Wayne Eric Stark

Home Address:
26941 Adele Lane
Olmsted Falls, OH 44138
Phone (734) 945-1659

Office Address:
EECS Department
The University of Michigan
Ann Arbor, MI 48109-2122
Phone (734) 763-0390
(email) stark@eecs.umich.edu

Personal Data:
Birth Date: February 26, 1956
Citizenship: U.S.A.

Positions Held:
1/2024-present: Professor Emeritus of Electrical Engineering and Computer Science, University of Michigan, Ann Arbor.
9/96-12/2023: Professor of Electrical Engineering and Computer Science, University of Michigan, Ann Arbor.
9/1988-9/1996: Associate Professor of Electrical Engineering and Computer Science, University of Michigan, Ann Arbor.
9/1982-9/1988: Assistant Professor of Electrical Engineering and Computer Science, University of Michigan, Ann Arbor.

Education:
Ph.D., Electrical Engineering, May 1982, University of Illinois.
M.S., Electrical Engineering, August 1979, University of Illinois.
B.S., Electrical Engineering, May 1978, University of Illinois. (Highest Honors).

Honors and Awards:
Journal of Communications and Networks Best Paper Award 2010.
IEEE Military Communications Conference Ellersick Best Paper Award, 2009.
IEEE Milcom Board 2002 Technical Achievement Award for sustained contributions to military communications.
IEEE Fellow: 1997. For contributions to the theory and practice of coding and modulation in spread-spectrum systems.
National Science Foundation Presidential Young Investigator 1985-1990.

AT&T Mobility LLC, AT&T Services Inc., Ericsson Inc., Nokia of America Corporation, T-Mobile USA, Inc. Ex. 1004
AT&T, et al v. Daingean Technologies
IPR-2024-00730

Governmental Grants and Contracts:
2016-2017 NIST ($50,000)
2014-2016 NIST ($100,000)
2010-2011 KAUST ($419,372, Co-PI with 2 others)
2009-2013 NSF Grant ($2,865,386 Co-PI with 5 others)
2008 NSF MRI Grant ($274,233, Co-PI with 2 others)
2007 AFOSR Grant ($140,000, Co-Pi with one other Co-PI)
2004 JPL Grant ($150,000)
2002 ONR Grant ($1,251,000)
2000 NSF Grant ($499,000, Demos Teneketzis, PI)
2000 ONR Grant ($247,000)
2000 ARO Equipment Grant ($168,000)
1998-2000 DARPA Glomo Research Grant ($200,000)
1997-1999 DARPA Small Unit Operations Research Grant ($500,000)
1996-2000 Director: ARO Multidisciplinary University Research Initiative Grant entitled "Low Energy Electronics Design of Mobile Platforms" ($5,000,000)
1995-1999 ARO Multidisciplinary University Research Initiative Grant ($4,000,000, George Haddad, PI)
1995 ARO Equipment Grant ($245,552)
1995-2000 ARO Focused Research Initiative Grant ($635,950)
1992-1995 NSF Research Grant ($284,711)
1983-1985 NSF Initiation Grant ($60,000)
1985-1990 NSF Presidential Young Investigator Award ($235,000)
1986 NSF Equipment Grant ($81,427)
1985-1988 ONR Research Grant ($247,668)
Industrial Grants and Contracts:
Ford, Hughes, TRW, General Electric, Ericsson, Raytheon ($210,000)

Professional Activities:
Member: Editorial Board IEEE Journal on Selected Areas in Communications (JSAC) 2011-present
Guest Editor: IEEE Journal on Selected Areas in Communications Special Issue on Advances in Military Networking and Communications, December 2011
Guest Editor: IEEE Journal on Selected Areas in Communications Special Issue on Advances in Multicarrier CDMA, June 2006
Guest Editor: IEEE Journal on Selected Areas in Communications Special Issue on Advances in Military Wireless Communications, May 2005.
Guest Editor: IEEE Journal on Selected Areas in Communications Special Issue on Wideband CDMA II, June 2001
Guest Editor: IEEE Journal on Selected Areas in Communications Special Issue on Wideband CDMA I, August 2000
Member: NSF Wireless Technology Panel 1999

Associate Editor: IEEE Transactions on Communications 1984-1989
Member: IEEE Information Theory Society Board of Governors, 1985-1988.
Reviewer: IEEE, NSF, ARO.
Co-organizer: 1986 IEEE International Symposium on Information Theory, Ann Arbor, Michigan.
Panel Member: National Science Foundation Research Initiation Awards, 1985, 1992, 1995.
Panel Member: National Science Foundation Grant Awards, 1996.
Consultant: Irwin Magnetics, General Electric, InterDigital Communications Corporation, Intratech Systems Inc. Ericsson.

