

Hamid R. Sadjadpour

Present Address

1156 High Street
Baskin School of Engineering
Santa Cruz, CA 95064
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Interest Development of digital communication systems particularly mobile and wireless communication systems, Coding theory, Blind equalization techniques, Satellite communication systems, Digital signal processing, Adaptive signal processing. Looking for a part-time position at Industry.

Education **Ph.D., Communication Sciences** *(Aug. '96)*

University of Southern California, Los Angeles, CA (GPA: 3.9/4.00)

Dissertation: Blind Equalization Techniques Using Maximum Likelihood Criterion.

M.S., Digital Signal Processing *(May '88)*

Sharif University of Technology, Tehran, Iran. (GPA: 17.8/20.00)

Thesis: Estimation of Doppler Frequency in MTI Radar.

B.S., Electrical Engineering *(Jan. '86)*

Sharif University of Technology, Tehran, Iran. (GPA: 17.2/20.00)

Thesis: Design of Microprocessor with TTL Hardware using AHPL language.

Industrial Experience **AT&T Shannon Labs., Florham Park, NJ** *(Dec. '95-July '01)*

Principal Technical Staff Member.

- Responsible for the research and development of the coding of the DSL modem, particularly the invention of a new Multi-tone Turbo Trellis Coded Modulation scheme, leading a team for complexity evaluation and hardware implementation of the design, performance evaluation of the system, invention of a new Log-MAP algorithm, and design of a new chip based on these algorithms. I have more than 11 patents. I have many Standard contributions to ITU and T1E1.4 standards, one of them currently US standard. More information on my web site: <http://www.soe.ucsc.edu/~hamid/>
- Interference analysis and computation between GSO, MEO, and LEO satellite systems and several recommendations to ITU standard for interference analysis of these systems.

LinCom Corporation, Los Angeles, CA *(June '93-Feb. '95)*

Involved in Teledesic satellite project:

- Design of transmitter and receiver for FQPSK signals.
- Phase tracking of FQPSK signal using a second order PLL.
- Simulation of Barker code for synchronization. (All simulations are done using SPW).
- Performance analysis of the effect of QPSK signals in the presence of FM signal.

Iranian Telecomm. Research Center, Tehran, Iran. *(Sep. '93-May '89)*

- Design of power supply for communication systems.
- Design analysis of various PLL structures for FDMA receiver implementation.

- Digital subsystem design of FDMA applications.

Academic **Associate Professor at UCSC** *(July'06-Now)*
Assistant Professor at UCSC *(Fall'01-June'06)*
Experience Teaching courses in communication and coding theory. Conducting research in wireless communications networks.

Adjunct Professor at Lehigh University *(Spring'99-01)*
Teaching a course in Advance topics in communications which includes advance coding techniques including Turbo codes.

Teaching/Research Assistant at USC *(Aug.'90-Aug.'93)*

- Developed Pseudo-Maximum Likelihood Data Estimation (PML) Algorithm and Simplified PML (SPML) algorithm and their applications to Rayleigh fading time-invariant channels.
- Developed an algorithm to reduce the number of states in Viterbi Algorithm.
- Developed an algorithm to detect targets in active sonar images using higher order statistics.

Professional Service

- Technical Program Committee member, ISBAT 2006.
- Technical Program Committee member, Infocom 2007.
- Technical Program Committee member, Globecom2006.
- Technical Program Committee member, [Chinacom 2006](#).
- Guest Editor of EURASIP, [Special issue on Wireless Mobile Ad Hoc Networks](#), 2005.
- Member of International Program Committee of IASTED Conference on Communication, Systems and Applications ([CSA 2006](#)).
- [Chair of Communication and Information Theory Symposium, IWCMC 2006](#).
- Technical Program Committee member, ICC2006.
- Technical Program Committee member, RAWCON2006.
- Technical Program Committee member, Globecom2005.
- Chair of Communication Theory Symposium, WirelessCom 2005.
- Technical Program Committee member, BWAN2005.
- Technical Program Committee member, ICC2005.
- Technical Program Committee member, Wireless ad hoc and sensor networks workshop as part of Globecom 2004.
- Technical Committee member of a book on "Turbo Code Applications: A journey from a paper to realizations.
- Technical Program Committee member, Globecom 2004.
- Technical Program Committee member, RAWCON2004.
- Technical Program Committee member, ICC2003.
- Guest Editor of EURASIP, Special issue on Multicarrier Communications and Signal Processing, 2003.
- Senior Member of IEEE communications society.

