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### **Current Research Interests:**

Research interests include broadband wireless communications and networks, multiple access techniques, diversity techniques, cooperative communications, infrastructure-based and infrastructure-less wireless networks, wireless/wireline interworking, resource and mobility management, network access, service scheduling, routing, flow/congestion control.

### **Books:**

**J.W. Mark** and W. Zhuang, *Wireless Communications and Networking*, Prentice-Hall, 2003 (translated into Chinese in 2004).

L. Cai, X. Shen and **J.W. Mark**, *Multimedia Services in Wireless Internet: Modeling and Analysis*, John Wiley & Sons, 2009.

D.T.C. Wong, P-Y. Kong, Y-C. Liang, K.C. Chua and **J.W. Mark**, *Wireless Broadband Networks*, John Wiley & Sons, 2009.

W.H. Tranter, D.P. Taylor, R.E. Ziemer, N.F. Maxemchuk and **J.W. Mark**, eds., *The Best of the Best: Fifty Years of Communications and Networking Research*, The Institute of Electrical and Electronic Engineers and John Wiley & Sons, 2007.

### **Recent Journal Publications:**

M.K. Awad, M. Mehrjoo, V. Mahinthan, X. Shen and **J.W. Mark**, "A Dual Decomposition-based Resource Allocation for OFDMA Networks with Imperfect CSI," *IEEE Trans. on Vehicular Technology*, to appear.

L.X. Cai, L. Cai, X. Shen, **J.W. Mark** and Q. Zhang, "Protocol Design and Optimization for Multi-hop Ultra-wideband Networks," *IEEE Trans. on Wireless Communications*, to appear.

L.X. Cai, X. Shen and **J.W. Mark**, "Efficient MAC Protocol for Ultra-wideband Networks," *IEEE Communications Magazine*, to appear.

V. Mahinthan, **J.W. Mark** and X. Shen, "Performance Analysis and Power Allocation for M-QAM Cooperative Diversity Systems," *IEEE Trans. on Wireless Communications*, to appear.

S. Pack, X. Shen, **J.W. Mark** and J. Pan, "Mobility Management in Mobile Hotspots with Heterogeneous Multi-Hop Wireless Links," *IEEE Communications Magazine*, special issue in *Technologies in Multihop Cellular Networks*, to appear.

M. Shi, X. Shen, **J.W. Mark** and D. Zhao, "User Authentication and Undeniable Billing Support for Agent-Based Roaming Service in WLAN/Cellular Integrated Mobile Networks," *Computer Networks* (Elsevier), to appear.

S. Pack, X. Shen and **J.W. Mark**, "Optimizing Truncated ARQ Scheme over Wireless Fading Channels," *IEEE Trans. on Vehicular Technology*, to appear.

X. Ling, **J.W. Mark**, X. Shen and Y. Cheng, "A Generic Framework for Modeling of MAC Protocols in Wireless Broadband Access Networks," *IEEE Networks* special issue on *Advances in Broadband Access Networks*, to appear.

L.X. Cai, X. Shen, **J.W. Mark** and L. Cai, "Capacity Analysis of IEEE 802.11n," *ACM/Wireless Networks*, to appear.

M. Shi, L. Xu, X. Shen, **J.W. Mark**, and A. Saleh, "Air Interface Switching and Performance Analysis for Fast Vertical Handoff in Cellular Network and WLAN Interworking," *Wireless Communications & Mobile Computing* (Wiley), to appear.

L. Cai, X. Shen, **J.W. Mark** and J. Pan, "QoS Support in Wireless/Wired Networks Using TCP-Friendly AIMD Protocols," *IEEE Trans. on Wireless Communications*, to appear.

L.X. Cai, L. Cai, X. Shen and **J.W. Mark**, "REX: a Randomized EXclusive Region based Scheduling Scheme for mmWave WPANs with Directional Antenna," *IEEE Trans. on Wireless Communications*, vol. 9, no. 1, Jan. 2010.

L.X. Cai, L. Cai, X. Shen and **J.W. Mark**, "Capacity Analysis of UWB Networks in Three-Dimensional Space," *IEEE/KICS J. Commu. and Networks (JCN)*, vol. 11, no. 3, pp. 287-296, 2009.