Patents:

- US Patent 11,582,305, *Vehicle radar system with a shared radar and communication system*, February 14, 2023.
- US Patent 11,262,448B2, *Software defined automotive radar*, March 1, 2022.
- US Patent 10,536529B2, *Vehicle radar system with a shared radar and communication system*, January 1, 2020.
- US Patent 9,772,397, *PMCW-PMCW interference mitigation*, September 26, 2017.
- US Patent 9753121, *Power control for improved near-far performance of radar systems*, September 5, 2017.
- US Patent 9,720,073, *Vehicular radar sensing system utilizing high rate true random number generator*, August 1, 2017.
- US Patent 9,689,967B1, *Adaptive transmission and interference cancellation for MIMO radar*, April, 2017.
- US Patent 9,575,160, *Vehicular radar sensing system utilizing high rate true random number generator*, February 21, 2017.
- US Patent 7,929,623, *FEC In Cognitive Multi-User OFDM*, April, 2011.
- US Patent 7,257,085, *Method and controller for data rate adaptation in wireless networks*, June 14, 2007.
- US Patent 6,282,181, *Pseudorandom number sequence generation in radio communication systems*, August 28, 2001.
- US Patent 6,240,538, *Method and apparatus for errors and erasures decoding*, May 5, 2001.
- US Patent 6,072,786, *Method for acquisition of spotbeam beacon frequency within a satellite communications system*, June 6, 2000.

- US Patent 6,028,538, *Method, keyboard and system for transmitting key characters*, Feb. 22, 2000.
- US Patent 5,938,787, *Communications systems and methods employing code rate partitioning with nonorthogonal modulation*, August 17, 1999.
- US Patent 4,796,110, *System and method for encoding and storing digital information on magnetic tape*, Jan. 3, 1989.

Sabbaticals:
January-December 1989: IBM Zurich. Worked on radio communication systems including synchronization.
August, 1995-June 1996: Ericsson. Worked on various aspects of coding, modulation, acquistion for wireless communications (see several of the patents above).
September-December 2006: Microsoft. Worked on cognitive radio research.
September-December 2013: Home.
Courses Taught:
Electrical Engineering I (EECS 210, Undergraduate)
Probabilistic Methods In Engineering (EECS 301, 401, Undergraduate)
Analog Communication Signals and Systems (EECS 453, Undergraduate)
Digital Communication Signals and Systems (EECS 455, Undergraduate)
Information Theory (EECS 550, Graduate)
Introduction to Digital Communications and Coding (EECS 554, Graduate)
Digital Communication Theory (EECS 555, Graduate)
Communication Networks (EECS 557, Graduate)
Channel Coding Theory (EECS 650, Graduate)
Spread-Spectrum Communications and Applications Short Course given at University of Michigan, Summer 1993, 1994, 1995, 1996
Wireless Communication Camp for High School Students, Summer 2010, 2011

Ph.D. Theses Supervised:

1. Jae Hong Lee, "Information and Coding for Channels with Block Interference," 1986.
2. Bal Gi Kim, "Coding for Spread-Spectrum Communications Networks," 1987.
3. Abdolrahman Khalid Al Jabri, "Coding for Meteor-Burst Communications Channels and Side Information for Channels with Block Interference," 1987.
4. Ken Castor, "Parallel Decoding for Concatenated Coded Spread-Spectrum Frequency-Hopped Communications in Partial Band Jamming," 1987.
5. Sang Park, "Performance Analysis of Frequency-Hopped Spread-Spectrum Systems with Worst Case Jamming Interference," 1987.
6. Manjunath Hegde, "Performance Analysis of Coded Frequency-Hopped Spread-Spectrum Systems with Unknown Interference," 1987.
7. Amer Hassan, "Algorithms for Decoding Block Codes," 1989.
8. Whoon Cheun, "Analysis of Asynchronous Frequency-Hop Spread-Spectrum Multiple-Access Networks," 1989.
9. Brian Woerner, "Coded Modulation for Direct-Sequence Spread-Spectrum Communications," 1991.
10. Michael McKinley, "Channel Coding to Exploit Soft-Decisions and Error Dependence in Channels with Memory," 1992.
11. Yi-Pin Wang, "On the Performance of DS/SS Systems in Bandlimited Multipath Environments," 1995.
12. Majari Asawa, "Optimal Scheduling and Admission Control in Communication Networks," 1995.
13. Matthew Klimesh, "Optimal Strategies for Communicator-Jammer Problems," 1995.
14. Mohamed Adnan Landolsi, "Performance of DS-CDMA Communication Systems with Generalized Offset QPSK," 1996.
15. Dennis Goeckel, "Performance Limits and Optimal Resource Allocation for Coded Mulit-User Communication Systems," 1996.
16. Abdulrauf Hafeez, "Trellis and Tree Search Algorithms for Equalization and Multiuser Detection," 1999.
17. Joseph Kang, "Iterative Estimation and Decoding for Channels with Memory," 1999.

