

# Cheng Wang

Building 5  
6500 River Place Blvd  
Austin, TX 78730

Phone: (814)777-7927  
Email: wangcheng@vmware.com  
Webpage: <http://chengwangpsu.weebly.com/>

## Education

- Ph.D. in Computer Science and Engineering 2011.08 - 2016.09  
Penn State University, University Park, PA  
Advisors: Prof. Bhuvan Urgaonkar (CSE) and Prof. Qian Wang (ME)
- M.E., Department of Automation 2008.08 - 2011.06  
Tsinghua University, Beijing, China  
Advisor: Prof. Yindong Ji
- B.E., Department of Automation 2004.08 - 2008.06  
Tsinghua University, Beijing, China

## Fields of Research Interest

Cloud Computing, Distributed Computing, Mathematical Modeling, Performance Evaluation & Optimization/Control of Computer Systems, Power Management.

## Honors and Awards

- IEEE ICAC 2016 best paper award finalist, 2016. (1/3)
- IEEE CLOUD 2016 best student paper award, 2016.
- IEEE CLOUD 2016 top 5 picks paper, 2016.
- IBM first patent application invention achievement award, 2015.
- Best paper award (Runner-up) from ACM e-Energy 2015.
- Student travel grant from ACM e-Energy 2015, USENIX ATC 2016, Penn State University EECS 2016.
- Best graduate paper and presentation award of CERS 2012 (College of Engineering Research Symposium) at Penn State University, 2012
- Guanghai Scholarship at Tsinghua University, 2007.
- Academic Excellence Scholarship at Tsinghua University, 2005.
- Provincial-level Merit Student, Jilin Province, China, 2004. (30/100,000)

## Professional Experience

- **Member of Technical Staff** VMware R&D 2016.09 - present  
Austin, TX  
Working in the vSphere Integrated Container (VIC) team. We develop a container runtime based on the vSphere cluster infrastructure which allows the developers and enterprise customers to deploy both traditional VM-based workloads and containerized applications on lightweight containerVMs, with better performance and security isolation.
- **Research Assistant** Computer Science and Engineering 2015.02 - 2016.09  
Penn State University, PA  
(i) *The cloud side*: Studied the problems of improving cost-efficacy and resource utilization for a public cloud via explicit dynamic effective capacity modulation, i.e., cloud provides virtual resources with different SLA classes to tenants who have different price/performance sensitivities, and how a tenant might react strategically in such an environment. (ii) *The tenant side*: Investigated the problem of how a tenant should orchestrate its resource procurement given the full



## Publications and Pre-prints

- **Cheng Wang**, Qianlin Liang, Bhuvan Uргаonkar. “An empirical analysis of Amazon EC2 spot instance features affecting cost-effective resource procurement.” The 8th ACM/SPEC International Conference on Performance Engineering (ICPE 2017), L’Aquila, Italy, April 2017.
- Neda Nasiriani, **Cheng Wang**, George Kesidis, and Bhuvan Uргаonkar. “Characterizing the network bandwidth dynamism of Amazon EC2 burstable instances.” The 5th IEEE International Conference on Cloud Engineering (IC2E 2017), Vancouver, Canada, April 2017.
- **Cheng Wang**, Bhuvan Uргаonkar, Aayush Gupta, Lydia Y. Chen, Robert Birke and George Kesidis. “Effective capacity modulation as an explicit control knob for public cloud profitability.” The 13th IEEE International Conference on Automatic Computing (ICAC 2016), Wurzburg, Germany, July 2016. (**Best paper award finalist: 1 out of 3.**)
- **Cheng Wang**, Bhuvan Uргаonkar, Aayush Gupta, and Qianlin Liang. “Navigating the public cloud labyrinth: A study of price, capacity, and scaling Granularity trade-offs.” The 2016 USENIX Annual Technical Conference (USENIX ATC 2016), Denver, USA, June 2016. (Poster)
- **Cheng Wang**, Aayush Gupta, and Bhuvan Uргаonkar. “Fine-Grained resource scaling in a public cloud: A tenant’s perspective.” The 9th IEEE International Conference on Cloud Computing (IEEE Cloud 2016), San Francisco, USA, June 2016. Acceptance ratio: 15%. (**Best student paper award; top 5 picks paper**)
- George Kesidis, Bhuvan Uргаonkar, Neda Nasiriani and **Cheng Wang**. “Neutrality in future public clouds: Implications and challenges.” The 8th USENIX Workshop on Hot Topics in Cloud Computing (HotCloud 2016), Denver, USA, June 2016. Acceptance ratio: 21/68.
- Qianlin Liang, **Cheng Wang** and Bhuvan Uргаonkar. “Spot Characterization: What are the Right Features to Model?” The 1st International Workshop on System Analytics and Characterization (SAC 2016), co-located with SIGMETRICS 2016, Antibes Juan-les-pines, France, June 2016.
- Neda Nasiriani, **Cheng Wang**, George Kesidis, Bhuvan Uргаonkar, Lydia Y. Chen, and Robert Birke. “On fair attribution of costs under peak-based pricing to cloud tenants.” ACM Transactions on Modeling and Performance Evaluation of Computing Systems (TOMPECS), 2016.
- **Cheng Wang**, Neda Nasiriani, George Kesidis, Bhuvan Uргаonkar, Qian Wang, Lydia Y. Chen, Aayush Gupta and Robert Birke. “Recouping energy costs from cloud tenants: Tenant demand response aware pricing design.” The 6th International Conference on Future Energy Systems (ACM eEnergy 2015), Bangalore, India, July 2015. Acceptance ratio: 16/70 (22.8%) (**Best paper award - Runner up**)
- Yijun Ying, Robert Birke, **Cheng Wang**, Lydia Y. Chen and Gautam Natarajan. “Optimizing energy, locality and priority in a MapReduce cluster.” The 12th IEEE International Conference on Automatic Computing (ICAC 2015), Grenoble, France, July 2015.
- Yijun Ying, Robert Birke, **Cheng Wang**, Lydia Y. Chen and Gautam Natarajan. “On energy-aware allocation and execution for batch and interactive MapReduce.” SIGMETRICS Performance Evaluation Review 42(4): 22-30 (2015).
- Neda Nasiriani, **Cheng Wang**, George Kesidis, Bhuvan Uргаonkar, Lydia Y. Chen, and Robert Birke. “On fair attribution of costs under peak-based pricing to cloud tenants.” 23rd International Symposium on Modeling Analysis and Simulation of Computer and Telecommunication System (MASCOTS 2015), Atlanta, GA, USA, October 2015.
- **Cheng Wang**, Bhuvan Uргаonkar, Qian Wang, and George Kesidis. “A hierarchical demand response framework for data center power cost optimization under real-world electricity pricing.” 22nd International Symposium on Modeling Analysis and Simulation of Computer and Telecommunication System (MASCOTS 2014), Paris, France, September 2014. Acceptance ratio: 39/192 (20.3%)
- George Kesidis, Bhuvan Uргаonkar, and **Cheng Wang**. “An electricity consumption game with both mean and peak consumption costs.” Penn State CSE technical report CSE-14-009, July 2014.
- **Cheng Wang**, Bhuvan Uргаonkar, George Kesidis, Uday V. Shanbhag, and Qian Wang. “A case for virtualizing the electric utility in cloud data centers.” The 6th USENIX Workshop on Hot

