

Andrea Goldsmith

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Education:

Ph.D.	Electrical Engineering, University of California at Berkeley	1994
M.S.	Electrical Engineering, University of California at Berkeley	1991
B.S.	Electrical Engineering, University of California at Berkeley	1986

Work Experience

Stanford University, Professor	05/07 - Present
Quantenna Communications, Inc., Founder, CTO	07/06 – 07/09
Stanford University, Associate Professor	09/02 - 04/07
Stanford University, Assistant Professor	01/99 - 08/02
California Institute of Technology- Assistant Professor	09/94 - 12/98
University of California, Berkeley - Research Assistant	08/89 - 08/94
AT&T Bell Laboratories, Intern and Consultant	06/91 - 08/92
MAXIM Technologies, Systems Engineer	06/86 - 09/90

Awards and Honors

- President: IEEE Information Theory Society – 2009
- 1st Vice President: IEEE Information Theory Society – 2008
- 2nd Vice President: IEEE Information Theory Society – 2007
- IEEE Comsoc Board of Governors – 2005-2008
- IEEE Information Theory Society Board of Governors – 2003-2008
- IEEE Communications Society Distinguished Lecturer – 2007-2008
- Stanford Postdoc Mentoring Award – 2008
- UCSD Shannon Memorial Lecture - 2007
- Stanford Fellow - 2005
- IEEE Fellow – 2005
- ComSoc & Information Theory Joint Paper Award: “On the Duality of Gaussian Multiple-Access and Broadcast Channels,” by N. Jindal, S. Vishwanath, and A. Goldsmith published in the *IEEE Trans. on Information Theory*, Vol. 50, No. 5, pp. 768-783, May 2004.
- Stanford School of Engineering Brecht Faculty Development Scholar - 2003
- National Academy of Engineering Gilbreth Lectureship - 2002
- Alfred P. Sloan Fellowship - 2001
- The Stanford Terman Fellowship - 1999
- Okawa Foundation Award - 1999
- The Office of Naval Research Young Investigator Award - 1999
- National Semiconductor Faculty Development Award - 1996, 1997

- The National Science Foundation CAREER Development Award - 1995
- IBM Fellow - 1992-93
- David Griep Memorial Prize for Excellence in Academic Achievement - 1991

Professional Affiliations:

- Member *IEEE Communications Society*
- Member *IEEE Information Theory Society*
- Member *IEEE Vehicular Technology Society*

Professional Service:

- **Committee Member:** National Research Council Committee on Technology Investment for the Dept. of Homeland Security. Sept. 2009-present
- **Committee Member:** National Research Council Committee on the Trends in Wireless Technology and Policy. August 2003-present.
- **Committee Member:** National Research Council Committee on the Future of Untethered Communication. Report published by the National Academy Press in September 1997.
- **Editor:** Associate Editor for the *IEEE Transactions on Information Theory* (2007-2009), Editor for *NoW Journal on Foundations and Trends in Communications and Information Theory* (2006-present), Editor for *NoW Journal on Foundations and Trends in Networks* (2006-present), Editor for *Communications in the area of wireless communications* (1995-2001), Technical Editor for the *IEEE Wireless Communications Magazine* (1995-2002, also guest editor for special issues on smart antennas in 1998, energy-constrained networks in 2002, and cooperative communications in 2006.)
- **Session Organizer and Chair:** IEEE Communications and Wireless Communications Conferences (ICC'94, ICC'95, ICC'96, ICC'98, Globecom'94, Globecom'95, Globecom'96, Globecom'99, VTC'96, ISIT'97, ISIT'98, ISIT'99, ISIT'00, Asilomar'97, Asilomar'00, Asilomar'02, IZS'04, CTW'06, ITW'10, CTW'10).
- **Technical Program Committee:** Globecom'04, IEEE Communications Theory Symposium at ICC'02, WPMC02, ISSSTA 2000, Globecom'99, IEEE Communications Theory Miniconference at ICC'99, Wireless Communications and Networking Conference 1999, Globecom'96, Globecom'94.
- **Tutorial Program Chair:** Globecom 2004.
- **Technical Program Chair:** IEEE Communication Theory Workshop'99. IEEE Information Theory Symposium 2007.
- **General Chair:** IEEE Communication Theory Symposium at Globecom'00. ITW 2010.

Stanford Service:

- Stanford Faculty Senate Chair and Member of the University Cabinet (2009-2010)
- Commission on Graduate Education (2005-2006)
- Committee on committees (2003-2004).
- Search committee for Vice Provost and Dean of Research (2003).
- Elected member of Stanford's Faculty Senate (2001-2004)
- Academic Affairs Council in Electrical Engineering (1999-present)
- EE Undergraduate Planning Committee (2000-present), Committee Chair (2003-2006).
- Freshman Advisor (2001-2002, 2004-2005)
- Stanford Summer Engineering Academy (summer 2001,2002,2003)
- Panelist/Speaker: SOE Entrepreneur's Day (2000, 2003)
- Speaker: SOE Advisory Council (2000)

PH.D. STUDENTS:

- Mohammed Slim Alouini (1999, Professor at Texas A&M University)