18. Michael Chu “Performance and Modeling of Communications in Channels with Memory,” 1999.

19. Victor Wen-Kai Cheng, “Trellis Coded Spread-Spectrum Modulation Schemes with Multiple-Access Interference and Coded Modulation Schemes in a Fading Environment,” 1999.

20. Sangjin Hong, “Performance Driven VLSI System Design For Low Energy Wireless Communications,” 1999.

21. Je-Hong Jong, “Performance and Power Optimization of Multicarrier Communication Systems in the Presence of Nonlinear Distortion,” 2000.

22. Cheng-Po Liang, “Resource Allocation and System Optimization for Spread-Spectrum and OFDM Networks with Multiuser Detection,” 2001.

23. Tingfang Ji, “Adaptive Coding for Wireless Data Networks,” 2001.

24. Andrew Worthen “Codes and Iterative Receivers for Wireless Communication Systems,” 2001.

25. Troy Nolan, “Coding Optimization and Nonlinear Receiver Analysis for Wireless Communication Systems in the Presence of Interference,” 2001.

26. Do-Sik Yoo, “Channel Characterization and System Design In Wireless Communications,” 2002.

27. Ali Zilmaz, “Performance of Turbo Codes: The Finite Length Case,” 2003.

28. John Choi, “Performance of Ultra-Wideband Communication Systems,” 2003.

29. Salam Zummo, “Coding and Channel Estimation for Block Fading Channels,” 2003.

30. Hua Wang, “Analysis and Design of Efficient Wireless Networks,” 2004.

31. Ping-Cheng Yeh, “Performance of Wireless Networks with Directional Antennas,” 2005.

32. Shihyu Chang, “Generating Function Analysis of Wireless Networks and ARQ Systems,” 2006.

33. Kar-Peo Yar, “Design and Analysis of Short Packet and Concatenated Coded Communications Systems,” 2007.

34. Jinho Kim, “Performance Analysis of Physical Layer Network Coding,” 2009.

35. Chih-Wei Wang, “Multilevel Coding and Unequal Error Protection for Multiple-Access Communications and Ultra-Wideband Communications in the Presence of Interference,” 2009.

36. Changhun Bae, “Energy-Bandwidth Tradeoff in Wireless Networks,” 2010.

37. Sanghoon Kim, “Cross Layer Analysis and Optimization of Relay Networks ,” 2013.

38. Sungjoon Park, “System Design and Outage Analysis for Cooperative Diversity Wireless Networks,” 2013.

39. Shao-Yuan Chen, “Detection, Synchronization, Channel Estimation and Capacity in UWB Sensor Networks using Compressed Sensing,” 2014.

University Service:
Chair: Promotion committee for an Associate Professor (2011, 2020).
Member: Budget Study Committee (2009)
Member: Recreational Sports Task Force (2008)
Director: Communications and Signal Processing Laboratory (2000-present)
Member: Senate Advisory Committee on University Affairs (2007-2010)
Member: Senate Assembly (2005-2010)
Member: Administrator Evaluation Committee (2004-2006)
Member: Academic Affairs Advisory Committee (2004-2006)
(9/1/2000-present)
Undergraduate Advisor: Electrical Engineering Program (9/1/2001-8/31/2004)
Associate Chair: Electrical Engineering and Computer Science Department (10/1997-8/1/2000). Was the leader of the Systems Faculty (around 20 faculty) overseeing teaching assignments, service assignments, faculty raises and staff.
Chair: Search Committee for Communication Area, 9/1/1999-5/1/2000, 9/2004-2006
Chair: Graduate Affairs Committee (1995-1996).
Chair: Electrical Engineering Systems Graduate Program (1990-1994).
Chair: College of Engineering Nominating Committee, 1993
Chair: Promotion/Tenure committee for an Assistant Professor.
Member: Systems Faculty Search Committee, 1993-1995
Member: College of Engineering Nominating Committee, 1992
Member: Michigan State Police Communications System review committee for University President and Governor, State of Michigan, 1/92-5/92.
Member: Electrical Engineering Systems Graduate Committee (1985-1994)
Member: Financial Aid and Recruiting Committee (1986-1987)
Member: Computing Needs Committee (1986-1987)
Member: Systems Science and Engineering Executive Committee (1986-1987)

Publications

Books

[1] W. Stark, *Introduction to Digital Communications*, Cambridge University Press, 2023.

Journal Articles

[2] T. Song, W. E. Stark, T. Li, and J. K. Tugnait, "Optimal multiband transmission under hostile jamming," *IEEE Transactions on Communications*, vol. 64, no. 9, pp. 4013–4027, 2016.

