



# The Third International Conference on *Quality of Service in Heterogeneous Wired/ Wireless Networks*

*QShine 2006*

Conference Centre  
University of Waterloo  
Waterloo, Ontario, Canada  
August 7 – 9, 2006

*Sponsored by Create-Net and ICST  
In-cooperation with ACM SIGMOBILE*

<http://www.qshine.org>

## *Final Technical Program*

August 7, 2006, Monday

[University of Waterloo Conference Centre](#)

Continental Breakfast

7:30 a.m. — 8:30 a.m.

## Opening Remarks and Welcome

8:30 a.m. — 8:45 a.m.

Jon Mark (*University of Waterloo*), General Chair

Sherman (Xuemin) Shen (*University of Waterloo*), General Co-Chair

Baochun Li (*University of Toronto*) and Prasant Mohapatra (*University of California, Davis*), Program Co-chairs

8:45 a.m. — 9:00 a.m.

## Award Presentation

### [IEEE Koji Kobayashi Computers and Communications Award](#)

The 2006 IEEE Koji Kobayashi Award is presented by **Professor Mischa Schwartz** to

**Professor Nicholas F. Maxemchuk, Columbia University**

For contributions to Metropolitan and Local Area Networks, reliable multicast, and protocol testing

## Keynote Address

Professor [Nicholas F. Maxemchuk](#), Columbia University

9:00 a.m. — 10:00 a.m.

### [Reliable Neighborcast: A New Communications Paradigm for Vehicle-to-Vehicle Applications](#)

*Chair: Jon Mark, University of Waterloo*

## Coffee and Tea Break

10:00 a.m. — 10:30 a.m.

## Session 1A: Featured Presentations: Best Paper Award Winner and Invited Papers

10:30 a.m. — 12:00 p.m.

*Session Chair: Baochun Li (University of Toronto)*

**10:30 a.m. — 11:15 p.m.**

**Best Paper Award Winner:** "Energy Efficient Cooperative Rate Adaptation in IEEE 802.11-based Multi-hop Networks," *Kun Wang (University of Science and Technology of China), Fan Yang (Microsoft Research Asia), Qian Zhang (Hong Kong University of Science and Technology), Dapeng Oliver Wu (University of Florida), and Yinlong Xu (University of Science and Technology of China)*

**Presented by:** Professor Qian Zhang (Hong Kong University of Science and Technology)

**11:15 a.m. — 12:00 p.m.**

**Invited Paper Presentation:** "What is the Right Model for Wireless Channel Interference?" *Aravind Iyer (Purdue University), Catherine Rosenberg, and Aditya Karnik (University of Waterloo)*

**Presented by:** Professor Catherine Rosenberg (University of Waterloo)

### Session 1B: Resource Allocation and Admission Control in Wireless Networks

**10:30 a.m. — 12:00 p.m.**

*Session Chair: Yuguang Fang (University of Florida)*

"Statistical Multiplexing, Admission Region, and Contention Window Optimization in Multiclass Wireless LANs," *Yu Cheng (University of Toronto), Xinhua Ling, Lin Cai, Wei Song, Weihua Zhuang, Xuemin Shen (University of Waterloo), Alberto Leon-Garcia (University of Toronto)*

"Resource Reservation and Admission Control in IEEE 802.11 WLANs," *Robil Daher and Djamshid Tavangarian (Rostock University, Germany)*

"End-to-End Rate Allocation in Multi-Radio Wireless Mesh Networks: Cross-Layer Schemes," *Jian Tang, Guoliang Xue and Weiyi Zhang (Arizona State University)*

### Conference Lunch

**12:00 p.m. — 2:00 p.m.**

### Session 2A: Best Paper Award Finalist and Energy-aware Protocols

**2:00 p.m. — 3:30 p.m.**

*Session Chair: Prasant Mohapatra (University of California, Davis)*

**Runner-Up, Best Paper Award:** "Jitter Free Probability Bounds for Video Streaming over Random VBR Channel," *Guanfeng Liang and Ben Liang (University of Toronto)*

"e-QoS: Energy-aware QoS for Application Sessions Across Multiple Protocol Domains in Mobile Computing," *Hanping Lufei and Weisong Shi (Wayne State University)*

"Energy Aware Efficient Geographic Routing in Lossy Wireless Sensor Networks with Environmental Energy Supply," *Kai Zeng, Kui Ren, and Wenjing Lou (Worcester Polytechnic Institute)*

## Session 2B: Multiple Access: Design, Analysis and Performance

2:00 p.m. — 3:30 p.m.