L.X. Cai, X. Shen and **J.W. Mark**, "Efficient MAC Protocol for Ultra-wideband Networks," *IEEE Communications Magazine*, vol. 47, no. 6, pp. 179-185, 2009.

L.X. Cai, X. Ling, X. Shen, **J.W. Mark** and L. Cai, "Supporting Voice and Video Applications over IEEE 802.11n WLANs," *ACM Wireless Networks (WINET)*, vol. 15, no. 4, pp. 443-454, May 2009.

L.X. Cai, L. Cai, X. Shen and **J.W. Mark**, "Resource Management and QoS Provisioning for IPTV over mmWave-based WPANs with Directional Antenna," *ACM MONET*, vol. 14, no. 2, pp. 210-219, 2009.

V. Mahinthan, H. Rutagemwa, **J.W. Mark** and X. Shen, "Cross-Layer Performance Study of Cooperative Diversity System with ARQ," *IEEE Trans. on Vehicular Technology*, vol. 58, no. 2, pp. 705-719, Feb. 2009.

J. Cai, S. Alfa, P. Ren, X. Shen and **J.W. Mark**, "Packet Level Performance Analysis in Wireless User-Relaying Networks," *IEEE Trans. on Wireless Communications*, vol. 7, no. 12, pp. 5336-5345, Dec. 2008.

S. Pack, H. Rutagemwa, X. Shen, **J.W. Mark** and K. Park, "Proxy-based Wireless Data Access Algorithms in Mobile Hotspot", *IEEE Trans. on Vehicular Technology*, vol. 57, no. 5, pp. 3165-3177, Sept. 2008.

X.P. Mao and **J.W. Mark**, "Polarization Filtering for Narrowband Interference Suppression in Ultra-Wideband Communications," *Wireless Communications and Mobile Computing (Wiley)*, vol. 8, no. 7, pp. 941-952, Sept. 2008.

K.-H. Liu, X. Ling, X. Shen and **J.W. Mark**, "Performance Analysis of Prioritized MAC in UWB-WPAN with Bursty Multimedia Traffic," *IEEE Trans. on Vehicular Technology*, vol. 57, no. 4, pp. 2462-2473, July 2008.

T.C. Wong, **J.W. Mark** and K.C. Chua, "Cross-Layer Performance Analysis of Multiclass Services in a Multi-Time-Hopping PPM UWB System with Rake Receivers," *IEEE Trans. on Wireless Communications*, vol. 7, no.6, pp.2243-2252, June 2008.

X. Ling, Y. Cheng, **J.W. Mark** and X. Shen, "A Renewal Theory Based Analytical Model for the Contention Access Period of IEEE 802.15.4 MAC," *IEEE Trans. on Wireless Communications*, vol. 7, no. 6, pp. 2340-2349, June 2009.

L. Zhao and J.W. Mark, "Joint Rate and Power Adaptation for Radio Resource Management in Uplink Wideband CDMA Systems," *IET on Communications*, vol. 2, no. 4, pp. 562-572, April 2008.

J. Cai, X. Shen, **J.W. Mark** and A.S. Alfa, "Semi-distributed User Relaying Algorithm for Amplify-and-Forward Wireless Relay Networks," *IEEE Trans. Wireless Communications*, vol. 7, no. 4, pp. 1348-1356, April 2008.

J. Xu, X. Shen, **J.W. Mark** and J. Cai, "Quasi-Optimal Channel Assignment for Real-Time Video in OFDM Wireless Systems", *IEEE Trans. on Wireless Communications*, vol. 7, no. 4, pp. 1417-1427, April 2008.

J. Cai, K.-H. Liu, X. Shen, **J.W. Mark** and T.D. Todd, "Power Allocation and Scheduling for Ultra-Wideband Wireless Networks," *IEEE Trans. on Vehicular Technology*, vol. 57, no. 2, pp. 1103-1112, March 2008.

V. Mahinthan, L. Cai, **J.W. Mark** and X. Shen, "Partner Selection Based on Optimal Power Allocation in Cooperative Diversity Systems," *IEEE Trans. on Vehicular Technology*, vol. 57, no. 1, pp. 511-520, Jan. 2008.

S. Pack, X. Shen, **J.W. Mark** and L. Cai, "Throughput Analysis of TCP-Friendly Rate Control in Mobile Hotspots," *IEEE Trans. on Wireless Communications*, vol. 7, no. 1, pp. 193-203, Jan. 2008.