[3] S. Kim and W. Stark, "Cross-layer analysis of energy–throughput tradeoff for relay networks," *IEEE Transactions on Wireless Communications*, vol. 13, no. 12, pp. 6716–6726, 2014.

[4] O. Khan, S.-Y. Chen, D. D.D. Wentzloff, and W. Stark, "Impact of compressed sensing with quantization on UWB receivers with multipath channel estimation," *IEEE Journal on Emerging and Selected Topics in Circuits and Systems*, vol. 2, no. 3, pp. 460–469, Sept 2012.

[5] C.-L. Chen, W. Stark, and S.-G. Chen, "Energy-bandwidth efficiency tradeoff in MIMO multi-hop wireless networks," *IEEE Journal on Selected Areas in Communications*, vol. 29, no. 8, pp. 1537 –1546, September 2011.

[6] C. Bae and W. E. Stark, "Minimum energy-per-bit wireless multi-hop networks with spatial reuse," *Journal on Communications and Networks*, vol. 12, no. 2, pp. 103–113, April 2010.

[7] D.-S. Yoo, W. Stark, K.-P. Yar, and S.-J. Oh, "Coding and modulation for short packet transmission," *IEEE Transactions on Vehicular Technology*, vol. 59, no. 4, pp. 2104–2109, May 2010.

[8] C. Bae and W. E. Stark, "End-to-end energy-bandwidth tradeoff in multi-hop wireless networks," *IEEE Transactions on Information Theory*, vol. 55, no. 9, pp. 4051–4066, November 2009.

[9] S. Zummo, P.-C. Yeh, and W. Stark, "New union bound on the error probability of bit-interleaved space-time codes with finite interleaver sizes," *IET Communications*, vol. 2, no. 10, pp. 1230–1238, November 2008.

[10] S. Y. Chang, W. E. Stark, and A. Anastasopoulos, "Energy-delay analysis of MAC protocols in wireless networks," *IEEE Transactions on Communications*, vol. 7, no. 8, pp. 2841–2845, August 2008.

[11] K.-P. Yar, D.-S. Yoo, and W. Stark, "Performance of RS coded M-ary modulation with and without symbol overlapping," *IEEE Transactions on Communications*, vol. 56, no. 3, pp. 445–453, March 2008.

[12] P.-C. Yeh, W. Stark, and S. Zummo, "Performance analysis of wireless networks with directional antennas," *IEEE Transactions on Vehicle Technology*, vol. 57, no. 5, pp. 3187–3199, September 2008.

[13] P. Richardson, W. Xiang, and W. Stark, "Modeling of ultra-wideband channels within vehicles," *IEEE Journal on Selected Areas in Communications*, vol. 24, no. 4, pp. 906–912, April 2006.

[14] P.-C. Yeh, S. A. Zummo, and W. Stark, "Error probability of bit-interleaved coded modulation in wireless environments," *IEEE Transactions on Vehicular Technology*, vol. 55, no. 2, pp. 722–728, March 2006.

[15] S. Zummo and W. E. Stark, "Error probability of coded STBC systems in block fading environments," *IEEE Transactions on Wireless Communications*, vol. 5, pp. 972–977, 2006.

[16] S. Zummo and W. E. Stark, "Performance analysis and iterative decoding of I-Q trellis space-time codes," *IEE Proceedings-Communications*, vol. 153, no. 2, pp. 233–237, April 2006.

[17] D.-S. Yoo and W. E. Stark, "Characterization of WSSUS channels: Normalized mean square covariance," *IEEE Transactions on Wireless Communications*, vol. 4, pp. 1575–1584, July 2005.

[18] D.-S. Yoo and W. E. Stark, "Characterization of WSSUS channels: Normalized mean square covariance and diversity combining," *IEEE Transactions on Wireless Communications*, vol. 4, pp. 1307–1310, July 2005.

[19] D.-S. Yoo and W. E. Stark, "Characterization of multipath fading channels: Channels with specular components," *IEEE Transactions on Wireless Communications*, vol. 4, pp. 1471–1482, July 2005.

[20] T. Ji and W. E. Stark, "Rate-adaptive transmission over correlated fading channels," *IEEE Transactions on Communications*, vol. 53, no. 10, pp. 1663–1670, October 2005.

[21] S. Hong, S. Kim, and W. E. Stark, "Low power application-specific parallel-pipeline multiplier design for DSP applications through coefficient optimization," *VLSI Design: An International Journal of Custom-Chip Design, Simulation, and Testing*, vol. 14, no. 3, pp. 287–298, March 2002.

[22] J. Choi, D.-S. Yoo, and W. E. Stark, "Performance limits of M-FSK with Reed-Solomon coding and diversity combining," *IEEE Transactions on Communications*, vol. 50, no. 11, pp. 1787–1797, November 2002.

