

Minghong Lin

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Research Overview

My research centers around data center energy efficiency and cluster performance, particularly capacity provisioning and workload scheduling taking energy and performance into consideration. I am interested in the development and utilization of analytical tools combined with implementation experience to improve system design and management. In addition to the data center area, my research contributes new analytical tools to the fields of convex optimization, online algorithms and stochastic modeling.

Education

- Ph.D. in Computer Science
California Institute of Technology (Caltech)
Advisor: Prof. Adam Wierman
Topics: energy-efficient computing, online algorithms, nonlinear optimization
Sep. 2008 - Present
Overall GPA: 4.0/4.0
- M.Phil. in Computer Science and Engineering
The Chinese Univ. of Hong Kong (CUHK)
Advisors: Prof. John C.S. Lui and Prof. Dah-Ming Chiu
Topics: BitTorrent-like file sharing systems, ISP-friendly P2P protocol
Sep. 2006 - Jun. 2008
Overall GPA: 3.84/4.0
- B.S. in Computer Science and Technology
Univ. of Sci. and Tech. of China (USTC)
Sep. 2002 - Jun. 2006
Overall GPA: 87/100
Class Rank: 8th/146

Industry Experience

- Internship at IBM Watson Research Center
System Analysis and Optimization Group
Manager: Dr. Li Zhang
Topic: improving big data processing via analytical approaches
Jul. 2012 - Oct. 2012
Hawthorne, NY
- Internship at Facebook
Infrastructure Team
Mentor: Dr. Qiang Wu
Topic: power modeling and data center efficiency
Jun. 2011 - Sep. 2011
Palo Alto, CA

Selected Honors and Awards

- Best Paper Award at International Green Computing Conference (IGCC), 2012.
- IBM Ph.D. Fellowship award, 2012.
- Finalist for the Facebook Fellowship, 2012.
- Chinese Government Award for Outstanding Students Abroad, 2011.
- Best Paper Award at IEEE INFOCOM, 2011. (the only one out of more than 1800 submissions)
- Best Student Paper Award at ACM GreenMetrics, 2011.
- Finalist for the Facebook Fellowship, 2011.
- Fellowship, Caltech, 2008.
- Fellowship, CUHK, 2006.
- Outstanding Undergraduate Thesis, USTC, 2006.

- Outstanding Award for Undergraduate Research Program, USTC, 2005.
- Outstanding Student Scholarship, USTC, 2005.
- Guanghua Education Scholarship, USTC, 2004.
- Outstanding Student Scholarship, USTC, 2003.

Teaching Experience

- Teaching Assistant for “CS/EE 143 Communication Networks”, Caltech, fall term 2011-12. Caltech Teaching Quality Feedback: 4.2/5
- Teaching Assistant for “CS/EE 143 Communication Networks”, Caltech, fall term 2010-11. Caltech Teaching Quality Feedback: 5.0/5
- Teaching Assistant for “CS/EE 145 Projects in Networking”, Caltech, spring term 2009-10. Caltech Teaching Quality Feedback: 4.7/5
- Teaching Assistant for “CS/EE 144 The Ideas Behind the Web”, Caltech, winter term 2009-10. Caltech Teaching Quality Feedback: 4.5/5

Conference Publications

1. Minghong Lin, Zhenhua Liu, Adam Wierman and Lachlan L. H. Andrew, “Online algorithms for geographical load balancing”, International Green Computing Conference (IGCC), 2012 (**Best Paper Award**).
2. Kai Wang, Minghong Lin, Florin Ciucu, Adam Wierman and Chuang Lin, “Characterizing the impact of the workload on the value of dynamic resizing in data centers”, Proceedings of ACM Sigmetrics (poster), 2012.
3. Minghong Lin, Adam Wierman, Alan Roytman, Adam Meyerson, and Lachlan L. H. Andrew, “Online optimization with switching costs”, ACM MAMA, 2012. Also appeared in Performance Evaluation Review.
4. Lachlan L. H. Andrew, Minghong Lin, Zhenhua Liu and Adam Wierman. “Algorithms for dynamic capacity provisioning”, Proceedings of Conference on Optical Internet (COIN), 2012.
5. Minghong Lin, Adam Wierman, Lachlan L. H. Andrew and Eno Thereska, “Online dynamic capacity provisioning in data centers”, Allerton Conference on Communication, Control, and Computing, 2011 (*invited paper*).
6. Zhenhua Liu, Minghong Lin, Adam Wierman, Steven Low and Lachlan L. H. Andrew, “Geographical load balancing with renewables”, ACM GreenMetrics, 2011 (**Best Student Paper Award**). Also appeared in Performance Evaluation Review, vol. 39(3), Dec. 2011.
7. Zhenhua Liu, Minghong Lin, Adam Wierman, Steven Low and Lachlan L. H. Andrew, “Greening geographical load balancing”, Proceedings of ACM Sigmetrics, 2011.
8. Minghong Lin, Adam Wierman, Lachlan L. H. Andrew and Eno Thereska, “Dynamic right-sizing for power-proportional data centers”, Proceedings of IEEE INFOCOM, 2011 (**Best Paper Award**). Extension is to appear in IEEE/ACM Transactions on Networking (TON).
9. Minghong Lin, Adam Wierman and Bert Zwart, “The average response time in a heavy-traffic SRPT queue”, ACM MAMA, 2010. Also appeared in Performance Evaluation Review, vol. 38(2), Sept. 2010.
10. Lachlan L. H. Andrew, Minghong Lin and Adam Wierman, “Optimality, fairness, and robustness in speed scaling designs”, Proceedings of ACM Sigmetrics, 2010.
11. Minghong Lin, John C.S. Lui and Dah-Ming Chiu, “Design and analysis of ISP-friendly file distribution protocol”, Allerton Conference on Communication, Control, and Computing, 2008.

