

Curriculum Vitae

Jan. 1, 2008

Chunming Qiao

201 Bell Hall

Department of Computer Science and Engineering
University at Buffalo (SUNY), Buffalo, NY 14260-2000
716-645-3180 ext. 140 (fax 716-645-3464)
qiao@computer.org (<http://www.cse.buffalo.edu/~qiao>)

EDUCATION

- B.S.** 1980-1985, University of Science and Technology of China (Computer Science and Engineering).
Graduate Study 1985-1987, Shanghai Jiao Tong University (SJTU) (Computer Science and Engineering). Left for University of Pittsburgh in Jan 1988 before finishing my degree.
Ph.D. 1988-1993, University of Pittsburgh (Computer Science). GPA: 4.0/4.0. Dissertation: "*A High Speed Interconnection Paradigm and Its Applications to Optically Interconnected Networks*". Advisor: Rami Melhem.

EMPLOYMENT HISTORY

- Teaching Assistant**, Jan 1988 to Aug 1990, Department of Computer Science, University of Pittsburgh.
- Student Consultant**, May 1990 to Aug 1990, Information Technology Center (sponsored by IBM), Carnegie Mellon University.
- Research Assistant**, Sept 1990 to June 1993, Department of Computer Science, University of Pittsburgh.
- Assistant Professor**, Sept 1993 to July 1998, Department of Electrical Engineering (was ECE before reorganization in 08/98), University at Buffalo.
- Assistant Professor**, Aug 1998 to Aug 1999, Department of Computer Science and Engineering (was CS before reorganization in 08/98), University at Buffalo.
- Adjunct Assistant Professor**, Computer Science, 01/98 to 07/98; and Electrical Engineering, 01/98 to 09/99, University at Buffalo.
- Associate Professor** (with tenure), Sept. 1999 to Aug. 2004, Department of Computer Science and Engineering, University at Buffalo.
- Adjunct Associate Professor**, Sept. 1999 to Aug. 2004, Department of Electrical Engineering, University at Buffalo.
- Professor**, Aug. 2004 to present, Department of Computer Science and Engineering, University at Buffalo.
- Guest Professor**, June 2004 - present, Department of EE, Shanghai Jiao Tong University, Shanghai, China.
- Visiting Scientist**, July 2007, National Institute of Information and Communications Technology (NICT), Tokyo, Japan.
- Visiting Professor**, Aug 2007 to Jan 2008, Department of EE, Stanford University.

AWARDS AND HONORS

Distinguished Ph.D. Candidate Award, **Andrew Mellon Educational Trust**, \$10,000, Sept. 1992
 UB Exceptional Scholar: Sustained Achievement Award, **University at Buffalo**, April 2005
 Best Tutorial Paper Award in 2004, **IEEE Communication Society**, Nov. 2005

PROFESSIONAL MEMBERSHIPS:

IEEE (Member since 1990 and Senior Member since 2005) and its Communications Society.
 Fullbright Scholar (Senior Specialist), Jan 2007 to present.

PROFESSIONAL ACTIVITIES:**Elected Office**

Chair (and Founder), Technical Group on Optical Networks (TGON), 1999 - 2003.
Vice Chair, IEEE Technical Committee on High-Speed Networking (TCHSN), formerly known as TC Gigabit Networks, March 2001 - April 2006.
Chair, IEEE Technical Committee on High-Speed Networking (TCHSN), formerly known as TC Gigabit Networks, April 2006 to present.
Chair (and Founder), IEEE Technical Subcommittee on Fiber and Wireless Integration for Access/Metro (FiWi), part of TC on Emerging Technologies, Feb 2006 - present.

Conference/Symposium Organization

Conference Co-Chair (four consecutive years), SPIE's Annual Conf. on All-optical Networking, Dallas, TX, Oct. 1997, and Boston, MA, from 1998 to 2000.
Conference Vice Chair, 7th Int'l Conf. on Computer Communications and Networks (IC3N), Oct. 1998, Lafayette, LA
Program Chair, SPIE Photonic East Program on Optical Layer and Internetworking Technology (with multiple conferences and short courses), Boston, MA, Oct. 2000.
Conference Co-Chair, Program Section on IP/WDM and Optical Internet (with its own program committee and technical program), as a part of Asia-Pacific Optical and Wireless Communications, Beijing, China, Sept. 2001.
Conference Co-Chair, Conf. on Optical Networking (with its own program committee and technical program), as a part of Asia-Pacific Optical and Wireless Communications, Shanghai, China, Oct. 2002
General Chair, Opticomm'02 (Conf. on Optical Networks and Communications, predecessor of IEEE Broadnets), Boston, MA, Aug. 2002.
Symposium Chair, Symp. on Optical Networks, as a part of IEEE Int'l Conf. Communications (ICC), Anchorage, Alaska, May 2003.
Co-General Chair, IEEE International Symposium on World of Wireless and Mobile Multimedia, Niagara Fall, NY, June 2006.
Vice-General Chair, IEEE INFOCOM, Anchorage, Alaska, May 2007.
Symposium Co-Chair, Symp. on Advances in Networks and Internet, as a part of IEEE Int'l Conf. Communications (ICC), Beijing, China, 2008.
TPC Vice-Chair, IEEE Mobile Ad hoc and Sensor Systems (MASS), Atlanta, GA, 2008

Workshop Organization

Workshop Co-Chair, Gigabit Networking Workshop (GBN) at IEEE Infocom 2001, Anchorage, Alaska, April 2001.

Workshop Co-Chair, Workshop on High Speed Networking (formerly GBN) at IEEE Infocom 2002, New York, NY, June 2002

Workshop Chair, First International Workshop on Optical Burst Switching (WOBS), co-located with Opticomm'03, Dallas, TX, Oct. 2003. <http://www.cse.buffalo.edu/~qiao/workshop/wobs>

Workshop Chair, Second International Workshop on Optical Burst Switching (WOBS), as a part of IEEE Globecom'03, San Francisco, CA, Dec. 2003

Workshop Chair, Fourth International Workshop on Optical Packet/Burst Switching, co-located with Conf on Optical Internet (COIN), ChongQing, Sichuan, China, May 2005.

Workshop Co-Chair, First and Second International Workshop on Future Optical Networks (FON), at the Joint IEEE/OSA Optical Fiber Communications and National Fiber-Optics Engineering Conference (OFC/NFOEC) March 2006 and 2007 (<http://www.cse.buffalo.edu/~qiao/workshop>), Anaheim, CA

Workshop Co-Chair, International Workshop on Intermittently Connected Mobile Ad Hoc Networks (ICMAN), at IEEE PerCom, NY, March 2007.

Workshop Co-Chair, Third FON, at the Opto-Electronic Comm. Conference (OECC), Yokohama, Japan, July 2007

Other Meeting Activities

Subcommittee Chair, "Optical Networks", OFC 2008, and "Applications and Demo", OFC 2009.

Publicity Co-Chair and Executive Committee, IEEE Infocom, Miami, FL, March 2005

Keynote Co-Chair and Executive Committee, IEEE Infocom, Barcelona, Spain, April 2006

Sponsorship Chair, IEEE WoWMoM, Helsinki, Finland, June 2007

Workshop Steering Committee Chair, (Third and Fifth) International Workshops on Optical Burst Switching (WOBS), co-located with IEEE Broadnet (formerly Opticomm), respectively, in San Jose, CA, Oct. 2004, and Boston, MA, Oct. 2005.

Steering Committee, IEEE High Performance Switching and Routing, Poland, June 2006

Industry Liaison, Opticomm (brought in sponsorships from more than six major networking companies), Dallas, TX, Dec. 2000.

Breakout Session Leader, Optical Networks at NSF Advanced Networking Infrastructure Research (ANIR) Program's PI Workshop (also drafted a report to NSF), Washington, D.C., Jan. 2003

Panel Organizer/Moderator IP over (ATM/SONET/WDM) at IEEE Globecom, Rio, Brazil, Dec. 1999.

Session Organizer/Chair, at many conferences and workshops including Session on Ad hoc Networks at Infocom'00, Session on OBS at Infocom'03, and Session on Sensor Networks at WCNC'03.

Panel Speaker, Panel on Optical Networks (along with J. Turner of U. Washington St Louis, and J. Mambretti of Northwest Univ and W. Huntton of Pittsburgh Supercomputing Center), NSF ANIR PI Workshop, Washington, D.C., Jan. 2003.

Panel Speaker, Terabit Challenges (along with N. Rao of Oakridge National Lab and E. Modiano of MIT), IEEE TCHSN Workshop, Narcelona, Spain, April 2006.

Panel Speaker, How REAL must be the ad hoc network research (along with Jon Crowcroft of U. Cambridge and Adam Wolisz of TU Berlin), ACM MobiHOC Workshop on REALMAN, Florence, Italy, May 2006.