Publications Chapters in Books

1. H.R. Sadjadpour and S. Olcer, "Turbo and Turbo-like Code Design in ADSL Modems," Turbo Code Applications: a journey from a paper to realizations, A book on the 10th year anniversary invention of Turbo codes, to be published.
2. H.R. Sadjadpour, "Orthogonal Frequency Division Multiplexing (OFDM)," Handbook of RF and Wireless Technologies, pp. 333-354, Elsevier Science and Technology Books, 2003.
3. R. D. Moraes, H.R. Sadjadpour and JJ. Garcia-Luna, "Capacity and Delay Analysis for Ad Hoc and Sensor Networks," , Under review.

Journals:

1. R. D. Moraes, H.R. Sadjadpour and JJ. Garcia-Luna, "Ergodic Capacity of MIMO MANETs with Opportunistic Cooperation," submitted.
2. R. D. Moraes, X. Yu, H.R. Sadjadpour and JJ. Garcia-Luna, "An Upper bound for the Capacity of MIMO MANETs using Cooperation," submitted.
3. H.R. Sadjadpour, K. Kim, H. Wang, R. Blum, and Y.H. Lee, "Application of randomization techniques to space-time convolutional codes," IEEE Transaction on Signal Processing, Accepted.
4. M. Yu, T. Li, and H.R. Sadjadpour, "A Geometry-inclusive analysis of single-relay systems, submitted.
5. X. Wu, H.R. Sadjadpour, and Z. Tian, "A New Adaptive Two-Stage Maximum-Likelihood Decoding Algorithm for Linear Block Codes," IEEE Transaction on Communications, June 2005.
6. R.M. Moraes, H.R. Sadjadpour and JJ. Garcia-Luna, "Taking Full Advantage of Multiuser Diversity in Mobile Ad-hoc Networks," submitted to IEEE Transaction on Wireless Communications, second revision.
7. M. Puzio, Z. Zhu, R.S. Blum, P. Andrekson, T. Li, and H.R. Sadjadpour, "Channel Coding for Polarization Mode Dispersion Limited Optical Fiber Transmission," submitted to Optics Express.
8. R.M. Moraes, H.R. Sadjadpour and JJ. Garcia-Luna, "Mobility-Capacity-Delay Trade-off in Wireless Ad Hoc Networks," submitted to Elsevier Ad hoc Networks Journal.
9. H.R. Sadjadpour, "Construction of non-square M-QAM Sequences with low PMEPR for OFDM Systems," IEE Proceedings- Communications, pp. 20-24, February 2004.
10. Z. Zhu, H.R. Sadjadpour, R. Blum, P. Andrekson, and T. Li, "Performance of A Single-Input Multiple-Output Decision Feedback Equalizer for Polarization Mode Dispersion Compensation" submitted to IEEE journal of lightwave technology.
11. E. Eleftheriou, S. Olcer, H. Sadjadpour, "Application of capacity approaching coding techniques to digital subscriber lines, communication magazine to appear in 2004.
12. H. Sadjadpour, S. Yoon, "Composite QAM sequences with low PMEPR for DMT systems," IEE Electronics Letters.
13. B. Tarokh, H. Sadjadpour, "Construction of M-QAM signals utilizing QPSK Golay Sequences with low PMEPR suitable for OFDM systems," Accepted for publication in IEEE Transaction on Communications.
14. Z. Zhu, H. Sadjadpour, "An adaptive Per-Survivor Processing algorithm," Accepted for publication in IEEE Transaction on Communications.

