

Nihar Jindal

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Education **Stanford University** *1999-2004*
PHD. ELECTRICAL ENGINEERING, July 2004
M.S. ELECTRICAL ENGINEERING, June 2001
Thesis: Multi-User Communication Channels: Capacity, Duality, and Cooperation
Advisor: Prof. Andrea Goldsmith
Associate Advisor: Prof. Thomas Cover

University of California, Berkeley *1995-1999*
B.S. ELECTRICAL ENGINEERING/COMPUTER SCIENCE, May 1999

Work Experience

University of Minnesota, Minneapolis, MN *Sept. 2010 - Present*
Associate Professor

University of Minnesota, Minneapolis, MN *Aug. 2004 - Aug. 2010*
Assistant Professor

Research

- Wireless communication
- Multi-user/multi-antenna communication systems
- Ad-hoc networks
- Cross-layer design of communication networks
- Dynamic resource allocation for fading channels
- Multi-user information theory

Teaching

- Wireless Communication (EE 5505), Spring 2010, Spring 2007, Spring 2006
- Information Theory and Coding (EE 5581), Fall 2010, Fall 2007, Fall 2005
- Digital Communication (EE 5501), Fall 2009
- Advanced Topics in Wireless Communication (EE 8950), Spring 2008
- Statistical Methods in Electrical and Computer Engineering (EE 3025), Fall 2006
- Multi-User Information Theory (EE 8510), Spring 2005
- Participant in Early Career Faculty Teaching Program, 2005-2006

Bell Labs, Lucent Technologies, Crawford Hill, NJ *June - August 2002*
Summer Intern, Wireless Research Lab
Mentor: Dr. Gerald Foschini

- Analyzed performance of pre-coding techniques for multiple-antenna downlink cellular systems.
- Evaluated potential gain due to multiple base station cooperation in a cellular environment.

Intel Corporation, Santa Clara, CA
Summer Intern, Microprocessor Research Lab
Mentor: Dr. Leslie Rusch

June - Sept 2000

- Evaluated performance of advanced signal processing techniques in wireless LAN receivers.

Honors

- Guillermo E. Borja Award, University of Minnesota, 2010
- NSF CAREER Award, 2008.
- McKnight Land-Grant Professor, University of Minnesota, 2007-2009
- Ezra Frederick Scattergood Fellowship, Stanford University
- Electrical Engineering Honors Program, UC-Berkeley
- Member Eta Kappa Nu

Paper Awards

- IEEE Communications Society Leonard G. Abraham Prize (JSAC Best Paper Award) 2009, "Limited Feedback-Based Block Diagonalization for the MIMO Broadcast Channel"
- IEEE Communications Society and Information Theory Society Joint Paper Award 2005, "On the Duality of Gaussian Multiple-Access and Broadcast Channels"

Professional Affiliations

- IEEE Information Theory Society
- IEEE Communications Society

Professional Service

- Associate Editor, IEEE Transactions on Communications, 2007-Present
- Treasurer, IEEE Information Theory Society, 2010-12
- Technical Program Co-Chair, IEEE Communication Theory Workshop, 2010
- Guest Editor, EURASIP Journal on Advances in Signal Processing, Special Issue on "Multiuser MIMO Transmission with Limited Feedback, Cooperation, and Coordination," 2008
- Guest Editor, EURASIP Journal on Wireless Communications and Networking, Special Issue on "Theory and Applications in Multiuser/Multiterminal Communications," 2008
- Treasurer, IEEE Communication Theory Workshop 2009; Poster Co-Chair, IEEE Communication Theory Workshop 2008.
- Technical Program Co-Chair, Multiple Antennas and Space-Time Processing Track, IEEE Vehicular Technology Conference, Fall 2007
- Technical Program Committee Member: IEEE Int. Symp. on Information Theory (ISIT) 2007, 2008, 2009, IEEE Int. Conf. of Communications (ICC) 2006, 2008, 2009, IEEE Global Telecommunications Conf.(Globecom) 2006, 2007, 2008, 2009, WiOpt 2008, Information Processing in Sensor Networks (IPSN) 2006, RAWNET 2006, Int. Wireless Commun. and Mobile Comput. Conf. (IWCMC) 2006, IEEE WirelessComm 2005, IEEE VTC 2005
- Reviewer for IEEE Transactions on Information Theory, IEEE Transactions on Communications, IEEE Communications Letters, IEEE Transactions on Wireless Communications, IEEE Journal on Selected Areas in Communications, IEEE Transactions on Signal Processing.
- President, IEEE Twin Cities Chapter of Signal Processing and Communication Societies, 2005 - Present

