

I-Hong Hou

Curriculum Vitae

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Professional Experience

9/2012 – **Assistant Professor**, Department of ECE, Texas A&M University

12/2011 – 8/2012 **Assistant Research Engineer**, Texas Engineering Experiment Station, Texas A&M University
Supervisor: Prof. P.R. Kumar

6/2010–8/2010 **Summer Intern**, Bell Labs, Alcatel-Lucent
Mentor: Dr. Piyush Gupta

09/2006 – 12/2011 **Research Assistant**, Department of CS, University of Illinois, Urbana-Champaign
Advisor: Prof. Jennifer Hou (2006–2007) and Prof. P.R. Kumar (2007–2011)

Education

2008–2011 *Ph.D., Computer Science*
University of Illinois at Urbana-Champaign, Urbana, IL
Advisor: Prof. P. R. Kumar

2006–2008 *M.S., Computer Science*
University of Illinois at Urbana-Champaign, Urbana, IL

2000–2004 *B.S., Electrical Engineering*
National Taiwan University, Taipei, Taiwan
Minor: *Mathematics*

Honors

Best Paper Award in MobiHoc 2017

Best Student Paper Award in WiOpt 2017

C. W. Gear Outstanding Graduate Student Award (awarded annually to one graduate student who has demonstrated excellence in research and service), 2010

Silver in Asian Pacific Mathematics Olympiad, 2000

Sixth Place in ACM Asia Programming Contest - Kaohsiung, 2003

Presidential Awards (top 5% per semester), National Taiwan University, Fall 2000, Spring 2001, Spring 2003, Fall 2003

Research Interests

Wireless Networks, Cyber-Physical Systems, Cloud Computing, Distributed Systems, and Vehicular Ad-Hoc Networks

Publications (*=student under my advising)

Book

1. I-Hong Hou and P.R. Kumar. Packets with Deadlines: A Framework for Real-Time Wireless Networks. *Morgan & Claypool*, 2013.

Book Chapter

1. Jennifer C. Hou, David K. Y. Yau, Chris Y. T. Ma, Yong Yang, Honghai Zhang, I-Hong Hou, Nageswara S. V. Rao, and Mallikarjun Shankar. Coverage in wireless sensor networks. In Sudip Misra, Issac Woungang, and Subhas C. Misra, editors, *Guide to Wireless Sensor Networks*. Springer-Verlag (London), June 2009.

Refereed Journal Articles

1. *Tao Zhao, I-Hong Hou, Shiqiang Wang, and Kevin Chan. RED/LED: An Asymptotically Optimal and Scalable Online Algorithm for Service Caching at the Edge. Accepted for *IEEE Journal on Selected Areas in Communications*.
2. *Tao Zhao, Korok Ray, and I-Hong Hou. A Non-Monetary Mechanism for Optimal Rate Control Through Efficient Cost Allocation. Accepted for *IEEE/ACM Transactions on Networking*.
3. *Han Deng and I-Hong Hou. Optimal Capacity Provisioning for Online Job Allocation with Hard Allocation Ratio Requirement. *IEEE/ACM Transactions on Networking*. vol. 26, no. 2, Apr, 2018, pp. 724 – 736.
4. I-Hong Hou and *Ping-Chun Hsieh. The Capacity of QoE for Wireless Networks with Unreliable Transmissions. *Queueing Systems: Theory and Applications (QUESTA)*. vol. 87, no. 1-2, Oct, 2017, pp. 131 – 159.
5. *Shuai Zuo, I-Hong Hou, Tie Liu, Ananthram Swami, and Prithwish Basu. Joint Rate Control and Scheduling for Real-Time Wireless Networks. *IEEE Transactions on Wireless Communications*. vol. 16, no. 7, Jul, 2017, pp. 4562 – 4570.
6. *Shuai Zuo, *Han Deng, and I-Hong Hou. Energy Efficient Algorithms for Real-Time Traffic over Fading Wireless Channels. *IEEE Transactions on Wireless Communications*. vol. 16, no. 3, Mar, 2017, pp. 1881–1892.
7. *Han Deng and I-Hong Hou. On the Capacity-Performance Trade-off of Online Policy in Delayed Mobile Offloading. *IEEE Transactions on Wireless Communications*. vol. 16, no. 1, Jan, 2017, pp. 526–537.
8. *Abhishek Jain and I-Hong Hou. R-PF: Enhancing Service Regularity for Legacy Scheduling Policy. *IEEE Transactions on Wireless Communications*. vol. 15, no. 1, Jan, 2016, pp. 258–266.
9. I-Hong Hou. Packet Scheduling for Real-Time Surveillance in Multi-hop Wireless Sensor Networks with Lossy Channels. *IEEE Transactions on Wireless Communications*. vol. 14, no. 2, Feb, 2015, pp. 1071–1079.
10. I-Hong Hou. Broadcasting Delay-Constrained Traffic over Unreliable Wireless Links with Network Coding. *IEEE/ACM Transactions on Networking*. vol. 23, no. 3, Jun, 2015, pp. 728 - 740.
11. I-Hong Hou and Piyush Gupta. Proportionally Fair Distributed Resource Allocation in Multi-Band Wireless Systems. *IEEE/ACM Transactions on Networking*. vol. 22, no. 6, Dec, 2014, pp. 1819–1830.