15. H. Sadjadpour, N. Sloane, M. Salehi, G. Nebe, "Intreleaver design for Turbo codes," IEEE Selected Areas in Communications, Special issue on Turbo codes, May 2001.
16. H. Sadjadpour, C. Weber, "Pseudo-Maximum likelihood Data Estimation algorithm and its applications over bandlimited channels," IEEE Transaction on Communications, January 2001.

Conference Papers:

1. R. D. Moraes, H.R. Sadjadpour and JJ. Garcia-Luna, "An Upper Bound For the Capacity of Distributed MIMO Mobile Ad Hoc Networks," IEEE ITS 2006 conference.
2. R. D. Moraes, H.R. Sadjadpour and JJ. Garcia-Luna, "On the link Ergodic Capacity of MIMO MANETs using Cooperation," Asilomar 2006 conference. **Invited Paper.**
3. K. Kim, H.R. Sadjadpour, R.S. Blum, Y. Lee, "Scalable Design of Space Time Trellis Codes with Low Decoding Complexity," IEEE Globecom 2006 conference.
4. K. Kim, H.R. Sadjadpour, R.S. Blum, Y. Lee, "Low Complexity Design of Space Time Convolutional Codes with High Spectral Efficiencies," ACM IWCMC 2006 conference.
5. R. D. Moraes, H.R. Sadjadpour and JJ. Garcia-Luna, "Capacity of MIMO MANETs with Cooperation," ACM IWCMC 2006 conference.
6. C. Rouchy and H. R. Sadjadpour, "Construction of M-QAM STCC Based on QPSK STCC," ICASSP 2006 conference.
7. C. Rouchy and H. R. Sadjadpour, "Construction of Space-time Convolutional Codes with High Spectral Efficiency," Asilomar 2005 conference.
8. Z. Zhu, H.R. Sadjadpour, R.S. Blum, P. Andrekson, and T. Li, "SIMO precoding techniques for polarization mode dispersion ," Asilomar 2005 conference.
9. H.R. Sadjadpour, K. Kim, H. Wang, R. Blum, Y. Lee, "Application of Randomization Techniques to Space-Time Convolutional Codes," IEEE WirelessCom 2005.
10. X. Yu, R. D. Moraes, H.R. Sadjadpour and JJ. Garcia-Luna, "Capacity of MIMO Wireless Ad Hoc Networks," IEEE WirelessCom 2005.
11. R. D. Moraes, H.R. Sadjadpour and JJ. Garcia-Luna, "Opportunistic Cooperation: A New Communication Scheme for MANETs," Asilomar 2005 conference.
12. M. Yu, T. Li, and H.R. Sadjadpour, "Amplify-Forward and Decode-Forward: The Impact of Location and Capacity Contour", IEEE MILCOM 2005 conference.
13. R. D. Moraes, H.R. Sadjadpour and JJ. Garcia-Luna, "A New Communication Scheme for MANETs," IEEE WirelessCom 2005.
14. M. Puzio, Z. Zhu, R.S. Blum, P. Andrekson, T. Li, and H.R. Sadjadpour, "Channel Coding for Polarization-Mode Dispersion Limited Optical Fiber Transmission" Asilomar conference 2004.
15. R. D. Moraes, H.R. Sadjadpour and JJ. Garcia-Luna, "Reducing Delay while Maintaining Capacity in Mobile Ad-hoc Networks Using Multiple Random Routes," Asilomar conference 2004.