Topics in Cloud Computing (HOTCLOUD 2014), Philadelphia, PA, USA, June 2014. Acceptance ratio: 22/72 (30.5%)

- **Cheng Wang**, Bhuvan Urgaonkar, Qian Wang, George Kesidis, and Anand Sivasubramanian. “Data center power cost optimization via workload modulation.” Proceedings of the Sixth IEEE/ACM International Conference on Utility and Cloud Computing (UCC 2013), Dresden, Germany, December 2013. (Short paper)
- Bhuvan Urgaonkar, George Kesidis, Uday V. Shanbhag, and **Cheng Wang**. “Pricing of service in clouds: optimal response and strategic interactions.” Workshop on Mathematical performance Modeling and Analysis (MAMA 2013), co-located with ACM SIGMETRICS, Pittsburgh PA, USA, June 2013.
- **Cheng Wang**, Wenqing Yao, Mu He, Yuhao Wang. “Optimal management of energy consumption for data centers.” College of Engineering Research Symposium 2012, Pennsylvania State University. (**Best graduate paper and presentation**)
- **Cheng Wang**, Wei Dong, and Yindong Ji. “An agent-based monitoring framework for distributed complex engineering simulation system.” 6th IEEE Joint International Conference on Information Technology and Artificial Intelligence (ITAIC 2011), Chongqing, China, June 2011.
- Wei Dong, **Cheng Wang**, Yindong J. “A Meta-model based modeling method for geographic information system of high-speed railway.” China Patent 201010591817.2, Apr. 27, 2011.

### Computer Skills

- Languages: C/C++, Java, Matlab, Python, PHP, Javascript, JSP, Shell, SQL, Go.
- Software/Systems: Matlab, Cplex, MySQL, OpenStack, Docker container, Memcached, vSphere.

### Extracurricular Activities

- Deputy Secretary of Youth League in Department of Automation, Tsinghua University 2008.09 - 2009.06
- Minister & Group Leader of Student Broadcast Station, Tsinghua University 2006.09 - 2007.06
- Member of Students Science & Technology Association, Tsinghua University 2005.09 - 2006.06

### Selected Talks

- “Navigating the public cloud labyrinth: A study of price, capacity, and scaling granularity trade-offs.” At VMware Austin, USA, February, 2016.
- “Recouping energy costs from cloud tenants: Tenant demand response aware pricing design.” At ACM e-Energy’15, Bangalore, India, July 2015.
- “A case for virtualizing the electric utility in cloud data centers.” At INFORMS Annual Meeting, San Francisco, USA, October 2014.
- “A hierarchical demand response framework for data center power cost optimization under real-world electricity pricing.” At IEEE MASCOTS’14, Paris, France, September 2014.
- “Energy management of demand in the cloud.” At LINCS (Laboratory of Information, Networking and Communication Sciences), Paris, France, September 2014.
- “Data center power cost optimization via workload modulation.” At IEEE/ACM UCC’13, Dresden, Germany, December 2013.

### References

Dr. Bhuvan Urgaonkar  
Associate Professor, Penn State University  
✉ buu1@psu.edu

Dr. Qian Wang  
Professor, Penn State University  
✉ quw6@psu.edu

Dr. Lydia Y. Chen  
Research Staff Member, IBM Research Zurich  
✉ yic@zurich.ibm.com

Dr. George Kesidis  
Professor, Penn State University  
✉ kesidis@enr.psu.edu