12. I-Hong Hou. Scheduling Heterogeneous Real-Time Traffic over Fading Wireless Channels. *IEEE/ACM Transactions on Networking*, vol. 22, no. 5, Oct, 2014, pp. 1631–1644.
13. I-Hong Hou and Chung Shue Chen. An Energy-Aware Protocol for Self-Organizing Heterogeneous LTE Systems. *IEEE Journal on Selected Areas in Communications*, vol. 31, no. 5, May, 2013, pp. 937–946.
14. I-Hong Hou and P.R. Kumar. Real-Time Communication over Unreliable Wireless Links: A Theory and Its Applications. *IEEE Wireless Communications*, vol. 19, no. 2, February, 2012, pp. 48–59.
15. I-Hong Hou and P.R. Kumar. Queueing Systems with Hard Delay Constraints: A Framework for Real-Time Communication over Unreliable Wireless Channels. *Queueing Systems: Theory and Applications*, vol. 71, no. 1, 2012, pp. 151–177.

Peer-Reviewed Conference Papers

1. *Ping-Chun Hsieh, and I-Hong Hou. A Decentralized Medium Access Protocol for Real-Time Wireless Ad Hoc Networks With Unreliable Transmissions. In *Proc. of IEEE ICDCS*, 2018.
2. Simon Yau, *Ping-Chun Hsieh, Rajarshi Bhattacharyya, Kartic Bhargav K. R., Srinivas Shakkottai, I-Hong Hou, and P. R. Kumar. PULS: Processor-supported Ultra-low Latency Scheduling. In *Proc. of ACM MobiHoc*, 2018.
Acceptance rate 17%.
3. *Ping-Chun Hsieh, Xi Liu, Jian Jiao, I-Hong Hou, Yunlong Zhang, and P. R. Kumar. Throughput-Optimal Scheduling for Multi-Hop Networked Transportation Systems With Switch-Over Delay. In *Proc. of ACM MobiHoc*, 2017. **(Best Paper Award)**
Acceptance rate 17%.
4. *Tao Zhao, Korok Ray, and I-Hong Hou. A Non-Monetary Mechanism for Optimal Rate Control Through Efficient Delay Allocation. In *Proc. of WiOpt*, 2017. **(Best Student Paper Award)**
5. I-Hong Hou, *Tao Zhao, Shiqiang Wang, and Kevin Chan. Asymptotically Optimal Algorithm for Online Reconfiguration of Edge-Clouds. In *Proc. of ACM MobiHoc*, 2016.
Acceptance rate 18.7%.
6. I-Hong Hou. On the Modeling and Optimization of Short-Term Performance for Real-Time Wireless Networks. In *Proc. of IEEE INFOCOM*, 2016.
Acceptance rate 18%
7. *Han Deng and I-Hong Hou. Online Job Allocation with Hard Allocation Ratio Requirement. In *Proc. of IEEE INFOCOM*, 2016.
Acceptance rate 18%.
8. *Ping-Chun Hsieh and I-Hong Hou. Heavy-Traffic Analysis of QoE Optimality for On-Demand Video Streams Over Fading Channels. In *Proc. of IEEE INFOCOM*, 2016.
Acceptance rate 18%.
9. I-Hong Hou and *Ping-Chun Hsieh. QoE-Optimal Scheduling for On-Demand Video Streams over Unreliable Wireless Networks. In *Proc. of ACM MobiHoc*, 2015.
Acceptance rate 14.8%.
10. Xiaohan Kang, I-Hong Hou, and Lei Ying. On the Capacity Requirement of Largest-Deficit-First for Scheduling Real-Time Traffic in Wireless Networks. In *Proc. of ACM MobiHoc*, 2015.
Acceptance rate 14.8%.
11. *Han Deng and I-Hong Hou. Online Scheduling for Delayed Mobile Offloading. In *Proc. of IEEE Infocom*, 2015.
Acceptance rate 19%.
12. *Shuai Zuo and I-Hong Hou. Online Scheduling for Energy Efficiency in Real-Time Wireless Networks. In *Proc. of Allerton*, 2014.