- Lifang Li (1999, Researcher at JPL)
- Neelesh Mehta (2000, Researcher at Mitsubishi Labs)
- Stavros Toumpis (2003, Professor at the University of Cypress, Greece)
- Syed Jafar (2003, Professor at U.C. Irvine)
- Sriram Vishwanath (2003, Professor at University of Texas, Austin).
- Kevin Yu (2003, MTS at mySource Communications).
- Tim Holliday (2004, Goldman Sachs)
- Nihar Jindal (2005, Professor at University of Minnesota)
- Xiangheng Liu (2005, Credit Suisse)
- Shuguang Cui (2005, Professor at Texas A&M University)
- Taesang Yoo (2006, Qualcomm)
- Chris Ng (2007, Alcatel-Lucent Bell Labs)
- Yifan Liang (2008, Goldman Sachs)
- Sachin Adlakha (Expected graduation 2009)
- Ying Ching (Expected graduation 2012)
- Seyed Reza Ghaderi (Expected graduation 2012)
- Sina Firouz (Expected graduation 2012)

Plenary/Keynote/Distinguished Lectures

- “The next wave in wireless technology: challenges and solutions,” IEEE Comsoc Distinguished Lecture Tour, Guadalajara and Monterrey, Mexico, Bogota and Medellin, Colombia. Also given as a plenary talk at the Wireless Communications and Networking Conference (WCNC), Budapest, Hungary, May 2009, and the IEEE International Conference on Computer Communications and Networks (ICCCN), San Francisco, CA, Aug. 2009.
- “Breaking Spectrum Gridlock via Cognitive and Cooperative Radios,” International Symposium on Wireless Pervasive Computing (ISWPC), Santorini, Greece, May 8, 2008.
- “Breaking Spectrum Gridlock via Cognitive and Cooperative Radios,” International Symposium on Wireless Pervasive Computing (ISWPC), Santorini, Greece, May 8, 2008.
- “Cooperation and Cognition in Wireless Sensor Networks,” Conference on Government Microcircuit Applications and Critical Technology (Gomactech), Las Vegas, NV, March 17, 2008
- “Consumating the union between control and communications,” American Control Conference, Manhattan, Ny, July 20, 2007.
- "Capacity, Cooperation, and Cross-Layer Design in Wireless Networks", Conference on Information Sciences and Systems, Princeton, NJ, March 24, 2006
- "Capacity, Cooperation, and Cross-Layer Design in Wireless Networks", Workshop on Signal Processing for Wireless Communications, King's College, London, May 31, 2006
- "Capacity and Cooperation in Wireless Networks: How to Best Exploit Thy Neighbor" International Workshop on Wireless and Ad Hoc Networks, New York City, New York, June 30, 2006.
- “Cross-Layer Design of Wireless Ad-hoc Networks,” University of California at Berkeley, Dept. of Electrical Engineering, Distinguished Lecture Series, Berkeley, CA, Feb 2005.

- A. Goldsmith, "Design challenges in future wireless systems," Lillian Gilbreth Lecture, Annual National Academy of Engineering Meeting/, Washington. DC, Oct 2002.

BOOKS

1. *Wireless Communications*, Cambridge University Press, 2005.
2. Chapter on Wireless Communications in *Cooperation in Wireless Networks*. Springer-Verlag., New York, NY. To appear in 2006. Co-author.
3. *An Introduction to MIMO Communication*. Cambridge University Press, New York, NY. To appear in 2006. Co-author.
4. Chapter on Wireless Communications in *High Performance Communication Networks*, Morgan-Kaufman, New York, NY. 2000. pp. 306-360.
5. *The Future of Untethered Communications*. National Academy Press. Washington, DC, 1997. Co-author.

JOURNAL AND MAGAZINE PAPERS (INVITED)

1. A. Goldsmith, S. A. Jafar, I. Maric and S. Srinivasa, Breaking Spectrum Gridlock with Cognitive Radios: An Information Theoretic Perspective, *Proceedings of the IEEE, invited*, May 2009.
2. I. Maric, A. Goldsmith, G. Kramer and S. Shamai (Shitz), On the Capacity of Interference Channels with One Cooperating Transmitter, *European Transactions on Telecommunications*, Vol. 19., pp. 405-420, Apr. 2008.
3. S. Cui and A. Goldsmith, Cross-layer Design in Energy-constrained Networks Using Cooperative MIMO Techniques, *EURASIP Journal on Applied Signal Processing, Special Issue on Advances in Signal Processing-based Cross-layer Designs*, Vol. 86, No. 8, pp. 1804-1814, August 2006.
4. E. Setton, T. Yoo, X. Zhu, A. Goldsmith, and B. Girod, Cross-layer Design of Ad Hoc Networks for Real-Time Video Streaming, *IEEE Wireless Communications*, vol. 12, issue 4, pp. 99-102, Aug. 2005.
5. S. A. Jafar, G. Foschini, A. Goldsmith, PhantomNet: Exploring optimal multicellular multiple antenna systems, *EURASIP Journal on Applied Signal Processing, Special Issue on MIMO Communications and Signal Processing*, No.5, pp. 591-605, May 2004.
6. A. Goldsmith, S. A. Jafar, N. Jindal, and S. Vishwanath, Capacity Limits of MIMO Channels, *IEEE Journal on Selected Areas in Communications*, Vol. 21, No. 5, pp. 684-702, June 2003.
7. A. Goldsmith and S. B. Wicker, Design challenges for energy-constrained ad hoc wireless networks, *IEEE Wireless Communications Magazine*, Vol. 9, No. 4, pp. 8-27, Aug. 2002.

