

Liu, Jia (Kevin)

Contact Information

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Research Interests

- MIMO, Multi-Carrier Communications, Cognitive Radio
- Wireless Networking, Cross-Layer Optimizations
- Mathematical Optimization Theory

Education

Ph.D. Candidate, Dept. of Electrical and Computer Engineering, May 2009 (expected)
Virginia Polytechnic Institute and State University, Blacksburg, VA
Dissertation Topic: "Cross-layer design for MIMO-based wireless networks"
Advisor: Dr. Y. Thomas Hou
Current GPA: 3.97/4.00

M.S. in Electrical Engineering, March 1999
South China University of Technology, Guangzhou, Guangdong, P. R. China
Advisor: Dr. Gang Wei
Summa Cum Laude, GPA: 3.9/4.0

B.S. in Electrical Engineering, July 1996
South China University of Technology, Guangzhou, Guangdong, P. R. China
Cum Laude, GPA: 3.8/4.0

B.S. in Computer Science, July 1996
South China University of Technology, Guangzhou, Guangdong, P. R. China
Cum Laude, GPA: 3.8/4.0

Research and Working Experience

Research Assistant, Virginia Polytechnic Institute and State University, September 2003 - Present
Research Topic: Cross-layer design for MIMO-based wireless networks
Advisor: Dr. Y. Thomas Hou

Software Engineer Summer Intern, Mercury Computer Systems, Inc., Chelmsford, MA, June 2005 - August 2005
Project: Development the Rapid IO[®] bus Linux drivers
Supervisor: Ron Gallerie

Member of Technical Staff, Bell Labs, Lucent Technologies, Beijing, P. R. China, May 2000 - January 2003
Project: Development of cdma2000-1x/1xEV-DO/1xEV-DV standards
Supervisor: Yvonne Kao

System Engineer, Lucent Technologies, Guangzhou, P. R. China, March 1999 - May 200

Project: Technical support and training on Lucent's ATM/Frame Relay/Gigabit Ethernet switches

Supervisor: Xiaohui Shen

Teaching Experience

Teaching Assistant, Virginia Polytechnic Institute and State University, 2005 - present

Course: Introduction to Telecommunication Networks

Responsibilities: Guest lectures on TCP/IP, grading assignments and exams

Awards and Honors

1. 2008 Chinese Government Award for Outstanding Ph.D. Student Abroad.
2. Student Travel Grant to IEEE MILCOM 2008, San Diego, CA.
3. Best Paper Award in IEEE ICC 2008, Beijing, China.
4. NSF Student Travel Grant to IEEE INFOCOM 2008, Phoenix, AZ.
5. NSF Student Travel Grant to International Symposium on Information Theory (ISIT), 2007, Nice, France.
6. Co-recipient of Bell Labs President Gold Award, The Highest Honor in Recognition of R&D Teams in Bell Labs, 2001.
7. Excellent Instructor of Bell Labs China Wireless Internal Training, Bell Labs China, 2001.
8. Midea Prize (8 out of 500 graduate students, merit-based), South China Univ. of Tech., 1999.
9. First Class Scholarship for Three Consecutive Years, South China Univ. of Tech., 1996-1999.
10. No.1 overall (out of over 500 examinees) of Admission Entrance Exams to Graduate School, South China Univ. of Tech., 1996.
11. Winner of the Contest of Electronics Design in SCUT, South China University of Technology, 1995.
12. Winner of the Contest of Advanced Mathematics in SCUT, South China University of Technology, 1993.
13. Excellent All-around Student, First Prize, South China Univ. of Tech. Three consecutive years, 1992-1994.

Publications

1. **Jia Liu**, Y. Thomas Hou and Hanif D. Sherali, "Weighted Proportional Fairness Capacity of Gaussian MIMO Broadcast Channels," submitted to *IEEE Transaction on Information Theory*, under review.
2. **Jia Liu** and Y. Thomas Hou, "Cross-Layer Optimization for MIMO-Based Mesh Networks with Dirty Paper Coding," submitted to *IEEE/ACM Transaction on Networking*, under review.