[23] J. Choi and W. E. Stark, "Performance of ultra-wideband communications with suboptimal receivers in multipath channels," *IEEE Journal on Selected Areas in Communications*, vol. 20, no. 9, pp. 1754–1766, Dec. 2002.

[24] M. Landolsi and W. E. Stark, "On the accuracy of Gaussian approximations in the error analysis of DS-CDMA with OQPSK modulation," *IEEE Transactions on Communications*, vol. 50, no. 12, pp. 2065–2071, Dec. 2002.

[25] M. Landolsi and W. E. Stark, "The effects of filtering and nonlinear amplification on the performance of DS-CDMA with OQPSK-type modulations," *IEEE Transactions on Vehicular Technology*, vol. 51, no. 5, pp. 1145–1152, Sep. 2002.

[26] W. E. Stark, H. Wang, A. Worthen, S. Lafortune, and D. Teneketzis, "Low energy wireless communication network design," *IEEE Wireless Communication Magazine*, vol. 9, pp. 60–72, August 2002.

[27] P. Kabamba, S. Meerkov, W. E. Stark, and C. Y. Tang, "Feedforward control of data rate in wireless networks," *IEEE Transactions on Vehicular Technology*, vol. 51, no. 5, pp. 1206–1222, September 2002.

[28] J.-H. Jong and W. E. Stark, "Performance analysis of coded multicarrier spread-spectrum systems in the presence of multipath fading and nonlinearities," *IEEE Transactions on Communications*, vol. 49, no. 1, pp. 168–179, January 2001.

[29] C.-P. Liang and W. E. Stark, "Iterative multiuser detection for turbo-coded FHMA communications," *IEEE Journal on Selected Areas in Communications*, vol. 19, pp. 1810–1819, September 2001.

[30] A. P. Worthen and W. E. Stark, "Unified design of iterative receivers using factor graphs," *IEEE Transactions on Information Theory*, vol. 47, pp. 843–849, February 2001.

[31] M. J. Chu and W. E. Stark, "Effect of mobile velocity on communications in fading channels," *IEEE Transactions on Vehicular Technology*, vol. 49, pp. 202–210, January 2000.

[32] T. Ji and W. Stark, "Turbo-coded ARQ schemes for DS-CDMA data networks over fading and shadowing channels: Throughput, delay, and energy efficiency," *IEEE Journal on Selected Areas in Communications*, pp. 1355–1364, August 2000.

[33] J. Kang and W. E. Stark, "Iterative estimation and decoding for FH-SS with slow Rayleigh fading," *IEEE Transactions on Communications*, vol. 48, pp. 2014–2023, December 2000.

[34] D. L. Goeckel and W. E. Stark, "Optimal diversity allocation in multiuser communication systems-Part II: Optimization," *IEEE Transactions on Communications*, pp. 45–52, January 2000.

[35] S. Hong and W. E. Stark, "Design and implementation of a low complexity VLSI turbo-code decoder architecture for low energy mobile wireless communications," *Journal of VLSI Signal Processing*, vol. 24, pp. 43–57, February 2000.

[36] D. L. Goeckel and W. E. Stark, "Optimal diversity allocation in multiuser communication systems-Part I: Systems model," *IEEE Transactions on Communications*, vol. 47, pp. 1828–1836, December 1999.

[37] M. A. Landolsi and W. E. Stark, "DS-CDMA chip waveform design for minimal interference under bandwidth, phase, and envelope constraints," *IEEE Transactions on Communications*, vol. 47, pp. 1737–1746, August 1999.

[38] C.-P. Liang, J.-H. Jong, W. E. Stark, and J. R. East, "Nonlinear amplifier effects in communications systems," *IEEE Transactions on Microwave Theory and Techniques*, pp. 1461–1466, August 1999.

[39] D. Goeckel, A. O. Hero, and W. E. Stark, "Data-recursive algorithms for blind channel identification in direct-sequence systems," *IEEE Transactions on Signal Processing*, vol. 46, pp. 2217–2220, August 1998.

[40] A. Hafeez and W. E. Stark, "Decision feedback sequence estimation for unwhitened ISI channels with applications to multiuser detection," *IEEE Journal on Selected Areas in Communications: Special Issue on Signal Processing for Wireless Communications*, vol. 16, no. 9, pp. 1785–1795, December 1998.

[41] J. H. Kang and W. E. Stark, "Turbo codes for noncoherent FH-SS with partial-band interference," *IEEE Transactions on Communications*, vol. 46, pp. 1451–1458, November 1998.

[42] S. W. Kim and W. E. Stark, "Performance limits of Reed-Solomon coded CDMA with orthogonal signalling in a Rayleigh faded channel," *IEEE Transactions on Communications*, vol. 46, pp. 1125–1134, September 1998.

[43] V. W. Cheng and W. E. Stark, "Performance of trellis coded direct-sequence spread-spectrum with noncoherent reception in a fading environment," *IEEE Transactions on Vehicular Technology*, vol. 47, pp. 579–590, May 1998.