JOURNAL PAPERS (PEER-REVIEWED)

Submitted / In Revision

1. R. Dabora and A. Goldsmith, The Capacity Region of the Degraded Finite-State Broadcast Channel, *submitted to the IEEE Transactions on Information Theory*, 2008.
2. Y. Liang, A. Goldsmith and M. Effros, Source-Channel Coding and Separation for Generalized Communication Systems, *To be submitted to IEEE Transactions on Information Theory*, August 2008.
3. M. Effros, A. Goldsmith and Y. Liang, Capacity Definitions for General Channels with Receiver Side Information, *submitted to IEEE Transactions on Information Theory*, April 2008.
4. D. Gündüz, E. Erkip, A. Goldsmith, H. V. Poor, Transmitting correlated sources over multiuser channels, *submitted to IEEE Transactions on Information Theory*.
5. O. Simeone, D. Gündüz, H. V. Poor, A. J. Goldsmith, S. Shamai, Compound multiple access channels with partial cooperation, *submitted to IEEE Transactions on Information Theory*.
6. C. T. K. Ng, D. Gündüz, A. J. Goldsmith and E. Erkip, Optimal Power Distribution and Minimum Expected Distortion in Gaussian Layered Broadcast Coding with Successive Refinement, *submitted to IEEE Transactions on Information Theory*, 2007.
7. N. Liu and A. Goldsmith, Capacity Regions and Bounds for a Class of Z-interference Channels, *submitted to IEEE Trans. on Information Theory*, May 2008.
8. J. M. Romero-Jerez and A. Goldsmith, "Performance of Multichannel Reception with Transmit Antenna Selection in Arbitrarily Distributed Nakagami Fading Channels," *Submitted to IEEE Transactions on Wireless Communications*.
9. E. Marto-Naya, J. F. Paris, U. Fernandez-Plazaola and A. Goldsmith, "Exact Closed-Form Performance Analysis for MIMO Beamforming with MRC under Prediction Errors," *Submitted to IEEE Transactions on Wireless Communications*.
10. S. Cui, R. Madan, A. Goldsmith, and S. Lall, Energy Minimization and Delay Analysis in TDMA-based Sensor Networks, *Submitted: IEEE Transactions on Wireless Communications*, 2004.
11. C. T. K. Ng and A. J. Goldsmith, "The Impact of CSI and Power Allocation on Relay Channel Capacity and Cooperation Strategies," *Submitted to IEEE Transactions on Wireless Communications*, 2007.
12. C. T. K. Ng, D. Gündüz, A. J. Goldsmith and E. Erkip, "Optimal Power Distribution and Minimum Expected Distortion in Gaussian Layered Broadcast Coding with Successive Refinement", *Submitted to IEEE Transaction on Information Theory* 2007.

Published / To Appear

13. T. Holliday, A. Goldsmith and H. V. Poor, "Joint Source and Channel Coding for MIMO Systems: Is it Better to be Robust or Quick?," *IEEE Transactions on Information Theory*, April 2008.

14. T. Yoo, N. Jindal and A. Goldsmith, "Multi-Antenna Broadcast Channels with Limited Feedback and User Selection," *IEEE Journal on Selected Areas in Communications*, Vol. 25, No. 7, pp. 1478-1491, September 2007.
15. F. Meshkati, A. J. Goldsmith, H. V. Poor and S. C. Schwartz, "A Game-Theoretic Approach to Energy-Efficient Modulation in CDMA Networks with Delay QoS Constraints," *IEEE Journal on Selected Areas in Communications*, Vol. 25, No. 6, pp. 1069-1078, August 2007.
16. A. Goldsmith and M. Medard, Capacity of Time-Varying Channels with Causal Channel Side Information , *IEEE Transactions on Information Theory*, Vol. 53, No. 3, pp. 881-899, March 2007.
17. J. M. Romero-Jerez and A. Goldsmith, "Receive Antenna Array Strategies in Fading and Interference: An Outage Probability Comparison," *IEEE Transactions on Wireless Communications*, vol. 7, No. 3, March 2008.
18. J. M. Romero-Jerez, J. P. Pena-Martin and A. Goldsmith, "Outage Probability of MRC with Arbitrary Power Cochannel Interferers in Nakagami Fading," *IEEE Transactions on Communications*, vol. 55, no. 7, pp. 1283-1286, July 2007.
19. S. Cui, J. Xiao, A. Goldsmith, Z. Luo and H. V. Poor, "Estimation Diversity and Energy Efficiency in Distributed Sensing", *IEEE Transactions on Signal Processing*, vol. 55, No. 9, pp. 4683-4695, September 2007.
20. R. Madan, S. Cui, S. Lall, and A. Goldsmith, Modeling and Optimization of Transmission Schemes in Energy Constrained Wireless Sensor Networks, *IEEE/ACM Transactions on Networking*, 2007.
21. J. Xiao, S. Cui, Z. Luo and A. Goldsmith, Linear Coherent Decentralized Estimation, *IEEE Transactions on Signal Processing*, 2007.
22. S. Cui, R. Madan, A. Goldsmith and S. Lall, Cross-layer Energy and Delay Optimization in Small-scale Sensor Networks, *IEEE Transactions on Wireless Communications*, Vol. 6, No. 10, pp.3688-3699, October 2007.
23. R. Madan, S. Cui, S. Lall, and A. Goldsmith, Cross-Layer Design for Lifetime Maximization in Interference-limited Wireless Sensor Networks, *IEEE Transactions on Wireless Communications*, Vol. 5, No. 11, pp. 3142-3152, November 2006.
24. T. Holliday, A. Goldsmith, and P. Glynn, On Entropy and Lyapunov Exponents for Finite State Channels, *IEEE Transactions on Information Theory*. Vol. 52, No. 8, August 2006.
25. M. J. Hossain, P.K. Vitthaladevuni, M.-S. Alouini, V.K. Bhargava, A. Goldsmith, "Adaptive Hierarchical Modulation for Simultaneous Voice and Multi-Class Data Transmission over Fading Channels," *IEEE Transactions on Vehicular Technology*, 2006.
26. S. Toumpis and A. Goldsmith, New Media Access Protocols for Wireless Ad Hoc Networks Based on Cross-Layer Principles, *IEEE Transactions on Wireless Communications*, Vol. 5, No. 8, August 2006.