3. **Jia Liu** and Y. Thomas Hou, "Maximum Weighted Sum Rate of Multi-Antenna Broadcast Channels," submitted to *IEEE Transaction on Wireless Communications*, under review.
4. **Jia Liu** and Y. Thomas Hou, "Optimal Downlink Power Allocation and Scheduling for MIMO-Based WiMAX Access Networks," submitted to *IEEE Journal on Selected Area of Communications*, under review.
5. **Jia Liu**, Y. Thomas Hou, Yi Shi, and Hanif D. Sherali, "Cross-Layer Optimization on Routing and Power Control of MIMO Ad Hoc Networks: Routing, Power Allocation, and Bandwidth Allocation," *IEEE Journal on Selected Areas of Communications*, vol. 26, no. 6, Aug. 2008, to appear.
6. **Jia Liu**, Y. Thomas Hou, Yi Shi, and Hanif D. Sherali, "On the Capacity of Multiuser MIMO Networks with Interference," *IEEE Transaction on Wireless Communications*, vol. 7, no. 2, pp. 488 - 494, Feb. 2008.
7. **Jia Liu**, Y. Thomas Hou, and Hanif D. Sherali, "Cross-Layer Optimization for MIMO-Based Mesh Networks with Dirty Paper Coding," in *Proc. IEEE ICC 2008 (Best Paper Award)*, Beijing, China, May 19 - 23, 2008.
8. **Jia Liu**, Y. Thomas Hou and Hanif D. Sherali, "Maximum Weighted Sum Rate of Multi-Antenna Broadcast Channels," in *Proc. IEEE ICC 2008*, Beijing, China, May 19 - 23, 2008.
9. **Jia Liu**, Y. Thomas Hou, "Weighted Proportional Fairness Capacity of Gaussian MIMO Broadcast Channels," in *Proc. IEEE INFOCOM 2008*, Phoenix, AZ, Apr. 13 - 17, 2008.
10. **Jia Liu**, Y. Thomas Hou, and Hanif D. Sherali, "Conjugate Gradient Projection Approach for MIMO Gaussian Broadcast Channels," in *Proc. IEEE ISIT*, Nice, France, Jun. 24 - 29, 2007.
11. **Jia Liu**, T. Y. Park, Y. Thomas Hou, Yi Shi, and Hanif D. Sherali, "Cross-Layer Optimization of MIMO-Based Mesh Networks Under Orthogonal Channels," in *Proc. IEEE WCNC*, Hong Kong, Mar. 11 - 15, 2007.
12. **Jia Liu**, Y. Thomas Hou, Yi Shi, and Hanif D. Sherali, "Optimization of Multiuser MIMO Networks with Interference," *Proc. IEEE GLOBECOM*, San Francisco, Nov. 27 - Dec. 1, 2006.
13. **Jia Liu** and A. Annamalai, "Efficacy of Channel-and-Node Aware Routing Strategies in Wireless Ad Hoc Networks," in *Proc. IEEE VTC*, Dallas, Oct. 2005.
14. **Jia Liu** and A. Annamalai, "Channel-Aware routing Protocol for Ad Hoc Networks: Generalized Multiple-Route Path Selection Diversity," in *Proc. IEEE VTC*, Dallas, Oct. 2005.
15. A. Annamalai and **Jia Liu**, "A Cross-Layer Design Perspective for Multi-Resolution Signaling," in *Proc. IEEE GLOBECOM*, Dallas, Nov. 2004.
16. **Jia Liu** and A. Annamalai, "Multi-Resolution Signaling for Multimedia Multicasting," in *Proc. IEEE VTC*, Los Angeles, Sep. 2004.

Presentations

Jia Liu (2008). "Cross-Layer Optimization for MIMO-Based Mesh Networks with Dirty Paper Coding," IEEE ICC, May 21, Beijing, China.

Jia Liu (2008). "Maximum Weighted Sum Rate of Multi-Antenna Broadcast Channels," IEEE ICC, May 22, Beijing, China.

Jia Liu (2008). “Weighted Proportional Fairness Capacity of Gaussian MIMO Broadcast Channels,” IEEE INFOCOM, April 16, Phoenix, AZ.

Jia Liu (2007). “Conjugate Gradient Projection Approach for MIMO Gaussian Broadcast Channels,” IEEE ISIT, June 26, Nice, France.

Jia Liu (2006). “Optimization of Multiuser MIMO Networks with Interference,” IEEE Globecom, December 1, San Francisco, CA.

Jia Liu (2004). “Multi-Resolution Signaling for Multimedia Multicasting,” IEEE VTC, September 28, Los Angeles, CA.

Technical Skills

Computer Languages: C/C++/C#, JAVA, Perl, PHP, Unix Shell, Delphi, HTML, \LaTeX

Software Development Tools: MATLAB, Visual Studio .NET, LINDO API, CPLEX, MySQL

Mathematics Skills: Linear Programming, Nonlinear Programming, Integer Programming, Graph Theory and Network Flows, Advanced Techniques for Large-Scale Optimization Problems, Matrix Theory, Probability and Statistics, Statistical Inference, Regression, Stochastic Processes, Real Analysis, Queuing Theory, Game Theory

Affiliations/Memberships

IEEE Student Member/IEEE ComSoc Student Member (since 2003).

Member of Tau Beta Pi, the National Engineering Honor Society (since 2006).

Professional Activities

Reviewer for Journals: IEEE Transactions on Wireless Communications (2004, 2005, 2006, 2007, 2008), IEEE Transactions on Vehicular Technologies (2004, 2005, 2006, 2007), EURASIP Journal on Advances in Signal Processing (2008).

Reviewer for Conferences: INFOCOM (2007), ICC (2007), GLOBECOM (2004), WCNC (2005, 2007), VTC (2004, 2005), SECON (2005).

References

Dr. Y. Thomas Hou

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Dr. Hanif D. Sherali

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Member, National Academy of Engineering
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Dr. Scott F. Midkiff

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