*Session Chair: Ekram Hossain (University of Manitoba)*

*"Double Sense Multiple Access for Wireless Ad Hoc Networks," Yang Yang, Feiyi Huang (University College London), Xuanye Gu (British Telecom), Mohsen Guizani (Western Michigan University), and Hsiao-Hwa Chen (National Sun Yat-Sen University, Taiwan)*

*"Saturated Throughput Analysis of IEEE 802.11e Using Two-Dimensional Markov Chain Model," Lixiang Xiong and Guoqiang Mao (University of Sydney)*

*"Performance of A Burst-Frame-Based CSMA/CA Protocol for High Data Rate Ultra-Wideband Networks: Analysis and Enhancement," Kejie Lu (University of Puerto Rico at Mayaguez), Jianfeng Wang, Dapeng Wu, and Yuguang Fang (University of Florida)*

## Coffee and Tea Break

3:30 p.m. — 4:00 p.m.

## Session 3A: Algorithms in Sensor Networks

4:00 p.m. — 5:30 p.m.

*Session Chair: Jelena Masic (University of Manitoba)*

*"Localized Algorithms for Coverage Boundary Detection in Wireless Sensor Networks," Chi Zhang, Yanchao Zhang, and Yuguang Fang (University of Florida)*

*"Algorithm Design for Base Station Placement Problems in Sensor Networks," Yi Shi, Y. Thomas Hou (Virginia Tech), and Alon Efrat (University of Arizona)*

*"Multi-constrained Soft-QoS Provisioning in Wireless Sensor Networks," Xiaoxia Huang and Yuguang Fang (University of Florida)*

## Session 3B: Clustering and Routing in Sensor Networks

4:00 p.m. — 5:30 p.m.

*Session Chair: Qian Zhang (Hong Kong University of Science and Technology)*

*"Network Lifetime Equalization in Interconnected 802.15.4 Clusters," Jelena Masic, Carol J. Fung, and Vojislav B. Masic (University of Manitoba)*

*"Clustering and Load Balancing in Hybrid Sensor Networks with Mobile Cluster Heads," Ming Ma and Yuanyuan Yang (State University of New York, Stony Brook)*

*"MESTER: Minimum Energy Spanning Tree for Efficient Routing in Wireless Sensor Networks," Yang Yang (University College London, UK), Huihai Wu (Brunel University, UK), and Weihua Zhuang (University of Waterloo)*

**Conference Banquet**

[Canadian Clay and Glass Gallery, Waterloo, Ontario](#)

7:00 p.m. — 10:00 p.m.

**QShine 2006 Poster Session**

12:30 p.m. — 5:30 p.m.

*"A Link Performance Model for Multi-User Wireless Fading Channels," Xinhua Ling, Mehrdad Dianati, Jon W. Mark, and Xuemin (Sherman) Shen (University of Waterloo)*

*"Score: A Sensor Core Framework for Cross-Layer Design," Safwan Al-Omari, Junzhao Du, and Weisong Shi (Wayne State University)*

*"An Optimization Framework for Balancing Throughput and Fairness in Wireless Networks with QoS Support," Ho Ting Cheng and Weihua Zhuang (University of Waterloo)*

*"PBMR: Power-Balancing Multipath Routing Protocol for Wireless Sensor Networks," Yunfeng Chen and Nidal Nasser (University of Guelph)*

*"Optimal Placement of Relay Infrastructure in Heterogeneous Wireless Mesh Networks by Bender's Decomposition," Aaron So and Ben Liang (University of Toronto)*

*"TCP Throughput Performance in IEEE 802.11-Based Multi-hop Wireless Networks," Min Shen and Dongmei Zhao (McMaster University)*

*"Cluster-based Routing Protocol for Mobile Sensor Networks," Liliana M. Arboleda C. and Nidal Nasser (University of Guelph)*

*"Performance of STT-Vegas in Heterogeneous Wired and Wireless Networks," Hong Zhou (University of Southern Queensland, Australia), Amoakoh Gyasi-Agyei (Central Queensland University, Australia), Zhongwei Zhang (University of Southern Queensland, Australia)*

**August 8, 2006, Tuesday**

[University of Waterloo Conference Centre](#)

**Continental Breakfast**

8:00 a.m. — 9:00 a.m.

## Keynote Address

Professor [Mischa Schwartz](#), Charles Batchelor Professor Emeritus, Columbia University

9:00 a.m. — 10:00 a.m.