Journal Publications

1. Peng Wu and Nihar Jindal, "Coding versus ARQ in Fading Channels: How Reliable should the PHY be?", Submitted: *IEEE Transactions on Communications*, March 2010.
2. Mari Kobayashi, Nihar Jindal, and Giuseppe Caire, "Training and Feedback Optimization for Multiuser MIMO Downlink", Submitted: *IEEE Transactions on Communications*, Dec. 2009.
3. Juyul Lee and Nihar Jindal, "Asymptotically Optimal Policies for Hard-deadline Scheduling over Fading Channels," Submitted: *IEEE Transactions on Information Theory*, June 2009.
4. Nihar Jindal, Jeff Andrews, and Steven Weber, "Multi-Antenna Communication in Ad Hoc Networks: Achieving MIMO Gains with SIMO Transmission", To Appear: *IEEE Transactions on Communications*.
5. Steven Weber, Jeff Andrews, and Nihar Jindal, "An Overview of the Transmission Capacity of Wireless Networks,," To Appear: *IEEE Transactions on Communications*, 2010.
6. Nihar Jindal and Angel Lozano, "A Unified Treatment of Optimum Pilot Overhead in Multipath Fading Channels," To Appear: *IEEE Transactions on Communications*, 2010.
7. Giuseppe Caire, Nihar Jindal, Mari Kobayashi, and Niranjay Ravindran, "Multiuser MIMO Achievable Rates with Downlink Training and Channel State Feedback," *IEEE Trans. on Inform. Theory*, Vol. 56, No. 6, pp. 2845-2866, June 2010.
8. Peng Wu and Nihar Jindal, "Performance of Hybrid-ARQ in Block-Fading Channels: A Fixed Outage Probability Analysis," *IEEE Transactions on Communications*, Vol. 58, No. 4, pp. 1129-1141, April 2010.
9. Angel Lozano and Nihar Jindal, "Transmit Diversity v. Spatial Multiplexing in Modern MIMO Systems," *IEEE Transactions on Wireless Communications*, Vol. 9, No. 1, pp. 186-197, Jan. 2010.
10. Juyul Lee and Nihar Jindal, "Energy-efficient Scheduling of Delay Constrained Traffic over Fading Channels," *IEEE Transactions on Wireless Communications*, Vol. 8, No. 4, pp. 1866-1875, April 2009.
11. J. Andrews, N. Jindal, M. Haenggi, R. Berry, S. Jafar, D. Guo, S. Shakkottai, R. Heath, M. Neely, S. Weber, and A. Yener, "Rethinking Information Theory for Mobile Ad Hoc Networks," *IEEE Communications Magazine*, Vol. 46, No. 12, pp. 94-101, Dec. 2008.
12. Nihar Jindal, Jeff Andrews, and Steven Weber, "Bandwidth Partitioning in Decentralized Wireless Networks," *IEEE Transactions on Wireless Communications*, Vol. 7, No. 12, pp. 5408-5419, Dec. 2008.
13. Nihar Jindal, Steven Weber, and Jeff Andrews, "Fractional Power Control for Decentralized Wireless Networks," *IEEE Transactions on Wireless Communications*, Vol. 7, No. 12, pp. 5482-5492, Dec. 2008.
14. Chan-Byoung Chae, David Mazzarese, Nihar Jindal and Robert W. Heath, Jr., "Coordinated Beamforming with Limited Feedback in the MIMO Broadcast Channel", *IEEE Journal on Selected Areas in Communications*, Vol. 26, No. 8, pp. 1505-1515, Oct. 2008.
15. Niranjay Ravindran and Nihar Jindal, "Limited Feedback-Based Block Diagonalization for the MIMO Broadcast Channel," *IEEE Journal on Selected Areas in Communications*, Vol. 26, No. 8, pp. 1473-1482, Oct. 2008. **(Recipient of 2009 IEEE Leonard G. Abraham Prize - JSAC Best Paper Award)**
16. Nihar Jindal, "Antenna Combining for the MIMO Downlink Channel", *IEEE Transactions on Wireless Communications*, Vol. 7, No. 10, pp. 3834-3844, Oct. 2008.

