

PUBLICATIONS

Patents

[P4] “Variable Rate Soft Information Forwarding,” patent filed June 2006 (with A. Chakrabarti, A. de Baynast, B. Aazhang).

[P3] “Constellations for Imperfect Channel State Information at the Receiver,” patent awarded February 2006 (with M. J. Borran and B. Aazhang).

[P2] “Low Complexity Beamformers For Multiple Transmit and Receive Antennas,” US Patent 0334414, August 2006 (with K. K. Mukkavilli and B. Aazhang).

[P1] “Technique for Wireless Communications Using a Multi-sector Antenna Arrangement,” US Patent 6127972, October 2000 (with D. Avidor, Lucent Technologies).

Invited Book Chapters

[B5] S. Gupta and **A. Sabharwal**, “WARPnet: A Platform for Deployed Cognitive Radio Experiments,” *Cognitive Radio: System Design Perspective*, Edited by Robert Broderon and Danijela Cabric, Springer, 2009.

[B4] K. Amiri, M. Duarte, C. Dick (Xilinx, Inc.), J. Cavallaro and **A. Sabharwal**, “High-Performance MIMO Algorithms,” *Title to be decided*, Edited by Anantha Chandrakasan, Springer, 2009.

[B3] A. Khoshnevis and **A. Sabharwal**, “Opportunism in Wireless Networks: Principles and Techniques,” *Wireless Ad Hoc Networking: Personal-Area, Local-Area, and Sensory-Area Networks*, Auerbach Publications, to be published in 2007.

[B2] A. Chakrabarti, **A. Sabharwal** and B. Aazhang, “Cooperative Wireless Communications: Fundamental Techniques and Enabling Technologies,” *Cooperation in Wireless Networks*, 2007

[B1] **A. Sabharwal** and B. Aazhang, “Multiuser Wireless Communication Systems,” *Encyclopedia of Telecommunications*, John Proakis (Editor), January 2003.

Refereed Journal Articles

In Review

[J33] D. Dash and **A. Sabharwal**, “Paranoid Secondary: Capacity of a Constrained Interference Channel,” submitted to *IEEE Journal of Selected Areas in Communications*, December 2009.

[J32] V. Aggarwal (Princeton), Y. Liu (Colorado) and **A. Sabharwal**, “Sum-capacity of Interference Channels with a Local View: Impact of Distributed Decisions,” submitted to *IEEE Transactions on Information Theory*, October 2009.

[J31] V. Aggarwal (Princeton) and **A. Sabharwal**, “Bits About the Channel: Multi-round Protocols for Two-way Fading Channels,” submitted to *IEEE Transactions on Information Theory*, September 2009.