Invited Discussant: Attended several workshops (whose attendance was by invitation only), including DARPA's Workshop on Optical Internet where I presented OBS (<http://www.isi.edu/~workshop/oi97/>), Washington D.C., Oct. 1997, and NSF's Ultra High-

capacity Optical Communications and Networking, Washington, D.C., Oct. 2002.).

Technical Program Committee, for more than two dozens conferences and workshops, including Optical Fiber Communications (OFC) 2005, IEEE INFOCOM 2005, 2004 & 2003, IEEE Vehicular Technology Conf (VTC) 2003, Opticom 2003 & 2000, GLOBECOM'02, ICC'02, Int'l Conf. on Computer Comm and Networks(IC3N) 2000 & 1999; Int'l Conf on Network Protocol (ICNP), 1999; Symposium on High-Speed Networks (at Globecom) 1999; Int'l Conf. on Parallel and Distributed Computing and Systems, 1999; 3rd Workshop on Optics and Computer Science (WOCS), 1999; (and many other between 1994 and 1998).

Editorial Service:

Associate Editor, *Journal of High Speed Networks*, May 1998 to Oct. 2004

Associate Editor, *Optical Networks Magazine*. March 1999 to Dec. 2002.

Editor-at-Large, IEEE Communication Society (ComSoc). Sept. 2000 - Nov. 2002. (Responsible for interacting with other Editor-in-Chiefs of IEEE ComSoc journals and magazines to identify directions, special issue topics and guest editors in the area of optical networking and computing).

Associate Editor, *IEEE/ACM Transactions on Networking*. March 2001 to present.

Area Editor, *IEEE Communications Magazine*. June 2002 to Feb. 2006 (In charge of the recently created IEEE Optical Communications Supplement).

Associate Editor, *Elsevier Optical Switching and Networking*. Jan 2004 to present.

Associate Editor, *IEEE Transactions on Parallel and Distributed Systems (TPDS)*. June 2007 to present.

Lead Guest-Editor, *IEEE JSAC, Special Issue on WDM-based Architecture*, with E. Modiano (MIT), G. Ellinas (Tellium) and D. Datta (IIT Kharagpur) and A. Gladisch (Deutsche Telekom). Jan. 2002.

Co-Guest-Editor, *Optical Networks Magazine*, Special Issue on Optical Packet Switched Networks, with A. Pattavina (Italy), Nov/Dec 2002

Co-Guest-Editor, *IEEE JSAC Special Issues on High-Performance Optical/Electronic Switches/Routers for High-Speed Internet* (two issues), with Dan Blumenthal (UCSB), J. Chao (Polytech Univ), M. Hamdi (HKUST), E. Leonardi (Politecnico di Torino) and K. Yun (Applied Micro Circuits). May and Sept 2003, respectively.

Co-Guest-Editor, *Optical Networks Magazine*, Special Issue on Engineering the Next Generation Optical Networks, with M. Hamdi (HKUST), Nov/Dec 2003

Co-Guest-Editor, *ACM/Baltzer Mobile Networks and Applications (MONET)*, Special Issue on Integrated Wireless Systems, with H. Wu, S. Dixit, and E. Cayirci. To appear in 2004.

Co-Editor: Proceedings of Conf. on All-optical Networking (as a Conference Co-Chair):

SPIE Vol. 3230 (with J.M. Senior), 1997

SPIE Vol. 3531 (with J. M. Senior), 1998

SPIE Vol. 3843 (with J. M. Senior and S. Dixit), 1999

SPIE Vol. 4213, (with J. M. Senior and S. Dixit), 2000

Co-Editor: Proceedings of Conf. on Optical Networking (as a Conference Co-Chair):

SPIE Vol. 4585 (with S. Xie), 2001

Co-Editor: Proceedings of Conf. on Optical Networking (as a Conference Co-Chair):

SPIE Vol. 4910 (with S. Xie and Y. Chung), 2002

Keynote/Plenary Talk (K), Invited Talk (I) and Tutorial (T)

- (I1). University of Santa Clara, Department of Computer Engineering, Santa Clara, CA, "A High Speed Interconnection Paradigm for Reconfigurable Optical Networks", Feb. 1994.
- (I2). University of Michigan (Ann Arbor), Department of EE & CS, "The RTDM Paradigm for Optically Interconnected Networks", Jan. 1995.
- (I3). M.I.T. Lincoln Lab, Advanced Networks Group, MA, "Exploiting Unique Characteristics of Fiber-optic Networks", Nov. 1996
- (I4). Alcatel Network Systems, Alcatel Corporate Research Center, Dallas, TX, "A Framework for Building WDM All-Optical Networks", July, 1998
- (I5). Telcordia (formerly Bellcore), Network Operations and Management Systems, Red Bank, NJ, "Opportunities, Challenges and Approaches in WDM All-Optical Networks", Oct. 1998
- (I6). Polytech University, Center for Advanced Telecom Technology, Brooklyn, NY, "Optical Burst Switching (OBS) and the Next Generation Optical Internet", March 1999.
- (K1) Sixth Int'l Workshop on Protocols for High Speed Networks (PfHSN), Salem, MA. "Keynote - The Optical Future of High-Speed Networks", Aug. 1999.
- (T1). Opticomm, Dallas, TX, "Tutorial - Labeled Optical Burst Switching and IP/WDM Integration", Oct. 2000.
- (K2). IP over DWDM Summit, Paris, France, "Keynote - A Pathway to IP over WDM Integration", Nov. 2000.
- (I7). Georgia Tech, Department of ECE, Atlanta, GA "Optical Burst Switching", June 2001.
- (I8). Marconi Communications' Research Day, Pittsburgh, PA, "Optically Assisted Packet Switching, a Marconi "Optical Burst Switching", Feb. 2001.
- (I9). Ohio State University, Computer and Information Science, Columbus, OH, "Selected Research Projects in Networking", March, 2002.
- (I10). 40th Annual Allerton Conference on Communication, Control, and Computing, Monticello, Illinois, "PROtection with Multi-Segment (PROMSIE) in SRLG Networks", Oct. 2002.
- (T2). Asia-Pacific Optical and Wireless Communications (APOC), "Tutorial - Integration of IP and WDM with Optical Burst Switching", Shanghai, China, Oct. 2002.
- (I11). IEEE/OSA Optical Fiber Communications (OFC), Atlanta, GA, "Potential of Optical Burst Switching", March 2003.
- (I12). Georgia Tech, College of Computing, Atlanta, GA, "Optical Burst Switching: The Dawn of a New Era in Optical Networking", March 2003
- (I13). Intel, Optical Communications Group, San Jose, CA, "Optical Burst Switching: The Dawn of a New Era in Optical Networking", April 2003
- (I14). Sprint, Advanced Technology Lab (ATL), Burlingame, CA, "Optical Burst Switching: The Dawn of a New Era in Optical Networking", April 2003
- (T3). IEEE Globecom, San Francisco, CA, "Tutorial - Optical Burst Switching", Dec. 2003
- (I15). ISI/USC, Computer Networking Division (Div 7), LA, CA, "TCP Performance and Its Enhancement in Optical Burst Switched Networks", Feb. 2004.
- (I16). UCLA, Computer Science Department, LA, CA, "TCP Performance and Its Enhancement in Optical Burst Switched Networks", Feb. 2004.
- (I17). Workshop on Optical Burst/Package Switching, a part of Annual Opto-Electronic Communications Conference (OECC) 2004, "Enhance TCP Performance with Optical Burst Switching", Yokohama, Japan, June 2004