[44] A. A. Hassan, J. E. Hershey, W. E. Stark, and S. Chennakeshu, "Cryptographic key agreement for mobile radio," *Signal Processing: Review Journal*, vol. 6, pp. 207–212, October 1996.

[45] K. Ban, M. Katayama, W. E. Stark, T. Yamazato, and A. Ogawa, "Multi-antenna transmission scheme for convolutionally coded DS/CDMA system," *IEICE Transactions on Communications*, vol. E80A, pp. 2437–2443, December 1997.

[46] M. A. Landolsi and W. E. Stark, "Optimal chip waveforms for DS-CDMA with generalized OQPSK modulation," *European Transactions on Telecommunications*, vol. 8, pp. 527–536, September-October 1997.

[47] M. Asawa and W. Stark, "Optimal scheduling of handoffs in cellular networks," *IEEE Transactions on Networking*, vol. 4, pp. 428–441, June 1996.

[48] A. Hassan, W. E. Stark, and J. Hershey, "The error rate for the optimal follower tone-jammer," *IEEE Transactions on Communications*, vol. 44, no. 5, pp. 546–548, May 1996.

[49] K. Cheun and W. Stark, "Performance of FHSS systems employing carrier jitter against one-dimensional tone jamming," *IEEE Transactions on Communications*, vol. 43, pp. 2622–2629, October 1995.

[50] M. Asawa and W. E. Stark, "Cellular digital packet data for intelligent vehicle highway systems," *IVHS Journal*, vol. 2, no. 4, pp. 341–358, April 1995.

[51] B. Woerner and W. E. Stark, "Improved upper bounds on the packet error probability of slotted and unslotted DS/SS system," *IEEE Transactions on Communications*, vol. 43, pp. 3055–3062, December 1995.

[52] A. Hassan and W. E. Stark, "Decoding algorithms with input quantization and maximum error correction," *IEEE Transactions on Information Theory*, vol. 41, pp. 1126–1133, July 1995.

[53] D. Goeckel and W. E. Stark, "Performance of direct-sequence systems with rake reception in a multipath fading environment," *European Transactions on Telecommunications*, vol. 6, pp. 41–51, January 1995.

[54] B. D. Woerner and W. E. Stark, "Trellis-coded direct-sequence spread-spectrum communications," *IEEE Transactions on Communications*, vol. 42, no. 12, pp. 3161–3170, December 1994.

[55] K. Cheun and W. E. Stark, "Performance of robust metrics with convolutional codes and diversity under worst-case partial-band noise jamming," *IEEE Transactions on Communications*, vol. 41, pp. 200–209, January 1993.

[56] K. Cheun and W. E. Stark, "Optimal selection of Reed-Solomon code rate and the number of frequency slots in asynchronous FHSS-MA networks," *IEEE Transactions on Communications*, vol. 41, pp. 307–311, February 1993.

[57] A. Hassan, W. E. Stark, and J. E. Hershey, "Frequency-hopped spread-spectrum in the presence of a follower partial-band jammer," *IEEE Transactions on Communications*, vol. 41, pp. 1125–1131, July 1993.

[58] K. Cheun and W. E. Stark, "Probability of error in frequency-hop spread-spectrum multiple-access communication systems with noncoherent signalling," *IEEE Transactions on Communications*, vol. 39, pp. 1400–1410, September 1991.

[59] N. Moayeri, D. Neuhoff, and W. E. Stark, "Fine-coarse vector quantization," *IEEE Transactions on Acoustics, Speech and Signal Processing*, vol. 39, pp. 1503–1515, July 1991.

[60] M. Hegde and W. E. Stark, "Capacity of frequency-hop spread-spectrum multiple-access communication systems," *IEEE Transactions on Communications*, vol. 38, pp. 1050–1059, July 1990.

[61] A. Hassan and W. E. Stark, "On decoding concatenated codes," *IEEE Transactions on Information Theory*, vol. 36, pp. 677–683, May 1990.

[62] M. Hegde and W. E. Stark, "On the error probability of coded frequency-hopped spread-spectrum multiple-access systems," *IEEE Transactions on Communications*, vol. 38, pp. 571–573, May 1990.

[63] M. Hegde, W. E. Stark, and D. Teneketzis, "On the capacity of channels with unknown interference," *IEEE Transactions on Information Theory*, vol. 35, pp. 770–783, July 1989.

[64] S. W. Kim and W. E. Stark, "Optimum rate Reed-Solomon codes for frequency-hopped spread-spectrum multiple-access communication systems," *IEEE Transactions on Communications*, vol. 37, pp. 138–144, February 1989.

[65] W. E. Stark and R. McEliece, "On the capacity of channels with block memory," *IEEE Transactions on Information Theory*, vol. 34, pp. 322–324, March 1988.