12. Minghong Lin, Bin Fan, John C.S. Lui and Dah-Ming Chiu, “Stochastic analysis of file swarming systems”, Proceedings of IFIP Performance 2007. Also appeared in Performance Evaluation vol. 64(9-12):856-875, Oct. 2007.
13. GuanJun Ma, Yinlong Xu, Minghong Lin and Ying Xuan, “A content distribution system based on sparse network coding”, NetCod 2007.

Journal Publications

1. Minghong Lin, Adam Wierman, Lachlan L. H. Andrew and Eno Thereska, “Dynamic right-sizing for power-proportional data centers”, to appear in IEEE/ACM Transactions on Networking (TON). Extension of a paper that appeared in IEEE INFOCOM, 2011.
2. Minghong Lin, Adam Wierman and Bert Zwart, “Heavy-traffic analysis of mean response time under Shortest Remaining Processing Time”, Performance Evaluation vol. 68(10), Oct. 2011.
3. Lachlan L. H. Andrew, Minghong Lin, Ao Tang, and Adam Wierman. “Speed scaling to trade-off efficiency, simplicity, robustness and fairness”, IEEE COMSOC MMTTC E-Letter, Jul. 2010.
4. Minghong Lin, John C.S. Lui and Dah-Ming Chiu, “An ISP-friendly file distribution protocol: analysis, design and implementation”, IEEE Transactions on Parallel and Distributed Systems, vol. 21, no. 9, pp. 1317-1329, Sept. 2010.
5. Minghong Lin, Bin Fan, John C.S. Lui and Dah-Ming Chiu, “Stochastic analysis of file swarming systems”, Performance Evaluation vol. 64(9-12):856-875, Oct. 2007. An earlier version appeared in the Proceedings of IFIP Performance 2007.

Book Chapter

Adam Wierman, Lachlan L. H. Andrew and Minghong Lin, “Speed scaling: An algorithmic perspective”, chapter in Handbook on Energy-Aware and Green Computing, 2011.

Preprints

1. Minghong Lin, Na Li, Lijun Chen, Lachlan L. H. Andrew and Adam Wierman, “Competitive online economic dispatch of power generation”.
2. Minghong Lin, Alan Roytman, Adam Wierman, Adam Meyerson and Lachlan L. H. Andrew, “A tale of two metrics: Simultaneous bounds on competitiveness and regret”.
3. Minghong Lin, Li Zhang, Adam Wierman and Jian Tan, “Joint optimization of overlapping phases in MapReduce”.

Conference & Invited Talks

- “Online dynamic capacity provisioning in data centers”, invited talk at INFORMS annual meeting, Revenue Management & Pricing section, Oct. 2012.
- “Energy efficient algorithms in data centers”, invited talk at Mathematical Sciences Department of the IBM Watson Research Center, Sep. 2012.
- “Dynamic capacity provisioning in data centers”, invited talk at IBM F2C2 workshop, Jul. 2012.
- “Online optimization with switching cost”, ACM MAMA, Jun. 2012.
- “Online algorithms for geographical load balancing”, International Green Computing Conference, Jun. 2012.
- “Online dynamic capacity provisioning in data centers”, invited talk at Allerton Conference on Communication, Control, and Computing, Sep. 2011.
- “Dynamic right-sizing for power-proportional data centers”, IEEE INFOCOM, Apr. 2011.
- “Dynamic right-sizing for power-proportional data centers”, SISHOO, Dec. 2010.
- “The average response time in a heavy-traffic SRPT queue”, ACM MAMA, Jun. 2010.

- “Heavy-traffic analysis of mean response time under Shortest Remaining Processing Time”, invited talk at INFORMS annual meeting, Applied Probability section, Oct. 2009.
- “Stochastic analysis of file sharing systems”, invited talk at CUHK-Tsinghua Student Workshop on Theoretical Computer Science, May 2008.
- “Stochastic analysis of file swarming systems”, IFIP Performance conference, Oct. 2007.

Invited Referee for Journals and Conferences

Transactions on Networking (TON), Transactions on Parallel and Distributed Systems (TPDS), Computer Networks (COMNET), Computer Communications (COMCOM), International Journal of Communication Systems (IJCS), International Symposium on Wireless Communication Systems (ISWCS) 2012.

References

Dr. Adam Wierman

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Dr. Steven Low

Professor of Computer Science and Electrical Engineering
California Institute of Technology
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Dr. John C.S. Lui

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The Chinese University of Hong Kong
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Dr. Li Zhang

Manager of the System Analysis and Optimization Group
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Dr. Lachlan L. H. Andrew

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