27. T. Yoo, A. Goldsmith, "Capacity and power allocation for fading MIMO channels with channel estimation," *IEEE Transactions on Information Theory*, Vol. 52, Issue 5, May 2006, pp. 2203-2214.
28. T. Yoo and A. Goldsmith, "On the Optimality of Multi-Antenna Broadcast Scheduling Using Zero-Forcing Beamforming," *IEEE Journal on Selected Areas in Communications Special Issue on 4G Wireless Systems*, March 2006, pp. 528-541.
29. J-J Xiao, S. Cui, Z-Q Luo, A. Goldsmith, "Power scheduling of universal decentralized estimation in sensor networks," *IEEE Transactions on Signal Processing*, Vol. 54, Issue 2, Feb. 2006, pp. 413-422.
30. S. Cui, A. Goldsmith, and A. Bahai, "Energy-constrained Modulation Optimization," *IEEE Transactions on Wireless Communications*, Vol. 4, No. 5, pp. 2349-2360, Sep 2005.
31. S. A. Jafar and A. Goldsmith, "Multiple-Antenna Capacity in Correlated Rayleigh fading with channel covariance information," *IEEE Transactions on Wireless Communications*, Vol. 4, No. 3, pp. 990-997, May 2005.
32. N. Jindal and A. Goldsmith, "Dirty-paper coding versus TDMA for MIMO Broadcast Channels," *IEEE Transactions on Information Theory*, Vol. 51, No. 5, pp. 1783-1794, May 2005.
33. N. Jindal, W. Rhee, S. Vishwanath, S. A. Jafar, and A. Goldsmith, "Sum Power Iterative Water-filling for Multi-Antenna Gaussian Broadcast Channels," *IEEE Transactions on Information Theory*, Vol. 51, No. 4, pp. 1570-1580, Apr 2005.
34. L. Li, N. Jindal, and A. Goldsmith, "Outage Capacities and Optimal Power Allocation for Fading Multiple-Access Channels," *IEEE Transactions on Information Theory*, Vol. 51, No. 4, pp. 1326-1347, Apr 2005.
35. S. A. Jafar and A. Goldsmith, "Isotropic Fading Vector Broadcast Channels: The Scalar Upper Bound and Loss in Degrees of Freedom," *IEEE Transactions on Information Theory*, vol. 51, Issue 3, pp. 848-857, Mar 2005.
36. S. Cui, A. Goldsmith and A. Bahai, "Energy-efficiency of MIMO and Cooperative MIMO Techniques in Sensor Networks," *IEEE Journal on Selected Areas in Communications*, Vol. 22, No. 6, pp. 1089-1098, Aug. 2004.
37. R.K. Mallik, M.Z. Win, J.W. Shao, M.-S. Alouini, and A. Goldsmith, "Channel capacity of adaptive transmission with maximal ratio combining in correlated Rayleigh fading," *IEEE Transactions on Wireless Communications*, Vol. 3, pp. 1124 - 1133, Jul 2004.
38. S. A. Jafar and A. Goldsmith, "Transmitter optimization and optimality of beamforming for multiple antenna systems with imperfect feedback," *IEEE Transactions on Wireless Communications*, Vol. 3, No. 4, pp. 1165-1175, Jul 2004.
39. N. Jindal, S. Vishwanath, and A. 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.