17. Ioannis Schizas, Georgios Giannakis and Nihar Jindal, "Distortion-Rate Bounds for Distributed Estimation with Wireless Sensor Networks," *EURASIP Journal on Advances in Signal Processing*, Special Issue on Distributed Signal Processing Techniques for Wireless Sensor Networks, 2008.
18. Juyul Lee and Nihar Jindal, "High SNR Analysis for MIMO Broadcast Channels: Dirty Paper Coding vs. Linear Precoding," *IEEE Transactions on Information Theory*, Vol. 53, No. 12, pp. 4787-4792, Dec. 2007.
19. Steven Weber, Jeff Andrews, and Nihar Jindal, "The Effect of Fading, Channel Inversion, and Threshold Scheduling on Ad Hoc Networks," *IEEE Transactions on Information Theory*, Vol. 53, No. 11, pp. 4127-4149, Nov. 2007.
20. Chris Ng, Nihar Jindal, Andrea Goldsmith, and Urbashi Mitra, "Capacity Gain from Two-Transmitter and Two-Receiver Cooperation," *IEEE Transactions on Information Theory*, Vol. 53, No. 10, pp. 3822-3827, Oct. 2007.
21. Taesang Yoo, Nihar Jindal, and Andrea Goldsmith, "Multi-Antenna Downlink Channels with Limited Feedback and User Selection," *IEEE Journal on Selected Areas in Communications*, Vol. 25, No. 7, pp. 1478-1491, Sept. 2007. (Nominated for JSAC Best Paper Award).
22. Yingqun Yu, Georgios Giannakis, and Nihar Jindal, "Information-Bearing Noncoherently Modulated Pilots for MIMO Training," *IEEE Transactions on Information Theory*, Vol. 53, No. 3, pp. 1160-1167, March 2007.
23. Nihar Jindal, "MIMO Broadcast Channels with Finite-Rate Feedback," *IEEE Transactions on Information Theory*, Vol. 52, No. 11, pp. 5045-5059, Nov. 2006.
24. Nihar Jindal and Andrea Goldsmith, "Dirty-Paper Coding vs. TDMA for MIMO Broadcast Channels", *IEEE Transactions on Information Theory*, Vol. 51, No. 5, pp. 1783-1794, May 2005.
25. Nihar Jindal, Wonjong Rhee, Sriram Vishwanath, Syed Ali Jafar, and Andrea Goldsmith, "Sum Power Iterative Water-filling for Multi-Antenna Gaussian Broadcast Channels," *IEEE Transactions on Information Theory*, Vol. 51, No. 4, pp. 1570-1580, April 2005.
26. Lifang Li, Nihar Jindal, and Andrea Goldsmith, "Outage Capacities and Optimal Power Allocation for Fading Multiple-Access Channels," *IEEE Transactions on Information Theory*, Vol. 51, No. 4, pp. 1326-1347, April 2005.
27. Nihar Jindal, Sriram Vishwanath, and Andrea Goldsmith, "On the Duality of Gaussian Multiple-Access and Broadcast Channels," *IEEE Transactions on Information Theory*, Vol. 50, No. 5, pp. 768-783, May 2004. **(Recipient of 2005 IEEE ComSoc/IT Society Joint Paper Award)**
28. Nihar Jindal and Andrea Goldsmith, "Capacity and Optimal Power Allocation for Fading Broadcast Channels with Minimum Rates," *IEEE Transactions on Information Theory*, Vol. 49, No. 11, pp. 2895-2909, Nov. 2003.
29. Sriram Vishwanath, Nihar Jindal, and Andrea Goldsmith, "Duality, Achievable Rates, and Sum-Rate Capacity of Gaussian MIMO Broadcast Channels," *IEEE Transactions on Information Theory*, Vol. 49, No. 10, pp. 2658-2668, Oct. 2003.
30. Andrea Goldsmith, Syed Ali Jafar, Nihar Jindal, and Sriram Vishwanath, "Capacity Limits of MIMO Channels," *IEEE Journal on Selected Areas in Communications*, Vol. 21, No. 5, pp. 684 -702, June 2003.