- (I18). International Communications University (ICU), S. Korea "Optical Burst Switching", July 2004.
- (I19). Samsung Advanced Institute of Technology, S. Korea, "Optical Burst Switching", July 2004.
- (I20). Electronics and Telecommunications Research Institute (ETRI), S. Korea, "Hierarchical Location Management in Mobile Ad hoc Networks", July 2004
- (I21). NEC Labs of America, Princeton, NJ, "An Orbit Based Mobility Framework and Routing Protocols", Oct. 2004.
- (K3). The 4th International Conference on Optical Internet (COIN), ChongQing, China, "Towards a Fully Integrated and Transparent Network", May 2005.
- (I22). Shanghai Jiao Tong University, National Key Lab for Optical Communications, Department of EE, "Advanced Research Issues in Optical Networks", June 2005.
- (I23). Beijing University of Post and Telecommunications (BUPT), School of Telecommunications, Beijing, China, "Recent Advances in Optical Burst Switching", July 2005
- (I24). Beijing University, Department of EE, Beijing, China, "OBS and Its Performance Evaluation", July 2005
- (I25). Tsinghua University, Department of EE, Beijing, China, "Comparison of OBS and SONET for Metro Networks", July 2005
- (K4). The 4th International Workshop on Optical Burst Switching (WOBS), Boston, MA, "Transparency, Low Latency and New Directions for OBS", Oct 2005
- (I26). Beijing University of Post and Telecommunications (BUPT), School of Telecommunications, "Optical Grids and OBS", Oct. 2005
- (I27). U. Toronto, ECE Department, Toronto, CA. "Integrating Optical and Wireless Technologies", Oct. 2005
- (I28). U. Automation of Madrid, Madrid, Spain. "Research Issues in Optical Networking", April 2006
- (I29). Tsinghua University, Center for Intelligent and Networked Systems, Department of Automation, Beijing, China, "On Profiling Mobility and Predicting Locations of Wireless Users", July 2006
- (I30). Beijing Jiao Tong Univ (BJTU), School of Engineering, "Integrating Optical and Wireless Technologies", July 2006.
- (K5). Workshop on Applications and Grid over Optical Network (WAGON), Shanghai Jiao Tong University, Shanghai, China, "Polymorphous, Agile and Transparent Optical Networks (PATON) and its Applications" (Plenary), July 2006
- (I31). Carnegie Mellon University (CMU), Department of ECE, "On Profiling Mobility and Predicting Locations of Wireless Users", Oct, 2006
- (I32). The 4th Workshop on Optimization of Optical Networks (OON), Montreal, Canada, May 2007, "Past and Present Optimization Problems in Optical Networks", May 2007
- (K6). Optical Network Design and Modeling (ONDM) COST 291 Workshop on Optical Networking Perspectives vs technologies Reality, Athens, Greece, "Cross-layer optimization to support distributed grid computing applications over physical topology", May 2007
- (I33). HongKong Univ of Science and Technology (HKUST), Department of CS, "Sociological Orbit-aware Localization and Routing (SOLAR) and its Applications", June 2007
- (I34). Tsinghua University, Center for Intelligent and Networked Systems, Department of Automation, Beijing, China, "Wireless and Sensor Networking Research for Next Generation Vehicular and Transportation Systems", June 2007

- (I35). Shanghai Jiao Tong University, National Key Lab for Optical Communications, Department of EE, "Application-Specific Agile Private (ASAP) Networking for Future Optical Internet", June 2007.
- (I36). Shanghai Jiao Tong University, Department of CS, "Mobility Profiling and its Applications to Vehicular Networks", June 2007.
- (I37). National Institute of Information and Communications Technology (NICT), Tokyo, Japan, "Application-Specific Agile Private (ASAP) Networking for Future Optical Internet", July 2007.
- (I38). NTT Innovation Lab, Yokosuka Research Park (YRP), Japan, "Application-Specific Agile Private (ASAP) Networking for Future Optical Internet", July 2007.
- (I39). Conference on Heterogeneous Networking for Quality, Reliability, Security and Robustness (QShine), Vancouver, Canada, "A Failure-tolerant Mobile Traversal Scheme based on Triangulation Scheme", Aug 2007,
- (I40). Simon Fraser University, Department of CS, Burnaby, Canada, "On Mobility Profiling and Infrastructure to Vehicular Communications", Aug. 2007
- (I41). IEEE Victoria Section and University of Victoria, Department of CS, Victoria, Canada, "On Mobility Profiling and Infrastructure to Vehicular Communications", Aug. 2007
- (K7). Wireless and Optical Communications, Montreal, Canada, "Integrating Optical and Wireless Technologies", June 2007.
- (I42). Distinguished Seminar Speaker, NEC Labs of America, Princeton, NJ, "Application-Specific and Agile Private (ASAP) Networking in Future Optical Internet", Aug. 2007
- (I43). Sino-Germany Joint Symp. on Optical Communications Networks, Berlin, Germany, "Application-Specific and Agile Private (ASAP) Networking in Future Optical Internet", Sept 2007 (one of three invited speakers from outside Chinese or Germany).
- (I44). DoCoMo Communications Labs USA, Palo Alto, CA, "Sociological Orbit-aware Localization and Routing (SOLAR) and its Applications", Oct 2007

Ad Hoc Referee for:

Many journals/magazines including IEEE/ACM Transactions on Networking; IEEE Trans. on Communications; IEEE Trans. on Mobile Computing, IEEE Trans. on Wireless Communications, IEEE Trans. on Computers, IEEE Trans. on Parallel and Distributed Systems, IEEE J. Selected Areas in Communications, ACM/Balzer WINET, ACM/Kluwer MONET, IEEE/OSA J. of Lightwave Technology, IEEE Communications Magazine, IEEE Networks Magazines, Computer Networks, Computer Communications, Ad Hoc Networks, J. High-Speed Networks, J. Parallel and Distributed Computing, Parallel Processing Letters etc.;

Many conferences and workshops including IEEE Infocom, Int'l Conf. on Computer Communications and Networks (IC3N), IEEE Globecom, Int'l Conf. on Communications (ICC), Int'l Parallel Processing Symposium (IPPS), Int'l Conf. on Parallel Processing (ICPP), High-Performance Computer Architectures (HPCA)

Grant Proposal Reviewing for National Science Foundation (NSF) since 1999 (including six panels and a number of ad hoc mail reviews), and Army Research Lab (2001).

Manuscript Book Reviewing for McGraw-Hill and Prentice-Hall

UNIVERSITY AND COLLEGE SERVICE

School of Engineering and Applied Sciences (SEAS): Computer Instructional Review Committee, (one of the main accomplishments is the replacement of EAS 231: Engineering Computing with EAS 230), 1994-1996.

School of Engineering and Applied Sciences (SEAS): Faculty Personal (Promotion) Committee, 09/2002 to 08/2004.

Provost Appointed Decanal Review Committee: 2002-2003.

Faculty Senate (alternate): 09/2004 - present

Undergraduate Academic Program Committee: 09/2004 - present

DEPARTMENTAL SERVICE

Seminar Series Coordinator, ECE Department, Spring 1994.

Undergraduate Affair Committee, CSE Department, 09/1999-08/2000.

Graduate Affair Committee, CSE Department, 09/00 to 08/01.

Ad hoc Committee Chair, CSE Department, MS in Information Technology Initiative, (developed the MS in IT Curriculum Program, which is on-hold for administrative purposes), 09/01 to 12/01

Faculty Search Committee, CSE Department, 09/01 to present

Executive Committee, CSE Department, 09/2004 - present

Chair, Distinguished Speaker Series Committee, CSE Department, 09/2004 - 05/2005

Director, Undergraduate Academic Committee, CSE Department, 09/2004 - present

COMMUNITY SERVICE

Assistant Program Director, Western New York Chinese Club (www.cc-wny.org), 1994 and 1995.

President, Western New York Chinese Club (www.cc-wny.org), 2005

COURSES TAUGHT (with enrollment in parenthesis):

Undergraduate: EAS 231 Engineering Computing II (Fall'95: 224, Fall'94: 310 and Spring'94: 170); EAS 140 Engineering Solutions (four lectures in 1996, 2 in 1997 and 1 in 1998).

Undergraduate/Graduate (on average, with the same undergraduate and graduate enrollment): CSE/ECE 489/589 Modern Networking Concepts (Spring'04: 64, Spring'03: 92, Spring'02: 78, Fall'00: 85, Fall'99: 79, Spring'99: 44, Fall'98:40, Spring'98:35, Fall'97:29, Spring'97: 19, Fall'96: 24).

Graduate: CSE/ECE 535 Principles of Parallel Processing (Fall'97: 5, Fall'95: 11 and Fall'94: 16); CSE/ECE 620 Advanced Networking Concepts (formerly Switching Methods and Routing Networks) (Fall'04: 19, Fall'03: 5, Fall'02: 20, Fall'01: 21, Spring'00: 27, Spring'99: 23, Spring'96: 5 and Spring'95: 9); CSE 716 Networking Seminar (Spring'04: 5, Spring'03: 5, Spring'02: 8, Spring'00: 11); Special Topics (Fall'93: 4).