### [Learning from the Past: “Wired City” to Wireless Society](#)

*Chair: Sherman (Xuemin) Shen, University of Waterloo*

## Coffee and Tea Break

10:00 a.m. — 10:30 a.m.

## Session 4A: Multi-hop Wireless Networks

10:30 a.m. — 12:00 p.m.

*Session Chair: Brian Mark (George Mason University)*

“An Adaptive MAC Scheme to Achieve High Channel Throughput and QoS Differentiation in a Heterogeneous WLAN,” *Wei Zha, Rose Qingyang Hu (Mississippi State University), Yi Qian (University of Puerto Rico at Mayaguez), and Yu Cheng (University of Toronto)*

“Stability-based Multi-objective Clustering in Mobile Ad Hoc Networks,” *Hui Cheng, Jiannong Cao (Hong Kong Polytechnic University), Xingwei Wang (Northeastern University), Sajal K. Das (University of Texas at Arlington)*

“Prediction-based Routing for Real Time Communications in Wireless Multi-hop Networks,” *Shouyi Yin (Tsinghua University), Yongqiang Xiong (Microsoft Research Asia), Qian Zhang (Hong Kong University of Science and Technology), Xiaokang Lin (Tsinghua University)*

## Session 4B: Pricing, Incentives, and Overlays

10:30 a.m. — 12:00 p.m.

*Session Chair: Baochun Li (University of Toronto)*

“Engineering Pricing Incentives for Efficient Bandwidth Utilization in LambdaGrids,” *Sumit Naiksatam, Stephen A. Chiappari, and Silvia Figueira (Santa Clara University)*

“Achieving Optimal Revenues in Dynamically Priced Network Services with QoS Guarantees,” *Steven Shelford, Gholamali C. Shoja, and Eric G. Manning (University of Victoria)*

“Improving Gnutella Network Performance Using Synthetic Coordinates,” *Andre Dufour and Ljiljana Trajkovic (Simon Fraser University)*

## Conference Lunch

12:00 p.m. — 1:30 p.m.

### Session 5A: Heterogeneous Wireless Networks

1:30 p.m. — 3:30 a.m.

*Session Chair: Weihua Zhuang (University of Waterloo)*

*"SAP: Seamless Authentication Protocol for Vertical Handoff in Heterogeneous Wireless Networks," Scott C.-H. Huang (City University of Hong Kong), Hao Zhu (Florida International University), Wensheng Zhang (Iowa State University)*

*"On the Performance of Traffic Equalizers on Heterogeneous Communication Links," Ji Li (MIT), Jack Brassil (HP Laboratories)*

*"Performance of Network Aware Prefetching in Heterogeneous Wireless Systems," Ben Liang, Stephen Drew (University of Toronto)*

*"Improve Transmission Reliability with Multi-AP Diversity in Wireless Networks: Architecture and Performance Analysis," Yanfeng Zhu (Tsinghua University), Qian Zhang (Hong Kong University of Science and Technology), Zhisheng Niu (Tsinghua University), Jing Zhu (Intel)*

### Session 5B: Quality of Service in Wireline Networks

1:30 p.m. — 3:30 p.m.

*Session Chair: Yi Cui (Vanderbilt University)*

*"A Distributed Approach for Multi-Constrained Path Selection and Routing Optimization," Zhenjiang Li and J.J. Garcia-Luna-Aceves (University of California, Santa Cruz)*

*"Towards Connecting Base Stations over Metro Gigabit Ethernets," Rainer Baumann and Ulrich Fiedler (ETH Zurich)*

*"Prediction Error Adaptation of Input Traffic for Absolute and Proportional Delay Differentiation," Kyung Mook Lim (Electronics and Telecommunications Research Institute, South Korea), JungHoon Paik (Dong-Ah Broadcasting College, South Korea), Jeong-dong Ryoo (Electronics and Telecommunications Research Institute, South Korea)*

*"Proactively Controlling RTT Variation and Packet Drops Using SmoothTCP-q," Elvis Vieira and Michael Bauer (University of Western Ontario)*

### Coffee and Tea Break

3:30 p.m. — 4:00 p.m.

### Session 6A: Multimedia

4:00 p.m. — 6:00 p.m.