Conference Publications

1. Joseph Blomer and Nihar Jindal, "Opportunistic Routing in Ad Hoc Networks: How many relays should there be? What rate should nodes use?" *IEEE Global Communications Conference*, Dec. 2010.
2. Fredrik Rusek, Angel Lozano, and Nihar Jindal, "Mutual Information of IID Complex Gaussian Signals on Block Rayleigh-faded Channels" *IEEE International Symposium on Information Theory*, June 2010.
3. Peng Wu and Nihar Jindal, "Coding versus ARQ in Fading Channels: How Reliable should the PHY be?" *IEEE Global Communications Conference*, Nov. 2009.
4. Nihar Jindal and Angel Lozano, "De-hyping Transmit Diversity in Modern MIMO Cellular Systems", *IEEE Global Communications Conference*, Nov. 2009.
5. Juyul Lee and Nihar Jindal, "Asymptotically Optimal Policies for Hard-deadline Scheduling over Fading Channels," *Allerton Conference on Communication, Control, and Computing*, Oct. 2009.
6. Nihar Jindal, Angel Lozano, and Thomas Marzetta, "What is the Value of Joint Processing of Pilots and Data in Block-Fading Channels?" *IEEE International Symposium on Information Theory*, July 2009.
7. Nihar Jindal, Jeff Andrews, and Steven Weber, "Rethinking MIMO for Wireless Networks: Linear Throughput Increases with Multiple Receive Antennas," *IEEE International Conference on Communications*, June 2009.
8. Juyul Lee and Nihar Jindal, "Delay Constrained Scheduling over Fading Channels: Optimal Policies for Monomial Energy-Cost Functions," *IEEE International Conference on Communications*, June 2009.
9. Joseph Blomer and Nihar Jindal, "Transmission Capacity of Wireless Ad Hoc Networks: Successive Interference Cancellation vs. Joint Detection," *IEEE International Conference on Communications*, June 2009.
10. Mari Kobayashi, Nihar Jindal, and Giuseppe Caire "Optimized Training and Feedback for MIMO Downlink Channels," *IEEE Information Theory Workshop*, June 2009. (Invited Paper)
11. Mariam Kaynia, Gier Oien, and Nihar Jindal, "Impact of Fading on the Performance of ALOHA and CSMA," *IEEE Workshop on Signal Processing Advances in Wireless Communications*, June 2009.
12. Steven Weber, Nihar Jindal, Radha Krishna Ganti, and Martin Haenggi, "Longest Edge Routing on the Spatial Aloha Graph," *IEEE Global Communications Conference*, Nov. 2008.
13. Mariam Kaynia, Gier Oien, Nihar Jindal, and David Gesbert, "Comparative Performance Evaluation of MAC Protocols in Ad Hoc Networks with Bandwidth Partitioning," *IEEE International Symposium on Personal, Indoor and Mobile Radio Communications*, Sept. 2008.
14. Mari Kobayashi, Giuseppe Caire, and Nihar Jindal, "How Much Training and Feedback are Required in MIMO Broadcast Channels?" *IEEE International Symposium on Information Theory*, July 2008.
15. Juyul Lee and Nihar Jindal, "Energy-efficient Scheduling of Delay Constrained Traffic over Fading Channels," *IEEE International Symposium on Information Theory*, July 2008.
16. Niranjay Ravindran and Nihar Jindal, "Multi-User Diversity vs. Accurate Channel Feedback for MIMO Broadcast Channels," *IEEE International Conference on Communications*, May 2008.
17. Peng Wu and Nihar Jindal, "Analysis of Fixed Outage Transmission Schemes: A Finer Look at the Full Multiplexing Point," *IEEE International Conference on Communications*, May 2008.