40. M. Medard, J. Huang, A. Goldsmith, S. P. Meyn, and T. P. Coleman, "Capacity of Time-Slotted ALOHA Packetized Multiple-Access Systems Over the AWGN Channel," *IEEE Transactions on Wireless Communications*, Vol. 3, No. 2, pp. 486-499, Mar 2004.
41. N. Jindal and A. Goldsmith, "Capacity and Optimal Power Allocation for Fading Broadcast Channels with Minimum Rates," *IEEE Transactions on Information Theory*, Volume 49, Issue 11, pp. 2895-2909, Nov 2003.
42. S. Vishwanath, N. Jindal, and A. Goldsmith, "Duality, Achievable Rates, and Sum-Rate Capacity of Gaussian MIMO Broadcast Channels," *IEEE Transactions on Information Theory*, Vol. 49, Issue 10, pp. 2658-2668, Oct 2003.
43. S. Toumpis and A. Goldsmith, "Capacity regions for wireless ad-hoc networks," *IEEE Transactions on Wireless Communications*, Vol. 2, No. 4, pp. 736-748, Jul 2003.
44. S. Vishwanath and A. Goldsmith, "Adaptive Turbo Coded Modulation for Flat Fading Channels," *IEEE Transactions on Communications*, Vol. 51, No. 6, pp. 964-972, Jun 2003.
45. S. A. Jafar and A. Goldsmith, "Adaptive multirate CDMA for uplink throughput maximization," *IEEE Transactions on Wireless Communications*, Vol. 2, No. 2, pp. 218-228, Mar 2003.
46. L. Xiao, M. Johansson, H. Hindi, S. Boyd, and A. Goldsmith, "Joint optimization of communication rates and linear systems," *IEEE Transactions on Automatic Control*, Vol. 48, No. 1, pp. 148-153, Jan 2003.
47. A. R. S. Bahai, M. Singh, A. Goldsmith, and B. R. Saltzberg, "A new approach for evaluating clipping distortion in multicarrier systems," *IEEE Journal on Selected Areas in Communications*, Vol. 20, pp. 1037-1046, Jun 2002.
48. L. Li and A. Goldsmith, "Low-complexity maximum-likelihood detection of coded signals sent over finite-state Markov channels," *IEEE Transactions on Communications*, Vol. 50, No. 4, pp. 524-531, Apr 2002.
49. N. B. Mehta and A. Goldsmith, "Effect of mobility on PRMA," *IEEE Transactions on Communications*, Vol. 50, No. 3, pp. 400-405, Mar 2002.
50. S. T. Chung and A. Goldsmith, "Degrees of Freedom in Adaptive Modulation: A Unified View," *IEEE Transactions on Communications*, Vol. 49, No. 9, pp. 1561-1571, Sep 2001.
51. L. Li and A. Goldsmith, "Capacity and Optimal Resource Allocation for Fading Broadcast Channels - Part I: Ergodic Capacity," *IEEE Transactions on Information Theory*, Vol. 47, No. 3, pp. 1083-1102, Mar 2001.
52. L. Li and A. Goldsmith, "Capacity and Optimal Resource Allocation for Fading Broadcast Channels - Part II: Outage Capacity," *IEEE Transactions on Information Theory*, Vol. 47, No. 3, pp. 1103-1127, Mar 2001.
53. A. Goldsmith and M. Effros, "The capacity region of broadcast channels with intersymbol interference and colored Gaussian noise," *IEEE Transactions on Information Theory*, Vol. 47, No. 1, pp. 219-240, Jan 2001.

54. M. -S. Alouini, M. K. Simon, and A. Goldsmith, "Average BER performance of single and multi carrier DS-CDMA systems over generalized fading channels," *Wiley Journal on Wireless Systems and Mobile Computing*, Vol. 1, No. 1, pp. 93-110, Jan 2001.
55. M. -S. Alouini and A. Goldsmith, "Adaptive modulation over Nakagami fading channels," *Kluwer Journal on Wireless Communications*, Vol. 13, No. 1-2, pp. 119-143, May 2000.
56. S. W. Kim and A. Goldsmith, "Truncated power control in code division multiple access communications," *IEEE Transactions on Vehicular Technology*, Vol. 49, No. 3, pp. 965-972, May 2000.
57. X. Tang, M. -S. Alouini, and A. Goldsmith, "Effect of channel estimation error on M-QAM BER performance in Rayleigh fading," *IEEE Transactions on Communications*, Vol. 47 No. 12, pp. 1856-1864, Dec 1999.
58. M. -S. Alouini and A. Goldsmith, "A unified approach for calculating error rates of linearly modulated signals in generalized fading channels," *IEEE Transactions on Communications*, Vol. 47, No. 9, pp. 1324-1334, Sep 1999.
59. M. -S. Alouini and A. Goldsmith, "Area spectral efficiency of cellular mobile radio systems," *IEEE Transactions on Vehicular Technology*, Vol. 48, No. 4, pp. 1047-1066, Jul 1999.
60. M. -S. Alouini and A. Goldsmith, "Capacity of Rayleigh fading channels under different adaptive transmission and diversity-combining techniques," *IEEE Transactions on Vehicular Technology*, Vol. 48, No. 4, pp. 1165-1181, Jul 1999.
61. M. -S. Alouini, X. Tang, and A. Goldsmith, "An adaptive modulation scheme for simultaneous voice and data transmission over fading channels," *IEEE Journal on Selected Areas in Communications*, Special Issue on Multi-Media Network Radios, Vol. 17, No. 5, pp. 837-850, May 1999.
62. A. Goldsmith and M. Effros, "Joint Design of Fixed-Rate Source Codes and Multiresolution Channel Codes," *IEEE Transactions on Communications*, Vol. 46, No. 10, pp. 1301-1312, Oct 1998.
63. A. Goldsmith and S.-G. Chua, "Adaptive coded modulation for fading channels," *IEEE Transactions on Communications*, Vol. 46, No. 5, pp. 595-602, May 1998.
64. A. Goldsmith and P. Varaiya, "Capacity of fading channels with channel side information," *IEEE Transactions on Information Theory*, Vol. 43, No. 6, pp. 1986-1992, Nov 1997.
65. A. Goldsmith and S.-G. Chua, "Variable-rate variable-power MQAM for fading channels," *IEEE Transactions on Communications*, Vol. 45, No. 10, pp. 1218-1230, Oct 1997.
66. A. Goldsmith, "The capacity of downlink fading channels with variable rate and power," *IEEE Transactions on Vehicular Technology*, Vol. 46, No. 3, pp. 569-580, Aug. 1997.
67. A. Goldsmith and P. Varaiya, "Capacity, mutual information, and coding for finite-state Markov channels," *IEEE Transactions on Information Theory*, Vol. 42, No. 3, pp. 868-886, May 1996.