[66] M. Hegde and W. E. Stark, "Asymptotic performance of M-ary orthogonal signals in worst-case partial-band interference and Rayleigh fading," *IEEE Transactions on Communications*, vol. 36, pp. 989–992, August 1988.

[67] W. E. Stark, "Capacity and cutoff rate of noncoherent FSK with nonselective Rician fading," *IEEE Transactions on Communications*, vol. COM-33, pp. 1153–1159, November 1985.

[68] W. E. Stark, "Coding for frequency-hopped spread-spectrum communication with partial-band interference -Part II: Coded performance," *IEEE Transactions on Communications*, vol. COM-33, pp. 1045–1057, October 1985.

[69] W. E. Stark, "Coding for frequency-hopped spread-spectrum communication with partial-band interference -Part I: Capacity and cutoff rate," *IEEE Transactions on Communications*, vol. COM-33, pp. 1036–1044, October 1985.

[70] M. B. Pursley and W. E. Stark, "Performance of Reed-Solomon coded frequency-hop spread-spectrum in partial-band interference," *IEEE Transactions on Communications*, vol. COM-33, pp. 767–774, August 1985.

[71] R. J. McEliece and W. E. Stark, "Channels with block interference," *IEEE Transactions on Information Theory*, vol. IT-30, pp. 44–53, January 1984.

[72] M. B. Pursley, D. V. Sarwate, and W. E. Stark, "Error probability for direct-sequence spread-spectrum multiple access communications – Part I: Upper and lower bounds," *IEEE Transactions on Communications*, vol. COM-30, pp. 975–984, May 1982.

[73] W. E. Stark and D. V. Sarwate, "Kronecker sequences for spread-spectrum communication," *IEE Proceedings – Part F Communications, Radar, and Signal Processing*, vol. 128, pp. 104–109, April 1981.

[74] C.-W. Wang and W. Stark, "Performance analysis of direct-sequence code-division multiple-access communications with asymmetric quadrature phase-shift-keying modulation," *Interplanetary Progress Report (JPL)*, vol. 42-163, pp. 1–39, November 2005.

Conference Publications

[75] M. Damsaz, D. Guo, J. Peil, W. Stark, N. Moayeri, and R. Candell, "Channel modeling and performance of Zigbee radios in an industrial environment," *IEEE International Workshop on Factory Communication Systems*, pp. 1–10, 2017.

[76] S. Park and W. Stark, "Performance analysis of concatenated convolutional codes for STBC systems in pulse jamming," *IEEE Military Communications Conference*, pp. 1510–1515, Oct 2014.

[77] S. Kim and W. Stark, "Simple relay enabled MAC (SRMAC) protocol for cooperative communication," *IEEE Military Communications Conference*, pp. 175–180, Nov 2013.

[78] S. Kim and W. E. Stark, "On the performance of full duplex wireless networks," *47th Annual Conference on Information Sciences and Systems (CISS)*, pp. 1–6, 2013.

[79] S. Kim and W. E. Stark, "On the energy-throughput tradeoffs for relay networks with transmit power control," *50th Annual Allerton Conference on Communication, Control, and Computing*, pp. 2088–2095, 2012.

[80] S. Kim and W. Stark, "On the optimal number of hops in relay networks," *2012 IEEE International Conference on Communications (ICC)*, pp. 5080–5085, June 2012.

[81] S. Park and W. Stark, "Opportunistic dual timer relay selection in MIMO relay networks," *IEEE Military Communications Conference*, pp. 1 –5, October 2012.

[82] S.-Y. Chen and W. Stark, "Performance evaluation of UWB using compressed sensing in multipath channel estimations," *IEEE Global Telecommunications Conference*, pp. 1 –5, December 2011.

[83] S. Park and W. Stark, "Opportunistic relaying in multipath and slow fading channel: Relay selection and optimal relay selection period," *IEEE Military Communications Conference*, pp. 661 –666, November 2011.

[84] C. Bae and W. E. Stark, "Distance-aware transmission energy selection for multi-hop wireless networks with spatial reuse," *IEEE Military Communications Conference*, pp. 513 –518, November 2010.

[85] C. Tekin, S. Hong, and W. Stark, "Enhancing cognitive radio dynamic spectrum sensing through adaptive learning," *IEEE Military Communications Conference*, pp. 1–10, November 2009.

[86] C. Bae and W. E. Stark, "On the energy-bandwidth tradeoff for AWGN relay channels," *IEEE Military Communications Conference*, pp. 1–10, November 2009.

[87] C. Bae and W. E. Stark, "On minimum energy routing in wireless multihop networks," *2009 Information Theory and Applications Workshop*, February 2009.