Appeared/Accepted

- [J30] M. Duarte, **A. Sabharwal**, C. Dick (Xilinx) and R. Rao (Xilinx), “Beamforming in MISO Systems: Empirical Results and EVM-based Analysis,” accepted for publication in *IEEE Transactions on Wireless Communications*, 2010.
- [J29] V. Aggarwal (Princeton) and **A. Sabharwal**, “Power-controlled Feedback and Training for Two-way MIMO Channels,” accepted for publication in *IEEE Transactions on Information Theory*, January 2009.
- [J28] M. J. Borran, **A. Sabharwal** and B. Aazhang, “Design Criterion and Construction Methods for Partially Coherent Multiple Antenna Constellations,” *IEEE Transactions on Wireless Communications*, 8(8), pp. 4122–4133, August 2009.
- [J27] P. Murphy, **A. Sabharwal** and B. Aazhang, “On Building a Cooperative Communication System: Testbed Implementation and First Results,” *EURASIP Journal on Wireless Communications and Networking*, June 2009.
- [J26] S. Vedantam (USC), U. Mitra (USC) and **A. Sabharwal**, “Distortion Bounds for the Estimation of Time-Varying Channels in Multihop Sensor Networks,” accepted subject to revision, *ACM Transactions on Sensor Networks*, December 2008.
- [J25] T. Moharemović, **A. Sabharwal** and B. Aazhang, “Policy-Based Multiple Access for Decentralized Low Power Systems,” *IEEE Transactions on Wireless Communications*, 8(1), pp. 256–267, January 2009.
- [J24] C. Steger and **A. Sabharwal**, “Single-Input Two-Way SIMO Channel: Diversity-Multiplexing Tradeoff with Two-Way Training,” *IEEE Transactions on Wireless Communications*, 7(12), pp. 4877–4885, December 2008.
- [J23] A. Khoshnevis and **A. Sabharwal**, “On the asymptotic performance of multiple antenna channels with quantized feedback,” *IEEE Transactions on Wireless Communications*, 7(10), pp. 3869–3877, October 2008.
- [J22] V. Aggarwal (Princeton) and **A. Sabharwal**, “Performance of Multiple Access Channels with Asymmetric Feedback,” *IEEE Journal on Selected Areas in Communications*, 26(8), pp. 1516–1525, October 2008.
- [J21] V. Aggarwal (Princeton) and **A. Sabharwal**, “Slotted Gaussian Multiple Access Channel: Stable Throughput Region and Role of Side Information,” *EURASIP Journal on Wireless Communications and Networking (Special Issue on Theory and Applications in Multiuser/Multiterminal Communications)*, January 2008.
- [J20] T. Moharemović, **A. Sabharwal** and B. Aazhang, “Antenna Packing in Low Power Systems: Communication Limits and Array Design,” *IEEE Transactions on Information Theory*, 54(1), pp. 429–440, January 2008.
- [J19] Arnab Chakrabarti, Elza Erkip, **A. Sabharwal** and B. Aazhang, “Code Designs for Cooperative Communication,” *IEEE Signal Processing Magazine*, 24(5), pp. 16–26, September 2007.
- [J18] **A. Sabharwal** and Urbashi Mitra (USC), “Bounds and Protocols for a Rate-constrained Relay Channel,” *IEEE Transactions on Information Theory*, 53(7), pp. 2616–2624, July 2007.
- [J17] **A. Sabharwal**, A. Khoshnevis and E. Knightly, “Opportunistic Spectral Usage: Bounds and a Multi-band CSMA/CA Protocol,” *ACM Transactions on Networking*, 15(3), pp. 533–545, June 2007.

- [J16] A. Chakrabarti, A. de Baynast, **A. Sabharwal** and B. Aazhang, “Low Density Parity Check Codes for the Relay Channel,” *IEEE Journal on Selected Areas in Communications, Special Issues on Cooperative Communications*, 25(2), pp. 280–291, February 2007.
- [J15] A. Chakrabarti, **A. Sabharwal** and B. Aazhang, “Communication Power Optimization in a Sensor Network with a Path-Constrained Mobile Observer,” *ACM Transactions on Sensor Networks*, 2(3), pp. 297–324, August 2006.
- [J14] N. Ahmed, M. A. Khojastepour, **A. Sabharwal** and B. Aazhang, “Outage Minimization with Limited Feedback for the Fading Relay Channel,” *IEEE Transactions on Communications*, 54(4), pp. 659–669, April 2006.
- [J13] B. Sadeghi, V. Kanodia, **A. Sabharwal** and E. Knightly, “OAR: A Multi-rate Media Access Protocol for Wireless Ad Hoc Networks,” *ACM/Kluwer Wireless Networks: Special Issue on Mobile Computing and Networking*, 11(1), pp 39–53, January 2005.
- [J12] D. Rajan, **A. Sabharwal** and B. Aazhang, “Delay Bounded Packet Scheduling of Bursty Sources over Wireless Channels,” *IEEE Transactions on Information Theory*, pp. 125–144, 50(1), January 2004.
- [J11] K. K. Mukkavilli, **A. Sabharwal**, E. Erkip and B. Aazhang, “On Beamforming with Finite Rate Feedback Multiple Antenna Systems,” *IEEE Transactions on Information Theory*, pp. 2562–2579, 49(10), October 2003.
- [J10] M. J. Borran, **A. Sabharwal** and B. Aazhang, “On Design Criteria and Construction of Noncoherent Space-time Constellations,” *IEEE Transactions on Information Theory*, pp. 2332–2351, 49(10), October 2003.
- [J9] B. Aazhang and **A. Sabharwal**, “Algorithms for High Data Wireless Communications: A Power-efficiency Perspective,” *Wireless Personal Communications*, pp. 217–226, 26, 2003.
- [J8] S. Bhashyam, **A. Sabharwal** and B. Aazhang, “Feedback Gain in Multiple Antenna Systems,” *IEEE Transactions on Communications*, pp. 785–798, 50(5), May 2002.
- [J7] V. Kanodia, C. Li, **A. Sabharwal**, B. Sadeghi, and E. Knightly, “Distributed Priority Scheduling and Medium Access in Ad Hoc Networks,” *ACM Wireless Networks*, pp. 455–466, 8(5), November 2002.
- [J6] **A. Sabharwal** and L. Potter, “Wald Statistic for Selection of Nested Nonlinear Models,” *IEEE Transactions on Signal Processing*, pp 956–965, 50(4), April 2002.
- [J5] **A. Sabharwal**, U. Mitra and R. Moses, “MMSE Receivers for Multirate DS-CDMA Systems,” *IEEE Transactions on Communications*, pp. 2184–2197, 49(12), December 2001.
- [J4] **A. Sabharwal**, D. Avidor and L. Potter, “Sector Beam Synthesis for Cellular Systems Using Phased Antenna Arrays,” *IEEE Transactions on Vehicular Technology*, 49(5), pp.1784–1792, September 2000.
- [J3] C. J. Ying, **A. Sabharwal** and R. Moses, “A Combined Order Selection and Parameter Estimation Algorithm for Undamped Exponentials,” *IEEE Transactions on Signal Processing*, 48(3), pp. 693–701, March 2000.
- [J2] **A. Sabharwal** and L. Potter, “Convexly Constrained Linear Inverse Problems: Iterative Least-squares and Regularization,” *IEEE Transactions on Signal Processing*, 46(9), pp. 2345–2352, September 1998.