18. Mariam Kaynia and Nihar Jindal, "Performance of ALOHA and CSMA in Spatially Distributed Wireless Networks," *IEEE International Conference on Communications*, May 2008.
19. Chris Ng, Nihar Jindal, Andrea Goldsmith, and Urbashi Mitra, "Power and Bandwidth Allocation in Cooperative Dirty Paper Coding," *IEEE International Conference on Communications*, May 2008.
20. Chan-Byoung Chae, David Mazzarese, Nihar Jindal, and Robert W. Heath, "A Low Complexity Linear Multiuser MIMO Beamforming System with Limited Feedback," *Conference on Information Sciences and Systems*, March 2008.
21. Niranjay Ravindran, Nihar Jindal, and Howard Huang, "Beamforming with Finite Rate Feedback for LOS MIMO Downlink Channels", *IEEE Global Communications Conference*, November 2007.
22. Giuseppe Caire, Nihar Jindal, and Shlomo Shamai, "On the Required Accuracy of Transmitter Channel State Information in Multiple Antenna Broadcast Channels", *Asilomar Conference on Signals, Systems, and Computers*, Oct. 2007. (Invited Paper)
23. Nihar Jindal, Jeff Andrews, and Steven Weber, "Energy-Limited vs. Interference-Limited Ad Hoc Network Capacity," *Asilomar Conference on Signals, Systems, and Computers*, Oct. 2007. (Invited Paper)
24. Nihar Jindal, Steven Weber, and Jeff Andrews, "Fractional Power Control for Decentralized Wireless Networks", *Allerton Conference on Communication, Control, and Computing*, Sept. 2007.
25. Giuseppe Caire, Nihar Jindal, Mari Kobayashi, and Niranjay Ravindran, "Achievable Throughput of MIMO Downlink Beamforming with Limited Channel Information," , *IEEE International Symposium on Personal, Indoor and Mobile Radio Communications*, Aug. 2007. (Invited Paper)
26. Nihar Jindal, Jeff Andrews, and Steven Weber, "Bandwidth-SINR Tradeoffs in Spatial Networks", *IEEE International Symposium on Information Theory*, June 2007.
27. Giuseppe Caire, Nihar Jindal, Mari Kobayashi, and Niranjay Ravindran, "Quantized vs. Analog Feedback for the MIMO Broadcast Channel: A Comparison between Zero-Forcing Based Achievable Rates", *IEEE International Symposium on Information Theory*, June 2007.
28. Niranjay Ravindran and Nihar Jindal, "MIMO Broadcast Channels with Block Diagonalization and Finite Rate Feedback", *IEEE International Conference on Acoustics, Speech, and Signal Processing*, April 2007.
29. Nihar Jindal, Jeff Andrews, and Steven Weber, "Optimizing the SINR Operating Point of Spatial Networks", *Workshop on Information Theory and its Applications*, Jan. 2007. (Invited Paper)
30. Jin-Jun Xiao, Zhi-Quan (Tom) Luo, and Nihar Jindal, "Linear Joint Source-Channel Coding for Gaussian Sources through Fading Channels", *IEEE Global Communications Conference*, San Francisco, CA, Nov. 2006.
31. Giuseppe Caire, Nihar Jindal, and Mari Kobayashi, "Achievable Rates of MIMO Downlink Beamforming with Non-Perfect CSI: A Comparison Between Quantized and Analog Feedback", *Asilomar Conference on Signals, Systems, and Computers*, Oct. 2006. (Invited Paper)
32. Juyul Lee and Nihar Jindal, "Dirty Paper Coding vs. Linear Precoding for MIMO Broadcast Channels", *Asilomar Conference on Signals, Systems, and Computers*, Oct. 2006. (Invited Paper)
33. Nihar Jindal, "MIMO Broadcast Channels with Digital Channel Feedback", *Asilomar Conference on Signals, Systems, and Computers*, Oct. 2006. (Invited Paper)
34. Steven Weber, Jeff Andrews, and Nihar Jindal, "Throughput and Transmission Capacity of Ad Hoc Networks with Channel State Information", *Allerton Conference on Communication, Control, and Computing*, Sept. 2006.

