of Energy and Time for GPU Workloads, In *Proceedings of ACM/IEEE Symposium on Edge Computing (SEC)* 2023.

- [3] **Qianlin Liang**, Walid A. Hanafy, Noman Bashir, Ahmed Ali-Eldin, David Irwin, Prashant Shenoy. Dēlen: Enabling Flexible and Adaptive Model-serving for Multi-tenant Edge AI. In *Proceedings of IEEE/ACM Eighth International Conference on Internet-of-Things Design and Implementation (IoTDI)*, San Antonio May 2023.
- [4] Abel Souza, Noman Bashir, Jorge Murillo, Walid Hanafy, **Qianlin Liang**, David Irwin, Prashant Shenoy. Ecovisor: A Virtual Energy System for Carbon-Efficient Applications. In *Proceedings of the ACM Architectural Support for Programming Languages and Operating Systems (ASPLOS)*, Vancouver, Canada, March 2023.
- [5] **Qianlin Liang**, Walid A. Hanafy, Ahmed Ali-Eldin, Prashant Shenoy. Model-driven Cluster Resource Management for AI Workloads in Edge Clouds. In *ACM Transactions on Adaptive and Autonomous Systems (TAAS)* Jan 2023.
- [6] **Qianlin Liang**, Prashant Shenoy, David Irwin. AI on the Edge: Rethinking AI-based IoT Applications Using Specialized Edge Architectures. In *Proceedings of IEEE International Symposium on Workload Characterization*, October 2020.
- [7] Cheng Wang, Bhuvan Urgaonkar, Aayush Gupta, **Qianlin Liang**, and George Kesidis. Exploiting Spot and Burstable Instances for Improving the Cost-efficacy of In-Memory Caches on the Public Cloud. In *Proceedings of the European Conference on Computer Systems (EUROSYS 2017)*, Belgrade, Serbia, April 2017.
- [8] Cheng Wang, **Qianlin Liang**, and Bhuvan Urgaonkar. An Empirical Analysis of Amazon EC2 Spot Instance Features Affecting Cost-effective Resource Procurement. In *ACM/SPEC International Conference on Performance Engineering (ICPE 2017)*, L'Aquila, Italy, April 2017.
- [9] **Qianlin Liang**, Cheng Wang, and Bhuvan Urgaonkar. Spot Characterization: What are the Right Features to Model?. In *Proceedings of the First International Workshop on System Analytics and Characterization (SAC 2016)*, co-located with ACM SIGMETRICS 2016, Antibes Juan-les-pines, France, June 2016.

TEACHING EXPERIENCE

University of Massachusetts Amherst – Teaching Assistant

- Reasoning Under Uncertainty (COMPSCI 240)
- Introduction to Informatics (INFO 101)

Spring 2020
Fall 2018

AWARDS

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| <ul style="list-style-type: none"> ▪ The Evan Pugh Scholar Award, The Pennsylvania State University
For undergraduate juniors and seniors who are in the upper 0.5 percent of their respective classes. ▪ The President Sparks Award, The Pennsylvania State University
For earning a 4.00(A) cumulative grade point average based on at least 36 graded credits. ▪ The President's Freshman Award, The Pennsylvania State University
For earning a 4.00(A) cumulative grade point average based on at least 12 graded credits. | <p>2015</p> <p>2014</p> <p>2013</p> |
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SKILLS

- Programming: Python, C/C++, Java, JavaScript, HTML5, Matlab, Bash, LaTeX
- Data Science Framework: Tensorflow, Pytorch, Numpy, Pandas, Scipy, Sklearn
- Operating Systems: UNIX/Linux, OS X, Windows
- Cloud Computing: Docker, Kubernetes, AWS