STUDENT SUPERVISION

Major Advisor for:

Ph.D. Graduated

- (1). Shou-ren Tsai (1996) (Co-advisor with M. Lin). Dissertation: "Bandwidth Allocation Schemes for Real-Time Communications in High-Speed Networks". Associate Professor, Computer and Communications Engineering, National Kaohsiung First University of Science and Technology (NKFUST), Kaohsiung, Taiwan (was with National Chiao Tung University upon graduation).
- (2). Y. Mei (1999). Dissertation: "Cost-Effective Design of WDM Optical Networks for Static and Dynamic Traffic". Qualcomm, San Diego, CA
- (3). X. Zhang (1999). Dissertation: "Traffic Grooming and Scheduling, Wavelength Routing and Assignment, and Multicasting in WDM Networks". Vice President, Advanced Management

- Knowledge Consulting, Boston, MA (was with Lucent upon graduation).
- (4). M. Yoo (2000). Dissertation: "Optical Burst Switching for Next Generation Optical Internet". Assistant Professor (tenured), School of EE, Soongsil University, Seoul, Korea (was with Nokia Research Center, MA, upon graduation).
 - (5). M. Jeong (2001). Dissertation: "Multicast in Optical Burst Switched WDM Networks". Samsung electronics, Seoul, Korea (was with Alcatel USA upon graduation).
 - (6). C. Xin (2002). Dissertation: "The Control and Provisioning for a Scalable and Efficient Optical Network". Assistant Professor, Department of CS, Norfolk State University, Norfolk, VA. <http://www.cs.nsu.edu/people/infopage.php?facID=17>
 - (7). H. Wu (2002). Dissertation: "iCAR: Integrated Cellular and Ad Hoc Relaying". Assistant Professor, Department of CS, Center for Advanced Computer Studies, University of Louisiana at Lafayette, LA (NSF CAREER AWARD RECIPIENT in 2004) <http://www.cacs.louisiana.edu/~wu>
 - (8). V. Anand (2003). Dissertation: "Efficient Design of Wavelength Division Multiplexing Based Optical Networks", Assistant Professor, Department of CS, SUNY Brockport, NY. <http://www.acs.brockport.edu/~vanand/>
 - (9). S. De (2004). Dissertation: "Resource Efficient Routing Strategies in Multihop Wireless Networks", Assistant Professor, Department of EE, IIT Delhi, Delhi, India (was with ECE, New Jersey Institute of Technology upon graduation). <http://web.njit.edu/~swadesd/>
 - (10). J. Li (2004). Dissertation "Design and Analysis of Efficient Scheduling Algorithms in Optical Burst Switched Networks", Assistant Professor, Department of CS, The College of New Jersey, NJ
 - (11). X. Cao (2004). Dissertation "Waveband Switching In Wavelength Division Multiplexing Networks", Assistant Professor, Department of CS, Georgia State University, Georgia (was with Rochester Institute of Technology upon graduation), NSF CAREER AWARD RECIPIENT in 2006. <http://www.it.rit.edu/~cao>
 - (12). S. Sheeshia (2005). Dissertation "Supporting Synchronous and Asynchronous Traffic in Optical Burst Switched Metro Networks", Associate Professor, School of CSE, American University of Science and Technology, Beirut, Lebanon
 - (13). S. Philip (2005). Dissertation "Scalable Location Management for Geographic Routing in Mobile Ad hoc Networks". Assistant Professor, CS Department, Western Illinois University, <http://www.wiu.edu/users/sjp111/links.html>
 - (14). X. Yu (Ms.) (2005). Dissertation "Traffic Analysis, Performance Evaluation and Enhancement in Modern Data Communication Networks", At&t Labs, Florham Park, NJ (was with Frosburg State University upon graduation)
 - (15). D. Xu (2005). Dissertation "Effective Failure Recovery Schemes for Survivable Networks", Senior Member of Technical Staff-Research, At&t Research Labs, Florham Park, NJ (was a Post-Doc at EE Department, Princeton University upon graduation). <http://www.princeton.edu/~dahaixu/>
 - (16). J. Ghosh (2006). Dissertation "Sociological Orbit Based Mobility Profiling and Routing for Wireless Networks". Yahoo Inc., <http://www.joyghosh.com>
 - (17). P. Lin (2007). Dissertation "Optimizations Issues in Broadband Access Networks", Goldman Sachs, New York, NY.

Ph.D. in Pipeline

X. Liu, S. Yoon, T. Lee, X. Yu (Mr) , Y. Tang, R. Sudhaakar

M.S. Graduated (most of them did a project): Jing Feng (1995), An-yi Chen (1996); R. Malli (1998), S. Maloo (1998); A. Guha, V. Nambiar, M. Amir, M. Kapoor, R. Rengaswami (all five in 1999); S. Bhargava, A. Mahajan, T. Katarki, G. Srinivasan, R. Pragada and P. Goel (all in 2000) S. Bakhru, S. Balraj, S. Chauhan, Y. Chen, A. Kulkarni, T. Sait, A. Venkatesan (all in 2001) all of them are working for Intel and Cisco. S. Bhomia, Y. Yuang, Z. Zeng and J. Wang (all four in 2002). Yang Chen (2003), PhD at Georgia Tech. Phaneendra Vuliyaaragoli, Vikas Singh (both in 2004). Most of them are working for AT&T Labs, Cisco, IBM, Motorola, Qualcomm and Verizon.

M.E. Graduated: Gaspar Kiraly Jr. (1996);

Committee Member for many Ph.D and MS students in ECE and CSE since 1994

Undergraduate Faculty Mentor for

NSF Research Experience for Undergraduates: W. Tao (B.S. in May 1998) and M. Grabowski (B.S. in May 1998);

Ronald McNair Scholarship (for minority students): J. Williams (B.S. in Sept. 1999);

University Honors Students: Thomas Finnerty, Anthony Guetta and Thomas Gaborski (freshmen in 1998, B.S. expected in 2002/2003).

GRANT SUPPORT

- (1). "Acquisition of a high-performance parallel computer for School of Engineering and Applied Sciences (SEAS)", **SUN Microsystems Inc** and **University at Buffalo**, \$228,000, Mar 1994. Co-PI with other 19 Assistant Professors in SEAS.
- (2). Riefler Award (for providing summer research guidance to graduate students), **University at Buffalo**, \$800, April, 1994
- (3). "Reducing communication latency with path multiplexing in optically interconnected multiprocessor systems", **National Science Foundation (NSF)** Research Initiation Award, \$96,300, Sept. 1994 - Aug. 1998, along with "NSF Research Equipment Matching Fund", \$6,300, **University at Buffalo**, Sept. 1994, **PI/PD**.
- (4). "Research Experience for Undergraduates" (REU), **National Science Foundation (NSF)**, \$10,000, Sept. 1996 - Aug. 1998, **PI/PD**.
- (5). "Optical burst switching - a new paradigm", **National Science Foundation (NSF)**, \$150,000, Sept. 1998 - Aug. 2000, **PI/PD**.
- (6). "WDM multicasting via optical burst/label switching", **Telcordia** (formerly Bellcore), \$54,000, Dec. 1998 - Nov. 1999, **PI/PD**.
- (7). "Multicasting Issues in Optical Burst Switched WDM Networks", **Alcatel Corporate Research Center**, \$20,000, Nov. 1999 - Oct. 2000, **PI/PD**.
- (8). "Flow Control in Next Generation Optical Internet", **Nokia Research Center**, \$20,000, Jan 2000 - Dec. 2000. **PI/PD**.
- (9). "ITR: A New Generation Wireless System with Integrated Cellular and Mobile Ad-hoc Relaying Technologies(iCAR)", **National Science Foundation (NSF)**, \$486,079, Sept 2000 - Aug. 2003. **PI/PD**, with Ozan Tonguz (now at CMU) as Co-PI.
- (10). "Ad-Hoc Relaying Technology in Next Generation Wireless System", **Nokia Research Center**, \$21,000, Sept 2000 - Aug. 2001, **PI/PD**.
- (11). "Protection and Restoration in WDM Networks Under MPLS", **Alcatel Corporate Research Center**, \$45,000, Oct. 2000 - Sept. 2001, **PI/PD**.
- (12). "Routing and Wavelength Assignment Strategies in WDM Networks", **Telcordia** (formerly Bellcore), \$100,000, Oct. 2000 - Sept. 2001, **PI/PD**.