35. Juyul Lee and Nihar Jindal, "Symmetric Capacity of MIMO Broadcast Channels", *IEEE International Symposium on Information Theory*, July 2006.
36. Nihar Jindal, "A Feedback Reduction Technique for MIMO Broadcast Channels", *IEEE International Symposium on Information Theory*, July 2006.
37. Nihar Jindal and Zhi Quan (Tom) Luo, "Capacity Limits of Multiple Antenna Multicast", *IEEE International Symposium on Information Theory*, July 2006.
38. Taesang Yoo, Nihar Jindal, and Andrea Goldsmith, "Finite-Rate Feedback MIMO Broadcast Channels with a Large Number of Users", *IEEE International Symposium on Information Theory*, July 2006.
39. Sudhir Srinivasa, Syed Ali Jafar, and Nihar Jindal, "On the Capacity of the Cognitive Tracking Channel", *IEEE International Symposium on Information Theory*, July 2006.
40. Nihar Jindal, "Finite Rate Feedback MIMO Broadcast Channels", *Workshop on Information Theory and its Applications*, Feb. 2006. (Invited Paper)
41. Nihar Jindal, "MIMO Broadcast Channels with Finite Rate Feedback", *IEEE Global Communications Conference*, Oct. 2005.
42. Ioannis Schizas, Georgios Giannakis, and Nihar Jindal, "Distortion-Rate Analysis for Distributed Estimation with Wireless Sensor Networks," *Allerton Conference on Communication, Control, and Computing*, Sept. 2005.
43. Nihar Jindal, "High SNR Analysis of MIMO Broadcast Channels", *IEEE International Symposium on Information Theory*, Sept. 2005.
44. Nihar Jindal and Andrea Goldsmith, "Capacity and Dirty Paper Coding for Gaussian Broadcast Channels with Common Information," *IEEE International Symposium on Information Theory*, June 2004.
45. Nihar Jindal, Urbashi Mitra, and Andrea Goldsmith, "Capacity of Ad-Hoc Networks with Node Cooperation," *IEEE International Symposium on Information Theory*, June 2004.
46. Nihar Jindal and Andrea Goldsmith, "Dirty Paper Coding vs. TDMA for MIMO Broadcast Channels," *IEEE International Conference on Communications*, June 2004.
47. Sriram Vishwanath, Nihar Jindal, and Andrea Goldsmith, "The "Z" channel," *IEEE Global Communications Conference*, Dec. 2003.
48. Sriram Vishwanath, Wonjong Rhee, Nihar Jindal, Syed Ali Jafar, and Andrea Goldsmith, "Sum Power Iterative Water-filling for Gaussian Vector Broadcast Channels," *IEEE International Symposium on Information Theory*, July 2003.
49. Nihar Jindal, Sriram Vishwanath, and Andrea Goldsmith, "On the Duality Between General Multiple-Access/Broadcast Channels," *IEEE International Symposium on Information Theory*, July 2003.
50. Nihar Jindal, Syed Ali Jafar, Sriram Vishwanath, and Andrea Goldsmith, "Sum Power Iterative Water-filling for Multi-Antenna Gaussian Broadcast Channels," *Asilomar Conference on Signals, Systems, and Computers*, Nov. 2002.
51. Nihar Jindal, Sriram Vishwanath, Syed Ali Jafar, and Andrea Goldsmith, "Duality, Dirty Paper Coding, and Capacity for Multiuser Wireless Channels," *DIMACS Workshop on Signal Processing for Wireless Transmission*, Oct. 2002. (Invited Paper)
52. Raymond Wang, Nihar Jindal, Thomas Bruns, Ahmed Bahai, and Donald C. Cox, "Comparing RLS and LMS Adaptive Equalizers for Nonstationary Wireless Channels in Mobile Ad Hoc Networks," *IEEE International Symposium on Personal, Indoor and Mobile Radio Communications*, Sept. 2002.
53. Nihar Jindal, Sriram Vishwanath, and Andrea Goldsmith, "On the Duality of Gaussian Multiple-Access and Broadcast Channels," *IEEE International Symposium on Information Theory*, July 2002.

54. Sriram Vishwanath, Nihar Jindal, and Andrea Goldsmith, "On the Capacity of Multiple Input Multiple Output Broadcast Channels," *IEEE International Conference on Communications*, April 2002.
55. Nihar Jindal and Andrea Goldsmith, "Capacity and Optimal Power Allocation for Fading Broadcast Channels with Minimum Rates," *IEEE Global Communications Conference*, Nov. 2001.
56. Nihar Jindal, Sriram Vishwanath, and Andrea Goldsmith, "On the Duality of Multiple-Access and Broadcast Channels," *Allerton Conference on Communication, Control, and Computing*, Oct. 2001.