[J1] **A. Sabharwal** and L. Potter, “Set Estimation via Ellipsoid Approximations: Theory and Algorithms,” *IEEE Transactions on Signal Processing*, 45(12), pp. 3107–3112, December 1997.

Invited Conference Articles

[C86] P. Murphy, C. Hunter and **A. Sabharwal**, “Design of a Cooperative OFDM Transceiver,” *Asilomar Conf on Signals, Systems and Computers*, (Pacific Grove, CA), November 2009.

[C85] V. Aggarwal, G. Krishna, S. Bhashyam and **A. Sabharwal**, “Two Models for Noisy Feedback in MIMO Channels,” *Asilomar Conf on Signals, Systems and Computers*, (Pacific Grove, CA), November 2008.

[C84] C. Hunter and **A. Sabharwal**, “Random Access Cooperative Communication,” *Asilomar Conf on Signals, Systems and Computers*, (Pacific Grove, CA), November 2008.

[C83] D. Dash and **A. Sabharwal**, “Cooperation via Feedback,” *Asilomar Conf on Signals, Systems and Computers*, (Pacific Grove, CA), November 2007.

[C82] C. Steger and **A. Sabharwal**, “Two-way Fading Channels: Training Protocol and Diversity-Multiplexing Performance,” *Asilomar Conf on Signals, Systems and Computers*, (Pacific Grove, CA), November 2007.

[C81] K. Amiri, Y. Sun, P. Murphy, C. Hunter, J. Cavallaro and **A. Sabharwal**, “Rice WARP, a Unified Wireless Network Testbed for Education and Research,” 2007 International Conference on Microelectronic Systems Education (MSE), San Diego (CA), June 2007.

[C80] C. Steger and **A. Sabharwal**, “On the Value of Transmitter Information,” *Proc. IEEE Radio and Wireless Communications (RWS)*, Long Beach (CA), January 2007.

[C79] M. Duarte, **A. Sabharwal**, C. Dick and R. Rao, “A High Throughput Beamforming Architecture for MIMO Systems,” *Asilomar Conf on Signals, Systems and Computers*, (Pacific Grove, CA), November 2006.

[C78] P. Murphy, **A. Sabharwal** and B. Aazhang, “Design of WARP: a Wireless Open-Access Research Platform,” *EUSIPCO*, 2006.