*Session Chair: Lin Cai (University of Victoria)*

"Capacity of UWB Networks Supporting Multimedia Services," *Lin X. Cai (University of Waterloo), Lin Cai (University of Victoria), Xuemin (Sherman) Shen, and Jon W. Mark (University of Waterloo)*

"Balancing Uplink and Downlink Delay of VoIP Traffic in WLANs using Adaptive Priority Control (APC)," *Sangho Shin and Henning Schulzrinne (Columbia University)*

"A Progressive Flow Auction Approach For Low-Cost On-Demand P2P Media Streaming," *Zongpeng Li, Anirban Mahanti (University of Calgary)*

"The Weighted Proportional Fair Scheduler," *Kinda Khawam, Daniel Kofman (GET/ENST - Telecom Paris), and Eitan Altman (INRIA Sophia Antipolis)*

### **Session 6B: Cross-Layer Design**

**4:00 p.m. — 6:00 p.m.**

*Session Chair: Song Ci (University of Nebraska, Lincoln)*

"Cross-Layer-Model Based Adaptive Resource Allocation for Statistical QoS Guarantees in Mobile Wireless Networks," *Jia Tang and Xi Zhang (Texas A&M University)*

"Evaluation of Throughput Estimation Models and Algorithms for WLAN Frequency Planning," *Timo Vanhatupa, Marko Hännikäinen and Timo D. Hämäläinen (Tampere University of Technology, Finland)*

"Effects of Link-Level Queueing and Truncated ARQ on TCP Throughput in Multi-rate Wireless Networks," *Long B. Le, Ekram Hossain (University of Manitoba), and Tho Le-Ngoc (McGill University)*

"Cross-Layer Combination of Hybrid ARQ and Adaptive Modulation and Coding for QoS Provisioning in Wireless Data Networks," *Dalei Wu and Song Ci (University of Nebraska, Lincoln)*

**August 9, 2006, Wednesday**

[University of Waterloo Conference Centre](#)

### **Session 7A: Scheduling**

**9:00 a.m. — 10:00 a.m.**

*Session Chair: Dongmei Zhao (McMaster University)*

"Real-Time Voice Traffic Scheduling and its Optimization in IEEE 802.11 Infrastructure-Based Wireless Mesh Networks," *Jun Zou and Dongmei Zhao (McMaster University)*

"An Adaptive Contention-based Scheduling Scheme for Proportional Service Differentiation in Multichannel Wireless Networks," *Aura Ganz (University of Massachusetts at Amherst)*

### **Session 7B: Admission Control**

**9:00 a.m. — 10:00 a.m.**

*Session Chair: Sagar Naik (University of Waterloo)*

"An Admission Control Algorithm for Multi-hop 802.11e based WLANs," Yuxia Lin, Vincent W.S. Wong (University of British Columbia), Michael Cheung (Cisco)

"A Game Theoretic Approach to Bandwidth Allocation and Admission Control for Polling Services in IEEE 802.16 Broadband Wireless Networks," Dusit Niyato and Ekram Hossain (University of Manitoba)

### Coffee and Tea Break

10:00 a.m. — 10:30 a.m.

### Session 8A: Fairness

10:30 a.m. — 12:00 p.m.

Session Chair: Ben Liang (University of Toronto)

"Opportunistic Fair Scheduling for the Downlink of IEEE 802.16 Wireless Metropolitan Area Networks," Mehri Mehrjoo, Mehrdad Dianati, Xuemin (Sherman) Shen, and Kshirasagar Naik (University of Waterloo)

"Distributed Schemes for Fair Throughput in Infrastructure-Based IEEE 802.11 Mesh Networks," Dongmei Zhao (McMaster University)

"On the Fairness of Flow Aggregation for Denial-of-Service Resistant QoS in MANETs," Marek Hejmo, Brian Mark, Charikleia Zouridaki (George Mason University), and Roshan Thomas (SPARTA, Inc.)

### Session 8B: Bandwidth Adaptation and Mobility

10:30 a.m. — 12:00 p.m.

Session Chair: Xi Zhang (Texas A&M University)

"Utility-based Optimal Bandwidth Adaptation for Multi-Class Traffic QoS Provisioning in Wireless Networks," Ning Lu and John Bigham (University of London, UK)

"A Novel Approach of Service Management in Wireless Mobile Networks," Omneya Issa and Jean-Charles Gregoire (University of Quebec)

"A Hierarchical Agent Assisted MIPv6 Handover Scheme with QoS support," Yan Cheng and J. W. Atwood (Concordia University)

### Concluding Remarks and Farewell

12:00 p.m. — 12:15 p.m.

Jon Mark (University of Waterloo), General Chair

Sherman (Xuemin) Shen (University of Waterloo), General Co-Chair

Baochun Li (University of Toronto) and Prasant Mohapatra (University of California, Davis), Program Co-chairs