68. A. Goldsmith, L. J. Greenstein and G. L. Foschini, "Error statistics of real-time power measurements in cellular channels with multipath and shadowing," *IEEE Transactions on Vehicular Technology*, Vol. 43, No. 3, pp. 439-446, Aug. 1994. Invited
69. A. Goldsmith and L. Greenstein, "A measurement-based model for predicting coverage areas of urban microcells," *IEEE Journal Select. Areas Communications*, Vol. 11, No. 7, pp. 1013-1023, Sep 1993.

Peer-Reviewed Conference Papers

To be published

1. S. Adlakha, R. Johari, G. Weintraub and A. Goldsmith, "Oblivious Equilibrium for Large-Scale Stochastic Games with Unbounded Costs," To Appear in *IEEE Conference on Decision and Control*, 2008.
2. S. Adlakha, S. Lall and A. Goldsmith, "Information State for Markov Decision Processes with Network Delays," To Appear in *IEEE Conference on Decision and Control*, 2008.
3. Y. Liang, A. Goldsmith and M. Effros, Generalized Capacity and Source-Channel Coding for Packet Erasure Channels, *IEEE Global Telecommunications Conference (GlobeCom)*, Dec. 2008, New Orleans, LA.
4. D. Gündüz, A. Goldsmith and H. V. Poor, Diversity-multiplexing tradeoffs in MIMO relay channels, *IEEE Global Communications Conf. (Globecom)*, New Orleans, LA, Nov. 2008.
5. R. Dabora, I. Maric and A. Goldsmith, Relay Strategies in Multiuser Networks, accepted to *2008 IEEE GLOBECOM*, New Orleans, LA, Nov. 2008.
6. D. Gündüz, A. Goldsmith and H. V. Poor, MIMO two-way relay channel: Diversity-multiplexing trade-off analysis, *Asilomar Conf. Signals, Systems and Computers*, Pacific Grove, CA, Oct. 2008.

Published

7. I. Maric, R. Dabora and A. Goldsmith, On the Capacity of the Interference Channel with a Relay, *2008 IEEE International Symposium on Information Theory*, Toronto, Canada, July 2008.
8. N. Liu and A. Goldsmith, Superposition Encoding and Partial Decoding is Optimal for a Class of Z-interference Channels, *IEEE International Symposium on Information Theory*, Toronto, Canada, July 2008.
9. D. Gündüz, E. Erkip, A. Goldsmith and H. V. Poor, Lossy source transmission over the relay channel, *IEEE International Symposium on Information Theory (ISIT)*, Toronto, Canada, July 2008.

10. R. Dabora and A. Goldsmith, Capacity Theorems for the Finite-State Broadcast Channel with Feedback, Proceedings of the International Symposium on Information Theory (ISIT), July 2008, Toronto, Canada.
11. R. Dabora and A. Goldsmith, The Capacity Region of the Degraded Finite-State Broadcast Channel, Proceedings of the Information Theory Workshop (ITW), May 2008, Porto, Portugal.
12. R. Dabora, I. Maric and A. Goldsmith, Relay Strategies for Interference-Forwarding, 2008 IEEE Information Theory Workshop, Porto, Portugal, May 2008.
13. Y. Liang, A. Goldsmith, G. Foschini, R. Valenzuela and D. Chizhik, Evolution of Base Stations in Cellular Networks: Denser Deployment versus Coordination, *IEEE International Conference on Communications (ICC)*, May 2008, Beijing China.
14. S. Adlakha, R. Madan, S. Lall, and A. Goldsmith, Optimal Control of Distributed Markov Decision Processes with Network Delays, Proceedings of the IEEE Conference on Decision and Control, Dec. 2007.
15. I. Maric, A. Goldsmith, G. Kramer and S. Shamaï (Shitz), An Achievable Rate Region for Interference Channels with a Cognitive Transmitter, The 41st Asilomar Conference on Signals, Systems and Computers, Pacific Grove, CA, Nov. 2007.
16. Y. Liang, R. Valenzuela, G. Foschini, D. Chizhik and A. Goldsmith, Interference Suppression in Wireless Cellular Networks through Picocells, *Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove CA, Nov. 2007.
17. S. H. Moon, H. H. Park, A. Goldsmith and M. Oh, "Bit Rearrangement for MIMO Retransmission," *IEEE Global Telecommunications Conference*, Nov 2007.
18. E. Martos-Naya, J. F Paris, U. Fernandez-Plazaola and A. Goldsmith, "Analysis of MIMO Beamforming with Channel Response Variations along the Frame Interval," *IEEE Global Telecommunications Conference*, Nov 2007.
19. I. Maric, A. Goldsmith and M. Medard, Information-Theoretic Relaying for Multicast in Wireless Networks, 2007 Military Communications Conference (MILCOM), Orlando, FL, Oct. 2007.
20. D O'Neill, A.Zymnis, A.Goldsmith and S. Boyd, "Combining Network Utility Maximization and Adaptive Modulation," *Allerton Conference on Communications, Control and Computing*, Sep. 2007.
21. V. Abhishek, S. Adlakha, R. Johari and G. Weintraub, "Oblivious Equilibrium for General Stochastic Games with Many Players," Allerton Conference on Communications, Control and Computing, Sep. 2007.
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147. M. -S. Alouini, S. -W. Kim, and A. Goldsmith, "RAKE reception with maximal-ratio and equal-gain combining for DS-CDMA systems in Nakagami fading," Proceedings: *IEEE International Conference on Universal Personal Communications (ICUPC'97)*, San Diego, CA, pp. 708-712, Oct 1997.
148. M. Medard and A. Goldsmith, "Capacity of time-varying channels with channel side information," Proceedings: *IEEE International Symposium on Information Theory*, Ulm, Germany, p 372, Jun 1997.