X. Ling, Y. Cheng, X. Shen and **J.W. Mark**, "Voice Capacity Analysis of WLANs with Channel Access Prioritizing Mechanisms," *IEEE Communications Magazine*, vol. 46, no. 1, pp. 82-89, 2008.

S. Pack, X. Shen, **J.W. Mark** and L. Cai, "A Two-Phase Loss Differentiation Algorithm for Improving TFRC Performance in IEEE 802.11 WLANs," *IEEE Trans. Wireless Communications*, vol. 6, no. 11, pp. 4164-4175, Nov. 2007.

K.-H. Liu, H. Rutgemwa, X. Shen and **J.W. Mark**, "Efficiency and Goodput Analysis of Dly-ACK in IEEE 802.3," *IEEE Trans. on Vehicular Technology*, vol. 56, no. 6, pp. 3888-3898, Nov. 2007.

H. Rutagemwa, S. Pack, X. Shen and **J.W. Mark**, "Robust Cross-layer Design of Wireless Profiled TCP Mobile Receiver for Vertical Handover," *IEEE Trans. on Vehicular Technology*, vol. 56, no. 6, pp. 3899-3911, Nov. 2007.

S. Pack, H. Rutagemwa, X. Shen, **J.W. Mark** and L. Cai, "Performance Analysis of Mobile Hotspots with Heterogeneous Wireless Links," *IEEE Trans. Wireless Communications*, vol. 6, no. 10, pp. 3717-3727, Oct. 2007.

M. Shi, H. Rutagemwa, X. Shen, **J.W. Mark** and A. Saleh, "A Service Agent Based Roaming Architecture for WLAN/Cellular Integrated Networks," *IEEE Trans. Vehicular Technology*, vol. 56, no. 5, pp. 3168-3181, Sept. 2007.

S. Pack, X. Shen, **J.W. Mark** and J. Pan, "Adaptive Route Optimization in Hierarchical Mobile IPv6 Networks," *IEEE Trans. on Mobile Computing*, vol. 6, no. 8, pp. 903-914, Aug. 2007.

V. Mahinthan, L. Cai, **J.W. Mark** and X. Shen, "Maximizing Cooperative Diversity Energy Gain for Wireless Networks," *IEEE Trans. on Wireless Communications*, vol. 6, no. 7, pp. 2530-2539, July 2007.

J. Xu, X. Shen, **J.W. Mark** and J. Cai, "Adaptive Transmission of Multi-layered Video over Wireless Fading Channels," *IEEE Trans. on Wireless Communications*, vol. 6, no. 6, pp. 2305-2314, June 2007.

H. Rutagemwa, M. Shi, X. Shen and **J.W. Mark**, "Wireless Profiled TCP Performance over Integrated Wireless LANs and Cellular Networks," *IEEE Trans. on Wireless Communications*, vol. 6, no. 6, pp. 2294-2304, June 2007.

J. Xu, X. Shen, **J.W. Mark**, J. Cai, "Mobile Location Estimation for DS-CDMA Systems using Self-Organizing Maps," *Wireless Communications and Mobile Computing*, Wiley, vol. 7, no. 5, pp. 581-594, 2007.

H. Rutagemwa, X. Shen and **J.W. Mark**, "Transfer Delay Analysis of WAP 2.0 over Wireless links for Short-Lived Flows," *IEEE Trans. on Vehicular Technology*, vol. 56, no. 3, pp. 1418-1426, May 2007.

L. Cai, X. Shen, **J.W. Mark** and J. Pan, "Performance Modeling and Analysis of Window-Controlled Multimedia Flows in Wireless/Wired Networks," *IEEE Trans. on Wireless Communications*, vol. 6, no. 4, pp. 1356-1365, April 2007.

T.C. Wong, **J.W. Mark** and K.C. Chua, "Video Services in a Round Robin Carrier-Hopping Multirate Multi-Carrier DS-CDMA System," *IEEE Trans. on Wireless Communications*, vol. 6, no. 3, pp. 993-1002, March 2007.

J. Pan, L. Cai, X. Shen and **J.W. Mark**, "Identity-based Security in Ad Hoc Networks," *Computer Networks* (Elsevier), vol. 51, pp. 853-865, Feb. 2007.