- (13). "Comparison between Optical Burst Switched and Optical Flow Switched WDM Networks", **Nortel Networks**, \$25,000, Dec. 2000 - Nov. 2001. **PI/PD**.
- (14). "Traffic Engineering in Optical Networks", **Nokia Research Center**, \$92,000, Jan 2001 - Jan. 2002. **PI/PD**.
- (15). "DWDM and VPN networks", **Industrial Technology Research Institute, Taiwan**, \$60,000 (before 20% tax), Sept 2001 to Dec 2001. **PI/PD**.
- (16). "Signaling in the Next Generation Wireless Networks", **Nokia Research Center**, \$21,000, Jan. 2002 - Aug. 2002. **PI/PD**.
- (17). "IP-centric Control in Optical Networks", **Nokia Research Center**, \$45,000, Jan. 2002 - Aug. 2002. **PI/PD**.
- (18). "PROMISE (PROtection with Multiple SEgments): a Novel Survivability Framework for High-Speed Networks", **National Science Foundation (NSF)**, \$299,048, Sept. 2002 - Aug. 2005. **PI/PD**.
- (19). "Bluetooth Testbed", **Nokia Research Center**, \$101,500, Jan. 2003 - June 2003 (two phases). **PI/PD**.
- (20). "Research Experience for Undergraduates (REU) Supplement to ITR: A New Generation Wireless System with Integrated Cellular and Mobile Ad-hoc Relaying Technologies(iCAR)", **National Science Foundation (NSF)**, \$21,115, Sept 2000 - Aug. 2003. **PI/PD**, with Ozan Tonguz (CMU) as Co-PI.
- (21). "Supplement to ITR: A New Generation Wireless System with Integrated Cellular and Mobile Ad-hoc Relaying Technologies(iCAR)", **National Science Foundation (NSF)**, \$41,233, Sept 2003 - Aug. 2004. **PI/PD**.
- (22). "ITR: RAFONET - A Versatile and Scalable Approach for Optical Network Design and Analysis", **National Science Foundation (NSF)**, \$349,000, Sept. 2003 - Aug. 2006. **PI/PD**, with W. Gong (Umass Amherst) as Co-PI.
- (23). "Integrating Ad hoc Relaying to 3G Wireless Systems", **NEC Labs America**, (Princeton, NJ), \$13,400, May 2004 - Aug 2004. **PI/PD**.
- (24). "Collaborative Research: Ultra-Broadband Optical Wireless Communications Networks", **National Science Foundation (NSF)**, \$550,000, Sept. 2004 - June. 2007. **PI/PD** for UB with Q. Liu of Oakland University (UB's Share is \$250,000).
- (25). "Fast Failure Recovery in Mesh IP/WDM Networks", **Sprint Advanced Technology Labs**, \$30,000, Sept. 2004 - March 2005. **PI/PD**.
- (26). "Advanced (G)MPLS Optical Networking", **Fujitsu Labs** (San Jose, CA), \$20,000, Jan. 2005 - May 2005. **PI/PD**.
- (26). "SGER - Exploring Sociological Orbits in Mobile Users' Mobility Pattern", **NSF**, \$50,000, Sept. 2005 - Aug 2006. **PI/PD**.
- (27). "Integrated Access Network Technologies", **NEC Labs America** (Princeton, NJ), \$90,000, Jan. 2006 - Aug. 2007. **PI/PD**.

UNIVERSITY GRANTS (AND PUBLIC SERVICE)

(All through NY State's SPIR program at UB Business Alliance.)

- "Establish a video library for revitalizing ECE 535 (Principle of parallel processing)", **University at Buffalo** (Learning Technologies Project), \$530, Apr 1994, **PI/PD**.
- "Web-based courseware development", **University at Buffalo** (Educational Technology Faculty Development Grant), \$4,250, May 1998, **PI/PD**.

- "Software development/enhancement", **Automated Control Solutions Inc.** \$36,500, June 1998 - Aug. 1998. **PI/PD.** Supported two graduate students.
- "Documentation System Assessment/Design", **Filtration System Division**, \$4,000, Jan. 2000 to Aug. 2000. **PI/PD.** Supported one undergraduate student.
- "Knowledge Acquisition and Scheduling System Design", **Carborundum Inc.**, \$64,200, Co-PI/Co-PD (with Rakesh Nagi as PI/PD), Sept. 2000 to Dec. 2000. Supported one graduate student.
- "Computer Science and Engineering Database Support", **Account Solutions Group**, \$8,000, Jan. 2001 to June 2001. **PI/PD.** Supported one graduate student.

PUBLICATION

Book Chapters

(The first author is either one of my students or myself except for those marked with *)

- (1). R. Melhem*, C. Qiao, D. Chiarulli, and S. Levitan, *Chapter 10: Reconfiguration and Routing in Interconnection Networks Using Time Division Multiplexing* in **PARALLEL COMPUTING: Paradigms and Applications**, A. Zomaya Ed., International Thomson Computer Press, pp. 309-340, 1996
- (2). C. Qiao, *Chapter 9: "Unique Designs of Fiber-optic Interconnection Networks and Algorithms"* in **Parallel Computation Using Optical Interconnections**, K. Li, Y. Pan, S. Zheng Eds., Kluwer Academic Publishers, pp. 163-184, Oct. 1998
- (3). C. Qiao and M. Yoo, *Chapter 5: "A Taxonomy of Switching Techniques"*, in **Optical WDM Networks: Principles and Practice**, K. Sivalingam and S. Subramaniam Eds, Kluwer Academic Publishers, pp. 103-125, 2000
- (4). V. Anand and C. Qiao, *Chapter 6: "Maximizing Profit in Optical WDM Networks"* in **Interfaces in Operation Research and Computer Science**, S. Upadhyaya et al. Editors. Kluwer Academic Publishers, pp. 119-137, 2002
- (5). Y. Pan*, C. Qiao, Y. Yang and J. Wu, *"Recent Development in Optical Multistage Networks"* in **Advances in Optical Networks**, D.Z. Du and L. Ruan Editors. Kluwer Academic Publishers, 2001
- (6). H. Wu, C. Qiao and S. Dixit, *Chapter 20: "Signaling and Routing Protocols in iCAR (integrated Cellular and Ad hoc Relaying System)"*, in **Wireless IP**, Artech House, 2002.
- (7). C. Xin, S. Dixit and C. Qiao, *Chapter 14: "IP-over-WDM Control and Signaling"*, in **IP Over WDM: Building the Next Generation Optical Internet**, John Wiley and Sons, 2002
- (8). X. Cao, V. Anand, and C. Qiao, *"Waveband Switching: A New Frontier in Optical WDM Networks"*, in **Optical WDM Networks II: Past Lessons and Path Ahead**, K. Sivalingam and S. Subramaniam Eds, Kluwer Academic Publishers, 2003/2004

Refereed Journal Articles

(Notes: (a). Except the papers listed below that are marked with *, the first author is either one of my students at the time or myself. (b). All the magazine papers listed below are peer-reviewed scholarly papers.)

- (1). C. Qiao, R. Melhem, D. Chiarulli, S. Levitan, "Optical Multicasting in Linear Arrays", **International Journal of Optical Computing**, Vol. 2, No. 1, pp. 31-48, April 1991.
- (2). C. Qiao, R. Melhem, "Time-Division Optical Communications in Multiprocessor Arrays", **IEEE Transactions on Computers**, Vol. 42, No. 5, pp. 577-590, May 1993
- (3). D. Chiarulli*, S. Levitan, R. Melhem and C. Qiao "Locality Based Control Algorithms for Reconfigurable Optical Interconnection Networks", Optical Society of America (OSA) **Applied Optics**, Vol. 33, pp. 1528-1537, March, 1994

- (4). C. Qiao and R. Melhem, "Reconfiguration with Time Division Multiplexed MINs for Multiprocessor Communications", **IEEE Transactions on Parallel and Distributed Systems**, Vol. 5, No. 4, pp. 337 -352, April, 1994
- (5). C. Qiao, R. Melhem, D. Chiarulli and S. Levitan, "Dynamic Reconfiguration of Optically Interconnected Networks with Time Division Multiplexing", **Journal of Parallel and Distributed Computing (JPDC)**, Vol. 22, No. 2, pp. 268 - 278, August, 1994
- (6). C. Qiao, R. Melhem, D. Chiarulli and S. Levitan, "A Time Domain Approach for Avoiding Crosstalk in Optical Blocking Multistage Interconnection Networks", **IEEE/OSA Journal of Lightwave Technology (JLT)**, Vol. 12, No. 10, pp.1854 - 1862, Oct, 1994
- (7). D. Chiarulli*, S. Levitan, R. Melhem, M. Bidnurkar, R. Ditmore, G. Gravenstreter, Z. Guo, C. Qiao, M. Sakr and J. Teza, "Optoelectronic Buses for High Performance Computing", **IEEE Proceedings, Special Issue on Optical Computing Systems**, Vol. 82, No. 11, pp. 1701 - 1710, Nov. 1994.
- (8). S. Tsai, T. Lin and C. Qiao, "Bandwidth Allocation for Isochronous Connections in DQDB using the PA scheme", **Computer Communications**, Special issue on Bandwidth Management in High-speed Networks, Vol. 18, No. 8, pp.545-551, Aug. 1995.
- (9). C. Qiao, "On Designing Communication-intensive Algorithms for a Spanning Optical Bus Based Array", **Parallel Processing Letters**, Vol. 5, No. 3, pp.499-511, Sept. 1995
- (10). C. Qiao and R. Melhem, "Reducing Communication Latency with Path Multiplexing in Optically Interconnected Multiprocessor Systems", **IEEE Trans. on Parallel and Distributed Systems**, Vol. 8, No. 2, pp.97-108, Feb. 1997.
- (11). C. Qiao, "A Two-level Process for Diagnosing Crosstalk in Photonic Switching Networks", **Journal of Parallel and Distributed Computing (JPDC)**, Special Issue on Parallel Computing with Optical Interconnects, Vol. 41, No. 1, pp.53-66, 1997.
- (12). M. Hamdi*, C. Qiao and Y. Pan, "On the Computing Power of Arrays of Processors with Optical Pipelined Buses", **Parallel Processing Letters**, Vol. 8, No. 4, pp. 503-513, 1998.
- (13). C. Qiao, "A Universal Analytic Model for Photonic Banyan Networks", **IEEE Trans. on Communications**, Vol. 46, No. 10, pp. 1381-1389, 1998.
- (14). Y. Mei and C. Qiao, "An Efficient Embedding of Binary Trees in Reconfigurable Arrays with Spanning Optical Buses", **Int'l Journal on Parallel and Distributed Systems and Networks**, Vol. 2, No. 1, pp. 40-48, 1999
- (15). C. Qiao and Y. Mei, "An Improved Embedding of Binary Trees in a Square Reconfigurable Arrays with Spanning Optical Buses", **Parallel Processing Letters**, Special issue on Bus-based Computing, Vol. 8, No. 3, pp. 321-336, 1998.
- (16). C. Qiao and L. Zhou, "Scheduling Switching Element Disjoint Connections in Stage-Controlled Photonic Banyans", **IEEE Trans. on Communications**, Vol. 47, No. 1, pp. 139-148, 1999
- (17). X. Zhang and C. Qiao, "On Scheduling All-to-All Personalized Connections and Cost-Effective Designs in WDM Rings", **IEEE/ACM Trans. on Networking (ToN)**, Vol. 7, No. 3, pp. 435-445, June 1999
- (18). C. Qiao and Y. Mei, "Off-line Permutation Embedding and Scheduling in Multiplexed Optical Networks with Regular Topologies", **IEEE/ACM ToN**, Vol. 7, No. 2, pp. 241-250, 1999
- (19). M. Hamdi*, C. Qiao, Y. Pan and J. Tong, "Communication-efficient Sorting Algorithms on Reconfigurable Array of Processors with Slotted Buses", **Journal of Parallel and Distributed Computing**, Vol. 57, No. 2, pp. 166-187, 1999
- (20). C. Qiao and M. Yoo, "Optical Burst Switching - A New Paradigm for an Optical Internet", **Journal of High Speed Networks (JHSN)**, Special Issue on Optical Networks, Vol. 8, No. 1,