Book Chapters

1. Andrea Goldsmith, Syed Ali Jafar, Nihar Jindal, and Sriram Vishwanath, Chapter Title: "Capacity Limits of MIMO Systems", Book Title: "MIMO Wireless Communications", Cambridge University Press, 2007.

Tutorials

1. Andrea Goldsmith, Syed Ali Jafar, Nihar Jindal, and Sriram Vishwanath, "Capacity Limits of MIMO Systems", IEEE Global Communications Conference 2005, St. Louis, MO.
2. Andrea Goldsmith, Syed Ali Jafar, Nihar Jindal, and Sriram Vishwanath, "Capacity Limits of MIMO Systems", IEEE International Symposium on Information Theory, 2005, Adelaide, Australia.
3. Ali Ghayeb, Georgios Giannakis, Andrea Goldsmith, Syed Ali Jafar, Nihar Jindal, Reinaldo Valenzuela, Sriram Vishwanath, and Shengli Zhou, "Theory and Practice of MIMO: Promises and Realities", IEEE Global Communications Conference 2004, Dallas, TX.

Invited Presentations

1. DoCoMo Labs, "A System-Level Perspective on CSI for Space-Division Multiple Access", Palo Alto, CA, June 2010.
2. Qualcomm Inc., "A System-Level Perspective on CSI for Space-Division Multiple Access", San Diego, CA, Jan. 2010.
3. Yonsei University, Distinguished Seminar Series, "Delay Constrained Scheduling over Fading Channels", Seoul, Korea, July. 2009.
4. University of Athens, "Rethinking MIMO for Wireless Networks: Linear Throughput Increases with Multiple Receive Antennas", Athens, Greece, June 2009.
5. Washington State Community College Math Conference, "Mathematics of Wireless Communication", Pasco, Washington, April 2009. (Keynote Speaker)
6. Indian Institute of Technology (IIT), "Rethinking MIMO for Wireless Networks: Linear Throughput Increases with Multiple Receive Antennas", Chennai, India, Dec. 2008.
7. Indian Institute of Science, "Rethinking MIMO for Wireless Networks: Linear Throughput Increases with Multiple Receive Antennas", Bangalore, India, Dec. 2008.
8. Universitat Politècnica de Catalunya, "Rethinking MIMO for Wireless Networks: Linear Throughput Increases with Multiple Receive Antennas", Barcelona, Spain, Nov. 2008.
9. CTTC, "Rethinking MIMO for Wireless Networks: Linear Throughput Increases with Multiple Receive Antennas", Barcelona, Spain, Nov. 2008.