16. X. Wu, H.R. Sadjadpour, and Z. Tian, "A New Adaptive Two-Stage Maximum-Likelihood Decoding Algorithm for Linear Block Codes," IEEE ICC2004 Conference.
17. R. D. Moraes, H.R. Sadjadpour and JJ. Garcia-Luna, " On Mobility-Capacity-Delay Trade-off in Wireless Ad Hoc Networks," IEEE MASCOTS 2004.
18. R. D. Moraes, H.R. Sadjadpour and JJ. Garcia-Luna, "Throughput-Delay Analysis of Multiple Ad hoc Networks with a Multi-copy Relaying Strategy," IEEE SECON 2004.
19. H.R. Sadjadpour, H. Wang "Exploring New Sources of Diversity In Wireless Systems," IEEE VTC2004 Conference.
20. N. Ehtiati, M.R. Soleymani, and H.R. Sadjadpour, "Joint interleaver Design for Multiple Turbo Codes," IEEE VTC2004 Conference.
21. Z. Zhu, H.R. Sadjadpour, R.S. Blum, and P. Andrekson, "Signal Processing on PMD SIMO Channels," OFC2004 Conference.
22. R. D. Moraes, H.R. Sadjadpour and JJ. Garcia-Luna, " Making Ad-hoc Networks Scale Using Mobility and Multi-copy Forwarding," IEEE Globecom 2004.
23. R. D. Moraes, H.R. Sadjadpour and JJ. Garcia-Luna, " A Study on Mobility-Capacity-Delay Trade-off in Wireless Ad Hoc Networks," Wireless Ad hoc and Sensor Workshop in IEEE Globecom 2004.
24. Z. Zhu, H.R. Sadjadpour, R.S. Blum, and P. Andrekson, "A SIMO DFE-Based Equalization Technique for PMD Compensation," IEEE ICC2004 Conference.
25. X. Wu and H.R. Sadjadpour, "An Optimal Two-Stage Decoding Algorithm for Linear Block Codes," Asilomar2003 Conference.
26. N. Ehtiati, M.R. Soleymani, and H.R. Sadjadpour, "Interleaver Design for Multiple Turbo Codes," CCECE2003 Conference.
27. S. Yoon, H. Sadjadpour, "Composite QAM sequences with low PMEPR for applications to DMT systems," International Conference on Communications, ICC2002, NY.
28. B. Tarokh, H. Sadjadpour, "Construction of M-QAM signals utilizing QPSK Golay Sequences with low PMEPR suitable for OFDM systems," Conference on Information Science and Systems CISS2001, John Hopkins University.
29. Z. Zhu, H. Sadjadpour, "Adaptive Per-Survivor Processing," Asilomar conference on signals, systems, and computers, October 2000.
30. R. Sonalkar, H. Sadjadpour, "A new Initialization Method for minimization of near end cross talk due to DMT Transmission in cable binders," ICCS2000, Singapore.
31. H. Sadjadpour, Z. Zhu, "Variable step size per-survivor processing," CISS2000, Princeton, NJ.
32. H. Zeng, Y. Li, J. Winters, H. Sadjadpour, "A 2-stage soft output Equalizer for EDGE," WCNC2000, Chicago, IL.
33. H. Sadjadpour, N. Sloane, M. Salehi, G. Nebe, "Interleaver design for Turbo codes," International Symposium on Information Theory ISIT2000, Sorrento, Italy.
34. H. Sadjadpour, N. Sloane, M. Salehi, G. Nebe, "Interleaver design for short block length Turbo codes," ICC2000, New Orleans, LI.
35. H. Sadjadpour, "Maximum a posteriori decoding algorithms for Turbo codes," invited paper in SPIE conference, Orlando, FL 2000.

36. R. Sonalkar, J. Basso, H. Sadjadpour, "A Novel bit allocation algorithm for duplex operation of DMT based DSL modems," Asilomar conference 1999.
37. H. Sadjadpour, C. Weber, "Adaptive Pseudo-Maximum Likelihood Data Estimation Algorithm," Asilomar conference 1998.
38. H. Sadjadpour, "Application of Parallel concatenated Trellis coded modulation for Discrete Multitone Modulation," ICC1999, Vancouver, Canada.
39. H. Sadjadpour, C. Weber, "Simplified Pseudo-Maximum Likelihood Data Estimation Algorithm," Asilomar 1996.
40. H. Sadjadpour, C. Weber, "Pseudo-Maximum Likelihood Data Estimation Algorithm and its Performance Analysis," MILCOM 1995.
41. H. Sadjadpour, C. Weber, "Pseudo-Maximum Likelihood Data Estimation of Digital Sequences in the presence of Intersymbol Interference," Asilomar 1994.
42. M. Tabiani, H. Sadjadpour, "Doppler Estimation by MA model and its comparison with FFT," Simulation Symposium, 1992.