pp. 69-84, 1999

- (21). Y. Pan*, C. Qiao and Y. Yang, "Optical multistage interconnection networks: new challenges and approaches", **IEEE Communications Magazine**, pp. 50-56, Feb. 1999
- (22). X. Yuan*, R. Melhem, R. Gupta, Y. Mei and C. Qiao, "Distributed Control Protocols for Wavelength Reservation and Their Performance Evaluation", **Photonic Networks and Communications**, Vol. 1, No. 3, pp. 207-218, 1999.
- (23). C. Qiao, Y. Mei, M. Yoo and Z. Zhang, "Polymorphic Control for Cost-Effective Design of Optical Networks", **European Trans. on Telecommunications (ETT)**, Special Issue on WDM Networks, Vol. 11, No. 1, pp. 17-26, 2000
- (24). C. Qiao and M. Yoo, "Choices, Features and Issues in Optical Burst Switching", **Optical Networks Magazine**, Vol. 1, No. 2, pp. 36-44, 2000.
- (25). C. Qiao and Y. Mei, "A Comparative Study of Cost-Effective Multiplexing Approaches for On-line Permutation Embedding and Scheduling in Optical Networks", **Journal Parallel and Distributed Computing**, Vol. 61, No. 1, pp. 1-17, Jan. 2001.
- (26). M. Yoo, C. Qiao and S. Dixit, "QoS Performance in Optical Burst Switched IP over WDM Networks", **IEEE J. Selected Areas in Communications (JSAC)**, Special Issue on the Protocols for Next Generation Optical Internet, Vol. 18, No. 10, pp. 2062-2071, Oct. 2000
- (27). X. Zhang and C. Qiao, "An Effective and Comprehensive Approach for Traffic Grooming and Wavelength Assignment in SONET/WDM Rings", **IEEE/ACM Trans. on Networking (ToN)**, Vol. 38, No. 9, pp. 104-114, Sept. 2000.
- (28). C. Qiao, "Labeled Optical Burst Switching for IP and WDM Integration", **IEEE Communications Magazine**, Vol. 38, No. 9, pp. 104-114, Sept. 2000.
- (29). X. Zhang, C. Qiao and J. Wei, "Constrained WDM Multicasting in IP/WDM Networks with Sparse Light Splitting", **IEEE/OSA J. Lightwave Technology (JLT)**, Special Issue on Optical Networks, Vol. 18, No. 12, pp. 1917-1927, 2000
- (30). Y. Yang*, J. Wang and C. Qiao, "Nonblocking WDM Multicast Switching Networks", **IEEE Trans. on Parallel and Distributed Systems**, Vol. 11, No. 12, pp. 1274-1287, Dec. 2000
- (31). M. Yoo, C. Qiao and S. Dixit, "Optical Burst Switching for Service Differentiation in the Next Generation Optical Internet", **IEEE Communications Magazine**, Vol. 39, No. 2, pp. 98-104, Feb. 2001.
- (32). M. Jeong, C. Qiao, and Y. Xiong, "A Reliable WDM Multicast Protocol for Optical Burst-Switched Networks", **Optical Networks Magazine**, Vol. 2, No. 2, pp. 29-40, 2001.
- (33). V. Anand and C. Qiao, "Static versus Dynamic Establishment of Protection Paths in WDM Networks", **Journal of High Speed Networks (JHSN)**, Special issue on optical networks Vol. 10. No. 4, pp. 317-327, 2001
- (34). H. Wu, C. Qiao, S. De and O. Tonguz, "Integrated Cellular and Ad hoc Relaying Systems: iCAR", **IEEE J. Selected Areas in Communications (JSAC)**, Special issue on Mobility and Resource Management in Next Generation Wireless Systems, I. Akyildiz, D. Goodman and L. Kleinrock editors, Vol. 19, No. 10, pp. 2105-2115, Oct. 2001 (accepted 23 out of 140 submissions).
- (35). C. Xin, Y. Ye, T-S Wang, M. Yoo, S. Dixit, C. Qiao, and M. Yoo, "On an IP-Centric Optical Control Plane", **IEEE Communications Magazine**, Vol. 39, No. 9, pp. 84-93, Sept. 2001.
- (36). C. Xin, Y. Ye, S. Dixit and C. Qiao, "A Joint Lightpath Routing Approach in Survivable Optical Networks", **Optical Networks Magazine**, Vol. 3, No. 3, pp.13-20, May 2002.
- (37). S De, S. Das, H. Wu and C. Qiao, "Trigger-based Distributed QoS Routing in Mobile Ad Hoc Networks", **ACM Mobile Computing and Communications Review (MC2R)**, Vol. 6, No. 3,

- pp. 22-35, July 2002.
- (38). S. Sheeshia, C. Qiao and J. Liu, "Supporting Ethernet in Optical Burst Switched (OBS) Networks", **OSA Journal of Optical Networks**", Special Issue on Optical Ethernet, Vol. 1, No. 8/9, pp. 299-312, Aug/Sept 2002.
 - (39). C. Xin, Y. Ye, S. Dixit and C. Qiao, "An Emulation-based Comparative Study of Centralized and Distributed Control Schemes for Optical Networks", **Optical Networks Magazine**, Vol. 3, No. 5, pp. 44-51, Sept. 2002.
 - (40). M. Jeong, H. Cankaya and C. Qiao, "On a New Multicasting Approach in Optical Burst-Switched Networks", **IEEE Communications Magazine**, Lightwave Series, Vol. 40, No. 11, pp. 96-103, Nov. 2002
 - (41). M. Jeong, C. Qiao, Y. Xiong, H. Cankaya, and M. Vandenhoute, "Bandwidth Efficient Multicast Schemes for Optical Burst-Switched WDM Networks", **IEEE/OSA J Lightwave Technology (JLT)**, Vol. 21, No. 1, pp. 13-24, Jan. 2003
 - (42). Y. Xiong, D. Xu, and C. Qiao, "Achieving Bandwidth Efficient and Fast Restorable Path Protection", **IEEE/OSA J Lightwave Technology (JLT)**, Vol. 21, No. 2, pp. 365-371, Feb. 2003
 - (43). X. Cao, V. Anand and C. Qiao, "Waveband Switching in Optical Networks", **IEEE Communications Magazine**, Lightwave Series, Vol. 41, No. 4, pp. 105-112, April 2003
 - (44). H. Wu and C. Qiao, "Modeling iCAR with Multi-dimensional Markov Chains", **ACM/Kluwer Mobile Networking and Applications (MONET)**, Special Issue on Performance Evaluation of Qos Architectures in Mobile Networks, Vol. 8, No. 3, pp. 295-306, June 2003.
 - (45). J. Xiong*, W. Gong and C. Qiao, "An Effective Method for Blocking Performance Analysis of WDM All-Optical Networks", **IEEE/OSA Journal of Lightwave Technology (JLT)**, Vol. 21, No. 6, pp. 1421-1434, June 2003
 - (46). S. Ryu*, C. Rump and C. Qiao, "Advances in Internet Congestion Control", **IEEE Communications Surveys and Tutorials**, Vol.5, No. 1, pp.28 -39, 2003.
 - (47). Y. Chen, M. Hamdi, D.H.K. Tsang and C. Qiao, "Proportional Service Differentiation - A scalability in IP-Oriented Networks", **IEEE Communications Magazine**, Special Issue on Scalability in IP-Oriented Networks, Vol. 41, No. 6, pp. 52 -59, 2003.
 - (48). X. Cao, V. Anand, Y. Xiong and C. Qiao, "A Study of Waveband Switching with Multi-layer, Multi-granular Optical Crossconnects", **IEEE J. Selected Areas in Communications (JSAC)**, Vol. 21, No. 7, pp. 1081-1095, 2003.
 - (49). S. Philip and C. Qiao, "Hierarchical Grid Location Management for Large Wireless Ad hoc Networks", **ACM Mobile Computing and Communications Review (MC2R)**, Vol. 7, No. 3, pp. 33-34, July 2003
 - (50). X. Cao, V. Anand, and C. Qiao, "A Waveband Switching Architecture and Algorithm for Dynamic Traffic", **IEEE Communications Letters**, Vol. 7, No. 8, pp. 397-399, 2003
 - (51). S. De, C. Qiao, and S. K. Das, "A Resource Efficient QoS Routing Protocol for Mobile Ad Hoc Networks", **Wireless Commun. and Mobile Computing (WCMC)** (J. Wiley), Vol. 3, pp. 465-486, 2003.
 - (52). S. De, C. Qiao, and H. Wu, "Meshed Multipath Routing: An Efficient Strategy in Wireless Sensor Networks", **Computer Networks** (Elsevier), Special Issue on Wireless Sensor Networks, Vol. 43, No. 4, pp. 481--497, 2003 (acceptance ratio is around 24%).
 - (53). D. Xu, Y. Xiong and C. Qiao, "Novel Algorithms for Shared Segment Protection", **IEEE J. Selected Areas in Communications (JSAC)**, Series in Optical Communications Networks, Vol. 21, No. 8, pp. 1320-1331, Oct. 2003.