13. Rahul Singh, I-Hong Hou, and P. R. Kumar. Fluctuation Analysis of Debt Based Policies for Wireless Networks with Hard Delay Constraints. In *Proc. of IEEE Infocom*, 2014.
Acceptance rate 19%.
14. I-Hong Hou. Providing End-to-End Delay Guarantees for Multi-hop Wireless Sensor Networks. In *Proc. of IEEE Globecom*, 2013.
15. I-Hong Hou, Jing Zhu, and Rath Vannithamby. Incentive-Oriented Downlink Scheduling for Wireless Networks with Real-Time and Non-Real-Time Flows. In *IEEE BWA workshop*, collocated with *IEEE Globecom*, 2013.
16. Rahul Singh, I-Hong Hou, and P. R. Kumar. Pathwise Performance of Debt Based Policies for Wireless Networks with Hard Delay Constraints. In *Proc. of IEEE CDC*, 2013.
17. I-Hong Hou, Yu-Pin Hsu, and Alex Sprintson. Truthful and Non-Monetary Mechanism for Direct Data Exchange. In *Proc. of Allerton*, 2013.
18. I-Hong Hou and Rahul Singh. Scheduling of Access Points for Multiple Live Video Streams. In *Proc. of ACM MobiHoc (Short Paper)*, 2013.
Acceptance rate 18%.
19. Yu-Pin Hsu, I-Hong Hou, and Alex Sprintson. The Index Coding Problem: A Game-Theoretical Perspective. In *Proc. of IEEE ISIT*, 2013.
20. I-Hong Hou, *Yao Liu, and Alex Sprintson. A Non-Monetary Protocol for Peer-to-Peer Content Distribution in Wireless Broadcast Networks with Network Coding. In *Proc. of WiOpt*, 2013.
21. I-Hong Hou and Chung Shue Chen. Self-Organized Resource Allocation in LTE Systems with Weighted Proportional Fairness. In *Proc. of IEEE ICC*, 2012.
22. I-Hong Hou and Anh Truong and Santanu Chakraborty and P.R. Kumar. Optimality of Periodwise Static Priority Policies in Real-time Communications. In *Proc. of IEEE CDC*, 2011.
23. I-Hong Hou and P.R. Kumar. Scheduling Periodic Real-Time Tasks with Heterogeneous Reward Requirements. In *Proc. of IEEE RTSS*, 2011.
Acceptance rate 21%.
24. I-Hong Hou and Piyush Gupta. Distributed Resource Allocation for Proportional Fairness in Multi-Band Wireless Systems. In *Proc. of IEEE ISIT*, 2011.
25. I-Hong Hou and P.R. Kumar. Broadcasting Delay-Constrained Traffic over Unreliable Wireless Links with Network Coding. In *Proc. of ACM MOBIHOC*, 2011.
Acceptance rate 20%.
26. I-Hong Hou and P.R. Kumar. Utility-Optimal Scheduling in Time-Varying Wireless Networks with Delay Constraints. In *Proc. of ACM MOBIHOC*, 2010.
Acceptance rate 17%.
27. I-Hong Hou and P.R. Kumar. Utility Maximization for Delay Constrained QoS in Wireless. In *Proc. of IEEE INFOCOM*, 2010.
Acceptance rate 18%.
28. I-Hong Hou and P.R. Kumar. Scheduling Heterogeneous Real-Time Traffic over Fading Wireless Channels. In *Proc. of IEEE INFOCOM*, 2010.
Acceptance rate 18%.
29. I-Hong Hou and P.R. Kumar. Admission Control and Scheduling for QoS Guarantees for Variable-Bit-Rate Applications on Wireless Channels. In *Proc. of ACM MOBIHOC*, 2009.
Acceptance rate 18%.
30. I-Hong Hou, Vivek Borkar, and P.R. Kumar. A Theory of QoS for Wireless. In *Proc. of IEEE INFOCOM*, 2009.
Acceptance rate 20%.

31. Yong Yang, I-Hong Hou, Jennifer C. Hou, Mallikarjn Shanka, and Nageswara S. Rao. Sensor Placement for Detecting Propagative Sources in Populated Environments. In *Proc. of IEEE INFOCOM*, 2009.
Acceptance rate 20%.
32. I-Hong Hou, Yu-En Tsai, Tarek F. Abdelzaher, and Indranil Gupta. AdapCode: Adaptive Network Coding for Code Updates in Wireless Sensor Networks. In *Proc. of IEEE INFOCOM*, 2008.
Acceptance rate 20%.