10. EURECOM, "Rethinking MIMO for Wireless Networks: Linear Throughput Increases with Multiple Receive Antennas", Sophia-Antipolis, France, Nov. 2008.
11. Supelec, "Rethinking MIMO for Wireless Networks: Linear Throughput Increases with Multiple Receive Antennas", Paris, France, Nov. 2008.
12. Universidad Carlos III, "Performance of Hybrid-ARQ in Block-Fading: A Fixed Outage Analysis", Madrid, Spain, Oct. 2008.
13. Universidad Rey Juan Carlos, "Performance of Hybrid-ARQ in Block-Fading: A Fixed Outage Analysis", Madrid, Spain, Oct. 2008.
14. IEEE Communication Theory Workshop, "Channel Feedback for Multiuser MIMO Downlink Channels", US Virgin Islands, May 2008.
15. Technical University-Berlin, "Performance of Hybrid ARQ in Fixed Outage Settings," Berlin, Germany, April 2008.
16. Northwestern University, "Multiuser MIMO Downlink Made Practical: Achievable Rates with Simple Channel State Estimation and Feedback Schemes," Evanston, IL, April 2008.
17. University of Colorado, Boulder, "Multi-User Diversity vs. Channel Feedback: Is Accurate Channel Feedback from a Few Users Preferable to Coarse Feedback from Many Users?" Feb. 2008.
18. University of California, Berkeley, "Bandwidth Partitioning in Decentralized Wireless Networks," Berkeley, CA, Oct. 2007.
19. Princeton University, "Achievable Throughput of MIMO Downlink Beamforming with Limited Channel Information", Princeton, NJ, Oct. 2007.
20. Penn State University, "Achievable Throughput of MIMO Downlink Beamforming with Limited Channel Information", College Station, PA, Oct. 2007.
21. Seoul National University, "MIMO Downlink Channels with Imperfect Channel Information", Seoul, Korea, Aug. 2007.
22. Yonsei University, "MIMO Downlink Channels with Imperfect Channel Information", Seoul, Korea, Aug. 2007.
23. University of California, Los Angeles, "Optimizing Frequency Reuse in Ad-Hoc Networks", Los Angeles, CA, May 2007.
24. University of Southern California, "Optimizing Frequency Reuse in Ad-Hoc Networks", Los Angeles, CA, May 2007.
25. Workshop on Resource Allocation in Wireless Networks (associated with WiOpt), "Multiple Antenna Downlink Channels: From Theory to Practice", Limassol, Cyprus, April 2007. (Keynote Speaker)
26. Purdue University, "MIMO Downlink Channels: From Theory to Practice", West Lafayette, IA, March. 2007.
27. Rice University, "Optimizing Frequency Reuse in Ad-Hoc Networks", Houston, TX, Feb. 2007.
28. Hughes Network Systems, "Multi-User MIMO: The Next Frontier in Wireless Networks", Germantown, MD, Sept. 2006.
29. Bell Labs, "Finite Rate Feedback MIMO Downlink Channels", Crawford Hill, NJ, May 2006.
30. Bell Labs, "Finite Rate Feedback MIMO Downlink Channels", Murray Hill, NJ, May 2006.
31. Motorola Research Labs, "Multi-User MIMO: The Next Frontier in Wireless Networks", Schaumburg, IL, Feb. 2006.
32. Ohio State University, Information Processing Systems Laboratory Seminar Series, "MIMO Broadcast Channels with Finite Rate Feedback", Jan. 2006

33. Melbourne Information Theory Workshop, "MIMO Broadcast Channels with Finite Rate Feedback", Melbourne, Australia, Aug. 2005.
34. Swiss Federal Institute of Technology (ETH), "MIMO Broadcast Channels at High SNR", Zurich, Switzerland, May 2005.
35. Telecommunications Research Center Vienna (ftw), "MIMO Broadcast Channels with Finite Rate Feedback", Vienna, Austria, May 2005.
36. Adventium Labs, "Multiple Antenna Communication", Minneapolis, MN, February 2005.
37. University of Maryland, "Capacity Results for Multiple Antenna Multi-User Systems", College Park, MD, December 2004.
38. Army Research Laboratory, "Multi-user MIMO & Sensor Networks", Adelphi, MD, December 2004.

Funded Research Projects

1. "CAREER: Exploring the Design and Fundamental Limits of Wireless Spatial Networks", PI, National Science Foundation (CAREER program), Feb. 2008 - Jan 2013.
2. "Rethinking Mobile Ad Hoc Networks: A Non-Equilibrium Information Theory", co-PI, Defense Advanced Research Projects Agency (Information Processing Technology Office), Oct. 2006 - May 2011.
3. "Collaborative Research: Cognitive Ad Hoc Networks: Capacity Optimization Through Local Adaptation", co-PI, National Science Foundation (CISE - Computing & Communications Foundations - Theoretical Foundations Cluster), Sept. 2006 - Aug. 2009.
4. "Integrated Scheduling and Broadband SDMA", PI, Motorola Corporation (University Partnership in Research), Sept. 2006 - May 2009.
5. "Wireless Technologies and Embedded Networked Sensing: Application to Integrated Urban Water Quality Management", co-PI, National Science Foundation (Geosciences - Earth Sciences - Hydrologic Sciences Program), Sept. 2006 - Aug 2008.
6. "IGERT: Non-Equilibrium Dynamics Across Space and Time: A Common Approach for Engineers, Earth Scientists, and Ecologists", senior personnel, National Science Foundation, CISE, Aug. 2005 - July 2010.
7. "Multiple Antenna Downlink Channels with Imperfect Transmitter Channel Knowledge", PI, Grant-in-Aid of Research, Artistry, and Scholarship, University of Minnesota Graduate School, Jan. 2005 - June 2006.