149. A. Goldsmith and M. Effros, "The capacity region of broadcast channels with memory," Proceedings: *IEEE International Symposium on Information Theory*, Ulm, Germany, p. 28, Jun 1997.
150. A. Goldsmith and M. Effros, "Iterative joint design of multiresolution source and channel codes," Proceedings: *IEEE International Communications Conference*, Montreal, Quebec, Canada, pp. 319-323, Jun 1997.
151. A. Goldsmith and L. Greenstein, "Effect of average power estimation error on adaptive MQAM modulation," Proceedings: *IEEE International Communications Conference*, Montreal, Quebec, Canada, pp. 1105-1109, Jun 1997.
152. S.-G. Chua and A. Goldsmith, "Adaptive coded modulation for fading channels, Proceedings," *IEEE International Communications Conference*, Montreal, Quebec, Canada, pp. 1488-1492, Jun 1997.
153. M. -S. Alouini and A. Goldsmith, "Area spectral efficiency of cellular systems with Nakagami multipath fading," Proceedings: *IEEE International Conference on Communications*, Montreal, Quebec, Canada, pp. 76-80, Jun 1997.
154. M. -S. Alouini and A. Goldsmith, "Area spectral efficiency of cellular mobile radio systems," Proceedings: *IEEE Vehicular Technology Conference*, Phoenix, AZ, pp. 652-656, May 1997.
155. M. -S. Alouini and A. Goldsmith, "Capacity of Nakagami multipath fading channels," Proceedings: *IEEE Vehicular Technology Conference*, Phoenix, AZ, pp. 358-362, May 1997.

Invited conference publications

156. Farhad Meshkati, Andrea Goldsmith, H. V. Poor, Stuart C. Schwartz). "A Game Theoretic Approach to Energy-Efficient Modulation in CDMA Networks with Delay Constraints," *Proceedings of the 2007 IEEE Radio and Wireless Symposium*, Long Beach , CA , January 9 – 11, 2007, pp. 11-14.
157. Y. Liang, T. Yoo and A. Goldsmith, [Coverage Spectral Efficiency of Cellular Systems with Cooperative Base Stations](#), *Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove CA, Oct. 2006. (Invited)
158. T. Holliday, A. Goldsmith, and P. Glynn, "Shannon Meets Lyapunov: Connections between Information Theory and Dynamical Systems," Proceedings: *IEEE Conference on Decision and Control*, Seville, Spain, pp. 1756-1763, Dec 2005.
159. L. Savidge, H. Lee, H. Aghajan, A. Goldsmith, "QoS-Based Geographic Routing for event-Driven Image Sensor Networks," Proceedings of International Conference on Broadband Networks, Workshop on Broadband Advanced Sensor Networks (BASENETS), Boston, MA, pp. 68-77, Oct 2005.
160. X. Liu and A. Goldsmith, "Wireless Network Design for Distributed Control," Proceedings: *Allerton Conference on Communications, Control, and Computing*, Monticello, IL, Sep 2005, 1899-1908..

161. S. Cui, A. Goldsmith, "Cross-Layer Optimization of Sensor Networks based on Cooperative MIMO Techniques with Rate Adaptation," Proceedings: *IEEE workshop on Signal Processing Advances in Wireless Communications (SPAWC)*, New York, NY, pp. 960-964, Jun 2005.
162. S. Cui and A. Goldsmith, "Energy Efficient Routing Based on Cooperative MIMO Techniques," Proceedings: *International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Philadelphia, PA, vol. 5, pp. 805-808, Mar 2005.
163. X. Liu and A. Goldsmith, "Wireless Network Design for Distributed Control," Proceedings: *IEEE Conference on Decision and Control*, Atlantis, Paradise Island, Bahamas, pp. 2823-2829, Dec 2004.
164. T. Holliday and A. Goldsmith, "Joint Source and Channel Coding for MIMO Systems," Proceedings: *Allerton Conference on Communications, Control, and Computing*, Monticello, IL, pp. 1302-1311, Oct 2004.
165. T. Holliday and A. Goldsmith, "Joint Source and Channel Coding for MIMO Systems: Is It Better to be Robust or Quick?" Joint workshop on communications and coding, Donnini, Italy, p. 18, Oct 2004.
166. M. Effros, R. Koetter, A. Goldsmith, and M. Medard, "On Source and Channel Codes for Multiple Inputs and Outputs: Does Multiple Descriptions Beat Space Time?" Proceedings: *IEEE Information Theory Workshop*, San Antonio, TX, pp. 324-329, Oct 2004.
167. C. T. K. Ng and A. Goldsmith, "Transmitter Cooperation in Ad-Hoc Wireless Networks: Does Dirty-Payer Coding Beat Relaying?" Proceedings: *IEEE Information Theory Workshop*, San Antonio, TX, pp. 277-282, Oct 2004.
168. T. Holliday, A. Goldsmith, and P. Glynn, "Distributed Power Control for Time Varying Wireless Networks: Optimality and Convergence," Proceedings: *Allerton Conference on Communications, Control, and Computing*, Monticello, IL, pp. 1024-1033, Oct 2003. Powerpoint Slides.
169. N. Jindal, S. A. Jafar, S. Vishwanath, and A. Goldsmith, "Sum Power Iterative Water-filling for Multi-Antenna Gaussian Broadcast Channels," Proceedings: *IEEE Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, CA, pp. 1518-1522, Nov 2002.
170. N. Jindal, S. Vishwanath, S. A. Jafar, and A. Goldsmith, "Duality, dirty paper coding, and capacity for multiuser wireless channels," Proceedings: *DIMACS (Discrete Mathematics and Theoretical Computer Science) workshop for Wireless Transmission*, Rutgers, NJ, pp. 71-80, Oct 2002.
171. S. Vishwanath, G. Kramer, S. Shamai, S. A. Jafar, and A. Goldsmith, "Capacity bounds for Gaussian vector broadcast channels," Proceedings: *DIMACS (Discrete Mathematics and Theoretical Computer Science) workshop for wireless transmission*, Rutgers, NJ, pp. 107-122, Oct 2002.
172. T. Holliday, A. Goldsmith, and P. Glynn, "Entropy and Mutual Information for Markov Channels with General Inputs," Proceedings: *Allerton Conference on Communications, Control, and Computing*, Monticello, IL, pp. 824-833, Oct 2002. (PDF Slides).