Invited Papers

1. *Han Deng and I-Hong Hou. A New Competitive Ratio for Network Applications with Hard Performance Guarantees. In *Proc. of SPCOM*, 2016.
2. I-Hong Hou and P.R. Kumar. A Survey of Recent Results on Real-Time Wireless Networking. In *Proc. of Real-time Wireless for Industrial Applications, CPS Week*, 2011.

Poster Papers and Extended Abstracts

1. *Han Deng and I-Hong Hou. On the Capacity Requirement for Arbitrary End-to-End Deadline and Reliability Guarantees in Multi-hop Networks. In *Proc. of ACM Sigmetrics 2017*.

Demos

1. Simon Yau, *Ping-Chun Hsieh, Rajarshi Bhattacharyya, Kartic Bhargav K. R., Srinivas Shakkottai, I-Hong Hou, and P. R. Kumar. Demo: PULS: Processor-Supported Ultra-Low Latency Scheduling. In *ACM MobiHoc 2018*.
2. Simon Yau, Liang Ge, *Ping-Chun Hsieh, I-Hong Hou, Shuguang Cui, P. R. Kumar, Amal Ekbal, and Nikhil Kundargi. WiMAC: Rapid Implementation Platform for User Definable MAC Protocols Through Separation. In *Sigcomm 2015*.
3. Jren chit Chin, I-Hong Hou, Jennifer C. Hou, Chris Ma, Nageswara S. Rao, Mohit Saxena, Mallikarjun Shankar, Yong Yang, and David K. Y. Yau. A Sensor-cyber Network Testbed for Plume Detection, Identification, and Tracking. In *IPSN 2007, INFOCOM 2007, MOBICOM 2007*.

Technical Reports

1. I-Hong Hou, Yan Gao, Yu-En Tsai, and Jennifer Hou. ERP: An Efficient and Reliable Protocol for Emergency Message Dissemination in Vehicular Ad hoc Networks. Technical report. UIUC Technical report (UILU-ENG-08-2207 DC-236), 2008.

Student Advising

Current PhD Students

1. Shuai Zuo, estimated to graduate on Spring 2018.
2. Ping-Chun Hsieh, estimated to graduate on Summer 2019.
3. Tao Zhao, estimated to graduate on Summer 2020.
4. Daojing Guo, estimated to graduate on Summer 2022.
5. Narges Zarnaghi-Naghsh, estimated to graduate on Summer 2022.

Current MS Students

1. Victor Lin, estimated to graduate on Summer 2018.

2. Yue Yang, estimated to graduate on Summer 2018.
3. Archana Sasikumar, estimated to graduate on Summer 2018.

Graduated PhD Students

1. Han Deng, graduated on Summer 2017. Thesis title: "A New Competitive Ratio for Network Applications with Hard Performance Guarantee."

Graduated MS Students

1. Liu Yao (co-chair), graduated on Fall 2013. Thesis title: "A Packet Scheduling Mechanism for Wireless Peer-to-Peer Content Distribution."
2. Abhishek Jain, graduated on Summer, 2014. Thesis title: "Reliable Downlink Scheduling for Wireless Networks with Real-Time and Non-Real Time Clients."

Funded Projects

"Distributed Network Algorithms for End-to-End Complex QoS Guarantees in Mission-Critical Multi-hop Mobile Networks." Source: ONR. PIs: I-Hong Hou and P. R. Kumar. Duration: 1/1/2018 - 12/31/2020. Total: 300,000. My share: 150,000.

"ICN-WEN: Collaborative Research: SPLICE: Secure Predictive Low-Latency Information Centric Edge for Next Generation Wireless Networks." Source: NSF and Intel. PIs: P. R. Kumar, I-Hong Hou, and Srinivas Shakkottai. Duration: 6/1/2017 - 5/31/2020. Total: 650,000. My share: 216,666.

"Equipment for Research in Networks and Systems." Source: ARO. PI: I-Hong Hou. Total: 144,673

"Modeling and Control of Information Driven Smart Transportation Systems." Source: Qatar National Research Fund. PIs: P. R. Kumar, Alnuweiri Hussein, Mohammad Shaqfeh, Yaser Fallah, I-Hong Hou. Duration: 2/1/2016 - 2/1/2019. Total: 900,000. My share: 62,865.

"EAGER: Pervasive Cyber-enabled Manufacturing." Source: NSF. PIs: Jyhwen Wang, I-Hong Hou, and Jorge Leon. Duration: 9/1/2015 - 8/30/2017. Total: 100,000. My share: 42,471.