[C77] C. Hunter, S. Gupta, P. Murphy, C. Dick and **A. Sabharwal**, “A Flexible Framework for Wireless Medium Access Protocols,” *Asilomar Conf on Signals, Systems and Computers*, (Pacific Grove, CA), November 2006.

[C76] A. Chakrabarti, A. de Baynast, **A. Sabharwal**, B. Aazhang, “Codes for Half Duplex Relay Channels,” *International Zurich Seminar on Communications*, ETH Zurich, Switzerland, February, 2006.

[C75] V. Kanodia, **A. Sabharwal** and E. Knightly, “MOAR: A Multi-channel Opportunistic Auto-rate Media Access Protocol for Ad-hoc Networks,” *IEEE First Annual Conference on Broadband Networks*, (San Jose, CA), October 25–29, 2004.

- [C74] D. Rajan, **A. Sabharwal** and B. Aazhang, “Power-efficient Broadcast Scheduling with Delay Deadlines,” *IEEE First Annual Conference on Broadband Networks*, (San Jose, CA), October 25–29, 2004.
- [C73] M. A. Khojastepour, **A. Sabharwal** and B. Aazhang, “Information Theory at Multiple Time-scales: The Case of Scheduling,” *First International Symposium on Control, Communications and Signal Processing*, (Hammamet, Tunisia), March 21-24, 2004.
- [C72] K. K. Mukkavilli, **A. Sabharwal** and B. Aazhang, “Finite Rate Feedback Design for Multiple Transmit Antennas,” *40th Annual Allerton Conference on Communication, Control, and Computing*, (Allerton, IL), October 2002.
- [C71] **A. Sabharwal**, D. Rajan and B. Aazhang, “Dual Problems in Power Control,” *39th Annual Allerton Conference on Communication, Control, and Computing*, (Allerton, IL), November 2001.
- [C70] D. Rajan, **A. Sabharwal**, B. Aazhang, “Impact of Multiple Access on Uplink Scheduling,” *Information Theory Workshop*, (Cairns, Australia), September 2001.
- [C69] K. K. Mukkavilli, **A. Sabharwal**, M. Orchard and B. Aazhang, “Space-time Coding with Feedback,” *Int. Symp. Telecommunications*, (Tehran, Iran), September 2001.
- [C68] M. Memarzadeh, **A. Sabharwal** B. Aazhang, “Broadcast Space-time Coding,” *International Symposium on the convergence of Information Theory and Communications*, (Denver, CO), August 2001.
- [C67] S. Bhashyam, **A. Sabharwal** and U. Mitra, “Channel Estimation for Multirate DS-CDMA Systems,” *34th Asilomar Conf on Signals, Systems and Computers*, (Pacific Grove, CA), November 2000.
- [C66] **A. Sabharwal**, C. J. Ying, L. Potter and R. Moses, “Model Order Selection for Summation Models,” *30th Asilomar Conf on Signals, Systems and Computers*, (Pacific Grove, CA), pp. 1240–1244, November 1996.

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- [C64] V. Aggarwal (Princeton), Y. Liu (Colorado) and **A. Sabharwal**, “Message Passing in Distributed Wireless Networks,” *Proc. IEEE International Symposium on Information Theory (ISIT)*, June 2009.
- [C63] D. Kao and **A. Sabharwal**, “Impact of Network Topology Errors on Fairness: A Geometric Approach for TDMA Networks,” *IEEE INFOCOM*, May 2009.
- [C62] D. Dash and **A. Sabharwal**, “Secondary Transmission Profile for a Single-band Cognitive Interference Channel”, *Proceedings of Asilomar Conference on Signals, Systems and Computers*, November 2008.