- (54). D. Xu, Y. Xiong, C. Qiao and G. Li, "Trap Avoidance and Protection Schemes in Networks with Shared Risk Link Groups", **IEEE/OSA Journal of Lightwave Technology (JLT)**, Special Issue on Optical Networks, Vol. 21, No. 11, pp. 2683-2693, 2003
- (55). J. Li, Y. Chen and C. Qiao, "Recent Progress in Scheduling Algorithms in OBS Networks", **OSA J. Optical Networks (JON)**, Vol. 3, No. 4, pp. 229-241, 2004.
- (56). S. Ryu*, C. Rump and C. Qiao, "Advances in AQM based TCP Congestion Control", **Telecommunications Systems**, Special issue on recent advances in Communications and Internet Technologies, Vol. 25, No. 3/4, pp. 317-351, 2004
- (57). J. Li and C. Qiao, "Schedule Burst Pro-actively for Optical Burst Switching Networks", **Computer Networks** (Elsevier), Vol. 44, pp. 617-629, 2004
- (58). Y. Chen, X. Yu and C. Qiao, "Optical Burst Switching (OBS): A New Area of Research in Optical Networking", **IEEE Network**, Vol. 18, No. 3, pp. 16-23, MAY/JUNE 2004.
- (59). D. Xu, Y. Xiong, C. Qiao and G. Li, "Failure Protection in Layer Networks with Shared Risk Link Groups", **IEEE Network**, Vol. 18, No. 3, pp. 36-41, MAY/JUNE 2004.
- (60). S. De, C. Qiao, D. Pados, M. Chatterjee, and S. Philip, "An Integrated Cross Layer Study of Wireless CDMA Sensor Networks", **IEEE J. Selected Areas in Communications (JSAC)**, Special Issue on Quality-of-Service Delivery in Variable Topology Networks, Vol. 22, No. 7, pp. 1271- 1285, 2004.
- (61). S. Sheeshia Y. Chen, V. Anand, and C. Qiao, "Performance Comparison of OBS and SONET in Metropolitan Ring Networks", **IEEE JSAC**, Special Issue in Advances in Metro Optical Networks (Architecture and Control), Vol. 22, No. 8, pp.1474-1482, 2004.
- (62). C. Xin, C. Qiao and S. Dixit, "Traffic Grooming in Mesh WDM Optical Networks -- Performance Analysis", **IEEE JSAC**, Series in Optical Communications Networks, Vol. 22 No. 9, pp. 1658-1669, 2004.
- (63). J. Xu, C. Qiao, J. Li, and G. Xu, "Efficient Burst Scheduling Algorithms in Optical Burst-Switched Networks Using Geometric Techniques," **IEEE JSAC**, Vol. 22 No. 9, pp. 1796-1811, 2004.
- (64). X. Yu, J. Li, Y. Chen, X. Cao and C. Qiao, "Traffic Characteristics and Performance Analysis of Optical Burst Switched Networks", **IEEE J. Lightwave Technology** (invited submission which is nonetheless refereed), Vol. 22, No. 12, pp. 2722-2738, 2004
- (65). H. Wu, S. De, C. Qiao, E. Yanmaz, and O. Tonguz, "Handoff Performance of The Integrated Cellular and Ad Hoc Relaying (iCAR) System", **ACM/Balzer Wireless Networks (WINET)**, Vol. 11, No. 6, pp. 775-785, November, 2005.
- (66). S. Philip, J. Ghosh and C. Qiao, "Performance Evaluation of A Hierarchical Location Management Protocol for Ad hoc Networks", **Computer Communications** (Elsevier Science), Special issue on Performance Issues of Wireless LANs, PANs, and Ad Hoc Networks, Vol. 8, No. 10, pp. 1110-1122, 2005
- (67). X. Yu, I. Thng, Y. Jiang and C. Qiao, "Upper Bounds on Individual Queue Length Distribution in GPS and PGPS with LRD Traffic Inputs", **IEEE/ACM ToN**, Vol. 13, No. 3, pp. 676-689, 2005
- (68). D. Xu, Y. Chen, Y. Xiong, C. Qiao, and X. He. "On the Complexity of and Algorithms for Finding the Shortest Path with a Disjoint Counterpart", **IEEE/ACM ToN**, Vol. 14, No. 1, pp. 147-158, 2006
- (69). H. Ngo*, D. Pan, and C. Qiao, "Constructions and Analysis of Nonblocking WDM Switches Based on Arrayed Waveguide Grating and Limited Wavelength Conversion", **IEEE/ACM ToN**, Vol. 14, No. 1, pp. 205-217, 2006

- (70). Q. Liu*, C. Qiao, G. Mitchell and S. Stanton, "Optical Wireless Communication Networks for First- and Last-mile Broadband Access". **OSA Journal of Optical Networking (JON)**, Vol. 4, pp. 807-828, Dec. 2006
- (71). J. Zhu, C. Qiao and X. Wang, "A Comprehensive Minimum Energy Routing Scheme for Wireless Ad hoc Networks", **IEEE Trans, on Wireless Computing**, Vol. 5, No. 11 pp. 3077-3086, 2006
- (72). X. Cao, V Anand and C. Qiao, "A Framework for Waveband Switching in Multi-Granular Optical Networks Part I - multi-granular cross-connect architectures ",**OSA JON**, Vol. 5, No. 12, pp. 1043-1055, 2006 (invited but still peer-reviewed).
- (73). X. Cao, V Anand and C. Qiao, "A Framework for Waveband Switching in Multi-Granular Optical Networks Part II - wavelength/waveband conversion and survivability",**OSA JON**, Vol. 6, No. 1, pp. 48-62, 2006 (invited but still peer-reviewed).
- (74). C. Qiao, W. Wei and X. Liu, "Extending Generalized Multi-protocol Label Switching (GMPLS) for Polymorphous, Agile and Transparent Optical Network (PATON)", **IEEE Communications**, Special Issue on Advances in Control and Management of Connection-Oriented Networks, Vol. 44, No. 12, Dec. 2006. pp. 104-114
- (75). H. Wu, C. Qiao, and S. Dixit, "Signaling and Routing Protocols for iCAR", **International Journal of Ad Hoc & Sensor Wireless Networks**. Vol. 3, No. 1, pp. 1-33, 2007 (Invited submission as one of the four best papers in International Conference on Mobile Ad-hoc and Sensor Networks 2005).
- (76). J. Ghosh, S. Philip, and C. Qiao, "Sociological Orbit-aware Location Approximation and Routing (SOLAR) in MANET", **ELSEVIER Ad Hoc Networks Journal**, Vol. 5, No.2,pp. 189-209, March 2007
- (77). J. Li, C. Qiao, J. Xu and D. Xu, "Maximizing Throughput for Optical Burst Switching Networks", **IEEE/ACM ToN**, Vol. 15 , No. 5, pp. 1163 - 1176, 2007
- (78). X. Cao, V Anand and C. Qiao, "Waveband Switching for Dynamic Traffic Demands in Multi-granular Optical Networks", **IEEE/ACM ToN**, Vol.15, No. 4, pp. 957 - 968, Aug. 2007
- (79). X. Guan*, S. Guo, Q. Zhai, W. Gong and C. Qiao, "A New Method for Solving Routing and Wavelength Assignment Problems in Optical Networks", **OSA Journal of Lightwave Technology**, Vol. 25, No.8, pp. 1895-1909, Aug. 2007
- (80). D. Xu, Y. Xiong and C. Qiao, "Ultra-fast, Potential Backup Cost (PBC) based Shared Path Protection Schemes", **OSA Journal of Lightwave Technology**, Vol. 25, No. 8, pp. 2251-2259, Aug. 2007.