"Towards Provably Timely and Reliable Battlefield Networks." Source: ARO. PIs: I-Hong Hou and P. R. Kumar. Duration: 6/15/2015 - 6/14/2018. Total: 480,657. My share: 240,328.

"Advanced MAC Layer Development and Hardware Prototyping." Source: National Instruments. PIs: Shuguang Cui, P.R. Kumar, and I-Hong Hou. Duration: 3/4/2013 - current. Total: 182,500. My share: 60,833.

"Improving Internet Experience Over Next Gen Mobile Broadband." Source: Intel. PIs: P. R. Kumar and I-Hong Hou. Duration: 2/22/2012 - 2/21/2013. Total:100,000. My share: 50,000.

Professional Services

Guest Editor

IEEE Journal on Selected Areas in Communications (JSAC), Special Issue on Ultra-Reliable Low-Latency Communications in Wireless Networks, 2018

Workshop Co-Chair

ACM International Symposium on Mobile Ad Hoc Networking and Computing (MobiHoc), 2014

Co-Chair

International Workshop on Indoor and Outdoor Small Cells, collocated with WiOpt 2014

Symposium Co-Chair

IEEE/CIC International Conference on Communications in China (ICCC): Future and Mobile Internet (FMI) 2013

Technical Program Committee

IEEE Infocom 2015, 2016, 2017, 2018
ACM MobiHoc 2012, 2013, 2014, 2015, 2016, 2017, 2018
WiOpt 2015, 2016, 2017, 2018
ACM ICN 2018
IEEE ICC 2015, 2016, 2017, 2018
IEEE Globecom 2015, 2016, 2017
ACM/IEEE ICCPS 2013
IEEE ICCCN 2013, 2018
IEEE PIMRC 2014, 2015, 2016
IEEE ICC 2015
FNSS 2015
IEEE Workshop on 5G Technologies (collocated with IEEE ICC) 2014
IEEE BackNets (collocated with IEEE ICC) 2015
RAWNET (collocated with WiOpt) 2015
IEEE ISSNIP 2013
Euromicro DSD 2013, 2014, 2015, 2016, 2017
CCBD 2015
WINCOM 2017

Reviewer

IEEE Journal on Selected Areas in Communication, IEEE/ACM Transactions on Networking, IEEE Transactions on Information Theory, ACM Transactions on Sensor Networks, ACM Transactions on Modeling and Performance Evaluation of Computing Systems, ACM Transactions on Cyber-Physical Systems, IEEE Transactions on Communications, IEEE Transactions on Wireless Communications, IEEE Transactions on Mobile Computing, IEEE Transactions on Parallel and Distributed Systems, IEEE Transactions on Vehicular Technology, IEEE Transactions on Computers, ACM Transactions on Embedded Computing Systems, Wireless Networks, International Journal of Communication Systems, Computer Networks Journal, IEEE Communication Letters, IEEE Wireless Communications Letters, IEEE Transactions on Cyber Physical Systems, Elsevier Journal of Parallel and Distributed Computing, IET Computers & Digital Techniques, IIE Transactions, Transactions on Emerging Telecommunications Technologies, British Journal of Mathematics and Computer Science, Globecom, ICC, VTC, etc.

Invited Talks and Special Presentations

1. **“A non-monetary mechanism for optimal rate control through efficient delay allocation,”** ITA workshop, 2018.
2. **“Delay analysis of queueing networks with context-switching overhead,”** European Conference on Queueing Theory, 2016.
3. **“A New Competitive Ratio for Network Applications with Hard Performance Guarantees,”** SPCOM, 2016.
4. **“Rethinking Competitive Ratio: A Case Study of WiFi Offloading,”** ITA workshop, 2015.
5. **“Does Network Coding Improve Throughput in Non-cooperative Wireless D2D Network?,”** ITA workshop, 2014.
6. **“An Energy-Aware Protocol for Self-Organizing Heterogeneous LTE Systems,”** TREND/GreenTouch Joint Workshop on Green and Energy Efficient Networking, 2013.
7. **“A Non-Monetary Protocol for Peer-to-Peer Content Distribution in Wireless Broadcast Networks with Network Coding,”** ITA Workshop, 2013.
8. **“Timely-Throughput in Wireless,”** ACM S3 Workshop, joint with ACM MobiCom/MobiHoc, Chicago, 2010.

9. **“A Theory of QoS for Wireless,”** US-Australia Workshop: Self-Organizing Wireless Networks Based on Cross Layer Interactions, Sydney, 2008.

May 28, 2018