- [C61] A. Khattab, **A. Sabharwal** and E. Knightly, “Fair Randomized Antenna Allocation in Asynchronous MIMO Multi-hop Networks,” *17TH International Conference on Computer Communications and Networks (ICCCN)*, August 2008.
- [C60] V. Aggarwal (Princeton), **A. Sabharwal**, “Diversity Order Gain with Noisy Feedback in Multiple Access Channels,” *Proceedings of International Symposium on Information Theory (ISIT)*, July 2008.
- [C59] V. Aggarwal (Princeton), **A. Sabharwal**, “On Multiple Access Channels with Asymmetric Feedback,” *Proceedings of International Symposium on Information Theory (ISIT)*, July 2008.
- [C58] G. Krishna (IIT Madras), S. Bhashyam (IIT Madras) and **A. Sabharwal**, “Decentralized Power Control with Two-way Training for Multiple Access,” *Proceedings of International Symposium on Information Theory (ISIT)*, July 2008.
- [C57] S. Vedantam (USC), W. Zhang (USC), U. Mitra (USC) and **A. Sabharwal**, “Joint Channel Estimation and Data Transmission: Achievable Rates,” *Information Theory Workshop (ITW)*, (Bergen, Norway), July 2007.
- [C56] S. Vedantam (USC), U. Mitra (USC) and **A. Sabharwal**, “Sensing the channel: sensor networks with shared communications and sensing,” *Information Processing in Sensor Networks (IPSN)*, (Nashville, TN), April 2006.
- [C55] A. Chakrabarti, A. de Baynast, **A. Sabharwal** and B. Aazhang, “LDPC Code Design for Half-Duplex Decode-and-Forward Relaying,” *Allerton Conference on Communication, Control and Computing*, (Allerton, IL), October 2005.
- [C54] C. Steger, A. Khoshnevis, **A. Sabharwal** and B. Aazhang, “The Importance of Transmitter Side Information and Value of Training,” *Allerton Conference on Communication, Control and Computing*, (Allerton, IL), October 2005.
- [C53] **A. Sabharwal** and U. Mitra (USC), “Rate-constrained Relaying: Achievable Rates and Protocol Comparisons,” *IEEE International Symposium on Information Theory (ISIT)*, (Adelaide, Australia), September 2005.
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- [C51] A. de Baynast and **A. Sabharwal** and B. Aazhang, “LDPC Code Design for OFDM Channel: Graph Connectivity and Information Bits Positioning,” *IEEE International Symposium on Signals, Circuits and Systems*, July 2005.
- [C50] A. Chakrabarti, **A. Sabharwal** and B. Aazhang “Sensitivity of Achievable Rates for Half-Duplex Relay Channel,” *IEEE Workshop on Signal Processing Advances in Wireless Communications*, (NY), June 2005.
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- [C43] M. A. Khojastepour, **A. Sabharwal** and B. Aazhang, “Improved Achievable Rates for User Cooperation and Relay Channels,” *IEEE International Symposium on Information Theory*, (Chicago, IL), June 2004.
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- [C36] M. A. Khojastepour, **A. Sabharwal** and B. Aazhang, “On the Capacity of Gaussian ‘Cheap’ Relay Channel,” *Communication Theory Symposium, GLOBECOM*, (San Francisco, CA), December 2003.

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- [C33] M. J. Borran, **A. Sabharwal** and B. Aazhang, "Partially Coherent Constellations for Multiple-antenna Systems," *37th Asilomar Conference on Signals, Systems and Computers*, (Asilomar, CA), November 2003.
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- [C31] P. Murphy, F. Lou, **A. Sabharwal** and J. P. Frantz, "An FPGA Based Rapid Prototyping Platform for MIMO Systems," *37th Asilomar Conference on Signals, Systems and Computers*, (Asilomar, CA), November 2003.
- [C30] U. Mitra and **A. Sabharwal**, "On Achievable Rates for Complexity Constrained Relay Channels," *41st Annual Allerton Conference on Communication, Control and Computing*, (Allerton, IL), October 2003.
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- [C28] D. Rajan and **A. Sabharwal**, "Power Efficient Broadcast Scheduling with Delay Constraints," *IEEE Emerging Telecommunications Technologies Conference*, (Dallas, TX), September 2003.
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- [C18] M. J. Borran, **A. Sabharwal** and B. Aazhang, “Constellations for Imperfect Channel State Information at the Receiver,” *40th Annual Allerton Conference on Communication, Control, and Computing*, (Allerton, IL), October 2002.
- [C17] B. Sadeghi, V. Kanodia, **A. Sabharwal**, and E. Knightly, “Opportunistic Media Access for Multirate Ad Hoc Networks,” *Proceedings of ACM MOBICOM 2002*, (Atlanta, GA), September 2002. (**acceptance ratio = 7.1%**)
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