173. A. Goldsmith, "Design challenges for future wireless systems," *National Academy of Engineering symposium on frontiers of engineering*, University of California at Irvine, Irvine, CA, Mar 2002. *Frontiers of Engineering 2002*, National Academy Press, Dec 2002.
174. H. Mandyam and A. Goldsmith, "Communication under energy constraints," Proceedings: *Allerton Conference on Communications, Control, and Computing*, Monticello, IL, pp. 1112-1121, Oct 2001.
175. S. Toumpis and A. Goldsmith, "Capacity regions for wireless ad-hoc networks," *International Symposium on Communication Theory and Applications*, Lake District, UK, pp. 111-11, July 2001.
176. S. Toumpis and A. Goldsmith, "Ad-Hoc Network Capacity," Proceedings: *IEEE Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, CA, pp. 1265-1269, Nov 2000.
177. S. Chung and A. Goldsmith, "Adaptive multicarrier modulation for wireless systems," Proceedings: *IEEE Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, CA, 1603-1607, Oct 2000.
178. L. Li and A. Goldsmith, "Outage Capacities and Optimal Power Allocation for Fading Multiple-Access Channels," Proceedings: *IEEE Wireless Communications and Networking Conference (WCNC)*, New Orleans, LA, pp. 485-489, Sep 1999.
179. M. Medard and A. Goldsmith, "Capacity of time-slotted ALOHA systems," Proceedings: *IEEE Wireless Communications and Networking Conference (WCNC)*, New Orleans, LA, pp. 490-494, Sep 1999.
180. A. Goldsmith, "Adaptive modulation and coding for fading channels," Proceedings: *IEEE Information Theory Workshop*, Kruger, South Africa, pp. 24-26, Jun 1999.
181. X. Tie, A. Goldsmith, and M. Effros, "Joint design of fixed-rate source codes and UEP channel codes for fading channels," Proceedings: *IEEE Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, CA, pp. 92-96, Nov 1998.
182. L. Li and A. Goldsmith, "Capacity and Optimal Resource Allocation for Fading Broadcast Channels," Proceedings: *Allerton Conference on Communications, Control, and Computing*, Monticello, IL, pp. 516-125, Sep 1998.
183. A. Goldsmith, "Multiuser capacity and dynamic resource allocation in cellular systems," Proceedings: *Allerton Conference on Communications, Control, and Computing*, Monticello, IL, pp. 915-924, Oct 1995.
184. A. Goldsmith, "Multiuser capacity of cellular time-varying channels," Proceedings: *IEEE Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, CA, pp 83-92, Oct 1994.

Other Invited Talks

1. "Fundamental Capacity Limits and Cross-Layer Design in MIMO Systems," *CUBIN/ACORN Information Theory Workshop*, Melbourne, Australia, Sep 2005.

2. "Cross-Layer Design for MIMO Systems: Is it better to be robust or quick?" *IEEE Communication Theory Workshop*, Park City, Utah, May 2005.
3. "MIMO Capacity Gains for Ad-Hoc Networks with Node Cooperation: Cooperation requires knowledge," *IEEE Communications Theory Workshop*, Capri, Italy, May 2004.
4. A. Goldsmith, "Capacity and dynamic resource allocation in wireless ad-hoc networks," *NSF/ONR Workshop on Ad-Hoc Networks*, Cornell University, Ithaca, NY, Jun 2001.
5. A. Goldsmith, "Resource allocation in wireless ad-hoc networks," *IEEE Communication Theory Workshop*, Borrega Springs, CA, Apr 2001.
6. A. Goldsmith, "Adaptive modulation and adaptive resource allocation in wireless systems," *IEEE Communication Theory Workshop*, Seascap, CA, May 1999.
7. A. Goldsmith, "Adaptive modulation for fading channels," *IEEE Communication Theory Workshop*, Santa Cruz, CA, May 1995.