V. Mahinthan, **J.W. Mark** and X. Shen, "A Cooperative Diversity Scheme Based on Quadrature Signaling," *IEEE Trans. on Wireless Communications*, vol. 6, no. 1, pp. 41-45, Jan. 2007.

L. Zhao, G. Yao and **J.W. Mark**, "Mobile Positioning Based on Relaying Capability of Mobile Stations in a Hybrid Wireless Network," *IEE Proc. on Communications*, vol. 153, no. 5, pp. 762-770, Oct. 2006.

L. Zhao, **J.W. Mark** and J. Ding, "Power Distribution and Allocation in Multirate Wideband CDMA Systems," *IEEE Trans. on Wireless Communications*, vol. 5, no. 9, pp. 2458-2467, Sept. 2006.

J. Xu, X. Shen, **J.W. Mark** and J. Cai, "Efficient Channel Utilization for Real-time Video in OVSA-CDMA Systems with QoS Assurance," *IEEE Trans. on Wireless Communications*, vol. 5, no. 6, pp. 1382-1391, June 2006.

L.X. Cai, X. Shen, **J.W. Mark**, L. Cai and Y. Xiao, "Voice Capacity Analysis of WLAN with Unbalanced Traffic," *IEEE Trans. on Vehicular Technology*, vol. 55, no. 3, pp. 752-761, May 2006.

L. Cai, J. Ye, J. Pan, X. Shen and **J.W. Mark**, "Dynamic Server Selection Using Fuzzy Inference in Content Distribution Networks," *Computer Communications*, vol. 29, no. 8, pp. 1026-1038, 2006.

D. Zhao, X. Shen and **J.W. Mark**, "QoS Guarantee and Optimum Power Distribution for Soft Handoff Connections in Cellular CDMA Downlinks," *IEEE Trans. on Wireless Communications*, vol. 5, no. 4, pp. 910-919, April 2006.

D. Zhao, X. Shen and **J.W. Mark**, "Soft Handoff and Connection Reliability in Cellular CDMA Downlinks," *IEEE Trans. on Wireless Communications*, vol. 5, no. 2, pp. 354-365, Feb. 2006.

J. Cai, X. Shen, **J.W. Mark**, H. Liu and T. Todd, "Semiblind Channel Estimation for Pulsed-based Ultra-Wideband Wireless Communications Systems," *IEEE Trans. on Vehicular Technology*, vol. 55, no. 1, pp. 95-103, Jan. 2006.

J. Pan, **J.W. Mark** and X. Shen, "TCP Performance with Segment-in-Flight Estimation Algorithm over Wireless Links," *Dynamics of Continuous, Discrete and Impulsive Systems, Series B: Applications & Algorithms*, vol. 13, pp. 77-94, 2006.

**Recent Ph.D. theses supervised/co-supervised:**

L.X. Cai, *Design and Analysis of Medium Access Control Protocols for Broadband Wireless Networks*, 2009.

V. Mahinthan, *Cooperative diversity and Partner Selection in Wireless Networks*, 2007

X. Ling, *Performance Analysis of Distributed MAC Protocols for Wireless Networks*, 2007.

H. Rutagemwa, *Performance Modeling, Design and Analysis of Transport Mechanisms in Integrated Wireless Networks*, 2007.

J. Xu, *Efficient Radio Resource Allocation for Real-Time Video with QoS Assurance*, 2006.

M Shi, *Service Integration and Authentication in WLAN/Cellular Mobile Networks*, 2006.

L. Cai, *Transport Layer Protocol Design for Multimedia Wireless/Wired Networks*, 2005.

J. Zhang, *Soft Handoff in MC-CDMA Cellular Networks Supporting Multimedia Services*, 2004.

J. Cai, *Transceiver design in OFDM Wireless Communication Systems to Support Heterogeneous Packet Transmission*, 2004.

**Recent M.A. Sc theses supervised/co-supervised:**

S. Chang, *MAC Protocol for Integrated Video/Data Services in WLAN*, 2007.

L.X. Cai, *Performance Analysis of Infrastructure-Based WLAN with Finite Asymmetric Traffic*, 2005.

A. Chan, *Wireless Packet Data Traffic Modelling*, 2004.