Other (technical reports & Standard contributions)

1. R. Sadjadpour, "Encoder Structure of Multi-Tone Turbo Trellis Coded Modulation Proposal," ITU temporary document RN-027, Red Bank, NJ May 2001.
2. H.R. Sadjadpour, "Decoder Structure of Multi-Tone Turbo Trellis Coded Modulation Proposal," ITU temporary document RN-028, Red Bank, NJ May 2001.
3. H.R. Sadjadpour, "Interleaver Design for Multi-Tone Turbo Trellis Coded Modulation Scheme for G.dmt.bis and G.lite.bis," ITU temporary document RN-029, Red Bank, NJ May 2001.
4. H.R. Sadjadpour, "Proposal to use fixed interleaver size for Turbo TCM," ITU temporary document RN-026, Red Bank, NJ May 2001.
5. H.R. Sadjadpour, "Delay issues using different Turbo Code schemes," ITU temporary document RN-030, Red Bank, NJ May 2001.
6. H.R. Sadjadpour, "Proposal on Using Multi-Tone Turbo Trellis Coded Modulation," T1E1.4/2000-274 ANSI standard for ADSL modem, October 2-4, 2000, Napa Valley, CA.
7. H.R. Sadjadpour, N.J.A. Sloane, M. Salehi, G. Nebe, "Semi-Random and Deterministic Interleaver Design for Turbo Codes," AT&T Research Technical Memo. 1360000-000410-01TM. March 21-23, 2001.
8. H.R. Sadjadpour, "Blind Equalization Techniques Using Maximum Likelihood Criterion," Ph.D. dissertation, University of Southern California, January 1996.
9. H.R. Sadjadpour, "Analysis of Interference Mitigation Techniques between GSO FSS and NGSO FSS Networks Operating in the 18.8-19.3 GHz and the 28.6-29.1 GHz Frequency Bands," ITU Radiocommunications Study Group, document number USWP 4A/11, Switzerland, September 26- October 4 1996.
10. H.R. Sadjadpour, C. Nikias, "Detection of Objects in Active Sonar Images Using Higher-Order Statistics (HOS)," Office of Naval Research and Technology, May 1992.

More publications can be found at my web site.

Honors Recipient of the outstanding student award in both B.S. and M.S. programs.
Awarded graduate research assistantship at USC.

Patents **Patent Name,**
No.

Pending Inducing randomization into the physical channel to improve reliability
(provisional filing)
6731696 Multi channel parallel/serial concatenated convolutional codes and Trellis coded
modulation encoder/decoder,
6393052 A Novel Algorithm for minimization of Near End Cross Talk due to DMT transmission
in Cable binders,
6226773 A New Hardware Architecture suitable for MAP-based decoding algorithms for Turbo
codes applications,
Pending, A 2-step S-random interleaver design for Turbo codes,
Pending, A bit and power allocation algorithm for full duplex transmission with echo cancellation
in multicarrier-based DSL modems, **This work is accepted in T1.E1.4,
spectrum management committee.**
Pending, Simplified Log-MAP algorithm for decoding Parallel/Serial concatenated codes in a
receiver of a communication system,
6088387 Multi channel parallel/serial concatenated convolutional codes and Trellis coded
modulation encoder/decoder,
6330277 Multi channel parallel/serial concatenated convolutional codes and Trellis coded
modulation encoder/decoder,
6396871 Multi channel parallel/serial concatenated convolutional codes and Trellis coded
modulation encoder/decoder,
5996095 Set partitioning for sub-optimal decoding,
6026121 An adaptive Per-survivor processing approach for MLSE-based receivers,

Memberships

- Senior member of Institute of Electrical and Electronics Engineers (IEEE).
- IEEE Communication Society.

References Available upon request.