Refereed Articles in Conference Proceedings

(The first author is either one of my students at the time or me, except those marked with *)

- (1). C. Qiao, "Towards a Multi-RISC Processor Architecture for Parallel Execution of Prolog", **International Parallel Processing Symposium (IPPS)**, pp. 186-198, Mar. 1989 (acceptance rate unavailable).
- (2). C. Qiao, "On the Combined Approached to Intelligent Backtracking", **IEEE Tools for Artificial Intelligence (TAI)**, pp. 490-494, Oct. 1989 (accepted 89 out of 147 submissions)
- (3). C. Qiao, R. Melhem, D. Chiarulli and S. Levitan, "Multicasting in Optical Bus Connected Processors Using Coincident Pulse Techniques", **International Conference on Parallel Processing**, Vol. I, pp. 708 -709, Aug. 1991 (accepted 291 out of 506 submissions).
- (4). C. Qiao, R. Melhem, "Time-Division Optical Communications in Multiprocessor Arrays", **Supercomputing**, pp. 644-653, Nov. 1991 (accepted 83 out of 215 submissions).

- (5). C. Qiao, R. Melhem, D. Chiarulli, S. Levitan, "Efficient Channel Allocation for Routing in Optically Interconnected Multiprocessor Systems", **Conference on Advances in Optical Information Processing V**, SPIE Vol. 1704, pp. 428-439, April 1992 (acceptance rate unavailable).
- (6). D. Chiarulli*, S. Levitan, R. Melhem and C. Qiao, "Bandwidth as a Virtual Resource in Multiprocessor Interconnection Networks", **Optical Computing**, Optical Society of America (OSA) Technical Digest, Vol. 7, pp. 299-302, March, 1993 (acceptance rate unavailable).
- (7). C. Qiao, R. Melhem, D. Chiarulli and S. Levitan, "A Time Domain Approach for Avoiding Crosstalk", **Photonics in Switching**, OSA Vol. 16. pp. 133-137, March, 1993 (acceptance rate unavailable).
- (8). C. Qiao and R. Melhem, "Reducing Communication Latency with Path Multiplexing in Optically Interconnected Multiprocessor Systems", **High-Performance Computer Architecture (HPCA)**, pp. 34-43, Jan 1995 (accepted 36 out of 190 submissions).
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- (129). X. Liu, C. Qiao, and T. Wang, "Survivable Optical Grids", **OFC/NFOEC**, Paper OWN1, 2008 (acceptance ratio is around 40%)
- (130). W. Shaw* et al. "Reconfigurable Optical Backhaul and Integrated Routing Algorithm for Load Balancing in Hybrid Optical-Wireless Access Networks", **ICC**, (to appear), 2008 (acceptance ratio is around 36%)

Conference Poster Presentation

- C. Qiao, H. Wu and O. Tonguz, "Load Balancing via Relay in Next Generation Wireless Systems", Proc. **ACM MobiHoc'00**, Boston, MA, Aug. 2000, pp. 149-150 (accepted 25 out of 82 submissions, of which 13 are accepted as poster papers).
- H. Wu and C. Qiao, "Quality of Coverage: A New Concept for Wireless Networks", in **ACM SIGCOMM**, San Diego, CA, Aug. 2001. (acceptance ratio unknown). A summary appeared in *ACM Computer Communication Review (CCR)*, Vol. 32, No. 1, January 2002.
- S. De, S. Das, H. Wu, and C. Qiao, "Trigger-based Distributed QoS Routing in Mobile Ad Hoc Networks", in **ACM MobiHoc**, Lausanne, Switzerland, June 2002 (acceptance ratio is 22% - accepted 16% as regular papers, and an additional 6% as posters)
- J. Li and C. Qiao, "Proactive Burst Contention Avoidance in OBS Networks", Poster MF103, in **Proceeding of IEEE/OSA Optical Fiber Communication Conference (OFC)**, pp. 129-130, Atlanta, GA, March 2003. (acceptance ratio unknown)
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- J. Ghosh, S. Philip, and C. Qiao, "Poster Abstract: Sociological Orbit aware Location Approximation and Routing (SOLAR) in MANET" **ACM MobiHoc 2005** (May)
- J. Ghosh, C. Westphal, H. Ngo, and C. Qiao, "Bridging Intermittently Connected Mobile Ad hoc Networks (ICMAN) with Sociological Orbits", **IEEE INFOCOM 2006**, Barcelona, Spain 2006 (April)
- S. Yoon and C. Qiao, "A Novel Approach to Reconnaissance using Cooperative Mobile Sensor Nodes", **IEEE MILCOM**, Washington, D.C. Oct 2006
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Workshop Presentations

- C. Qiao, "PETAFLIPS: PERhaps Take A Futuristic Look at Optical Processing Systems", **PetaFLOP Frontier Workshops** (in conjunction with the 5th Symp. on Frontiers of Massively Parallel Computation), Feb. 1995

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- C. Qiao, Y. Mei, M. Yoo and X. Zhang, "Polymorphic Control for Cost-Effective Design of Optical Networks", **NSF DIMACS Workshop on Multichannel Optical Networks**, DIMACS Series, Vol. 46, pp. 157-179, March 1998.
- X. Zhang and C. Qiao, "Pipelined Versus Non-pipelined Traffic Scheduling in Unidirectional WDM Rings", **Workshop on Optics and Computer Science (WOCS)** (in conjunction with IPPS/SPDP'99), April 1999
- C. Qiao, H. Wu, S. De, E. Yanmaz, O. Tonguz, and S. Mishra, "Deploying iCAR in Disaster Recovery," in **IEEE Workshop on Disaster Recovery Networks (DIREN)**, Co-located with IEEE Infocom'02, New York, Jun. 2002.
- C. Qiao, D. Xu and Y. Xiong, "A Novel Segment Protection Approach for SRLG Networks", **High-Speed Networks (HSN)**, Co-located with Infocom'03, April 2003.
- S. Sheeshia and C. Qiao, "Burst Grooming in Optical-Burst-Switched Networks", **Workshop on Traffic Grooming**, Co-located with Broadnets, Oct. 2004, Proceedings available at <http://www.broadnets.org/2004/trafficgrooming.html>.
- C. Qiao, "How to Make The 'Network' Disappear?", **NSF Workshop on the Future of Optical Communications**, Santa Barbara, CA, April 2005
- C. Qiao, W. Wei and X. Liu, "Towards a Polymorphous, Agile and Transparent Optical Network (PATON)", **High-Speed Networks (HSN)**, Co-located with Infocom'06, April 2006.
- X. Liu, W. Wei, X. Yu, C. Qiao and T. Wang, "Distributed Computing Task Assignment and Lighpath Establishment (TALE)", **High-Speed Networks (HSN)**, Co-located with Infocom'07, May 2007.
- S.Yoon, H. Ngo and C. Qiao, "On Shooting a Moving Vehicle with Data Flows", **MOBILE Networking for Vehicular Environments (MOVE)**, Co-located with Infocom'07, May 2007.

Patents

- (1). Labeled optical burst switching for IP-over-WDM integration, US 6,956,868, Issued Oct. 2005
- (2). Method to control a special class of OBS/LOBS and other burst switched network devices, US 7,042,906, Issued May 2006
- (3). Efficient Optical Network Design Using Multi-Granular Optical Cross-Connects with Wavelength Band Switching, US 7,162,632, Issued Jan. 2007
- (4). Methods to process and forward control packets in OBS/LOBS and other burst switched networks, US 7,286,531, Issued Oct. 2007

Others

- Wrote editorials for about a dozen of Optical Network Magazine issues, three IEEE JSAC issues, and five IEEE Optical Communications Issues.
- Drafted a 6-page report for the breakout session on optical networking at NSF ANIR's PI Workshop in Jan. 2003.
- Contributed several paragraphs to an Internet 2 proposal to NSF submitted by a New York state-wide consortium which includes University at Buffalo (a total of about 10 millions received, of which 2.45 millions are from NSF).