[88] W. Stark and P. de Vries, "Detection of white spaces in a cognitive radio architecture," *International Conference on Cognitive Radio Oriented Wireless Networks and Communications*, pp. 1–10, May 2008.

[89] C. Bae and W. Stark, "Minimum energy-per bit in multi-hop wirelesss networks," *Allerton Conference on Communication, Control, and Computing*, pp. 1–10, September 2008.

[90] C. Bae and W. Stark, "Energy-bandwidth tradeoff with spatial reuse in wireless multi-hop networks," *IEEE Military Communications Conference*, pp. 1–7, November 2008.

[91] C.-W. Wang and W. Stark, "Jamming interference suppression in ultra-wideband communications," *IEEE Military Communications Conference*, pp. 1–7, November 2008.

[92] J. Kim and W. Stark, "Outage probability of LDPC-coded systems," *IEEE Global Telecommunications Conference*, pp. 3260–3264, 2007.

[93] J. Kim, C.-W. Wang, and W. Stark, "Frequency domain channel estimation for OFDM based on slepian basis expansion," *IEEE Communications Conference*, pp. 3011–3015, June 2007.

[94] C.-W. Wang and W. Stark, "Nonlinear interference mitigation in multiple-access ultra-wideband communications," in *Proceedings of 2007 IEEE Military Communications Conference*, pp. 1–7, October 2007.

[95] C. Bae and W. Stark, "A tradeoff between energy and bandwidth efficiency in wireless networks," in *Proceedings of 2007 IEEE Military Communications Conference*, pp. 1–7, October 2007.

[96] S. A. Zummo, P.-C. Yeh, and W. E. Stark, "Bit error probability of bit-interleaved coded modulation (BICM) in wireless environments," *International Symposium on Information Theory*, p. 739, September 2005.

[97] S. Y. Chang, A. Anastasopoulos, and W. Stark, "Energy and delay analysis of wireless networks with ARQ," in *IEEE Vehicular Technology Conference*, volume Volume 4, pp. 2601–2605, May 30 -June 1 2005.

[98] K.-P. Yar, S. Y. Chang, and W. E. Stark, "Analysis of energy and delay for ARQ systems over time varying channels," in *IEEE Military Communications Conference*, 2005.

[99] K.-P. Yar and W. E. Stark, "Performance of Reed-Solomon coded M-ary modulation systems with overlapped symbols," in *IEEE Military Communications Conference*, 2005.

[100] S. Zummo and W. Stark, "Error probability of coded multi-antenna systems in block fading environments," *IEEE International Conference on Communications*, vol. 2, pp. 937–941, 2004.

[101] P.-C. Yeh, W. E. Stark, and S. Zummo, "Outage probability of wireless networks with directional antennas," *IEEE Military Communications Conference*, vol. 1, pp. 333–338, 2004.

[102] S. Y. Chang, A. Anastasopoulos, and W. Stark, "Energy-delay analysis of wireless systems with random coding," *IEEE Global Telecommunications Conference*, pp. 3270–3274, 2004.

[103] J. Choi and W. E. Stark, "Performance of UWB communications with imperfect channel estimation," *Proceedings of the IEEE Military Communication Conference*, vol. 2, pp. 915–920, 2003.

[104] S. Zummo and W. Stark, "Performance analysis of binary coded systems over block fading Rician channels," *IEEE Military Communications Conference*, pp. 314–319, October 2003.

[105] P.-C. Yeh, A. O. Yilmaz, and W. Stark, "On the error floor analysis of turbo codes: Weight spectrum estimation (WSE) scheme," *IEEE International Symposium on Information Theory*, p. 439, July 2003.

[106] P.-C. Yeh, S. A. Zummo, J. D. Choi, and W. E. Stark, "Performance analysis of coded multi-carrier wideband systems of fading channels," *IEEE Military Communications Conference*, vol. 2, pp. 909–914, October 2003.

[107] S. Zummo and W. Stark, "Iterative decoding algorithms for I-Q space-time codes," *IEEE International Symposium on Information Theory*, p. 389, July 2002.

[108] S. Zummo and W. Stark, "Performance of coded systems with noncoherent detection over block fading channels," *IEEE International Symposium on Advances in Wireless Communications (ISWC'02)*, pp. 1–2, September 2002.

[109] S. Zummo and W. Stark, "An algorithm for iterative decoding and channel estimation of space-time coded FH systems," *IEEE Military Communications Conference*, vol. 2, pp. 768–773, October 2002.

[110] S. Zummo and W. Stark, "Performance analysis of coded systems over block fading channels," *IEEE Vehicular Technology Conference*, vol. 2, pp. 1129–1133, September 2002.

[111] A. Yilmaz and W. Stark, "Application of the Gaussian approximation to iterative decoding with finite blocklengths," *Proceedings of the IEEE Vehicular Technology Conference*, vol. 3, pp. 1763–1767, 2002.

[112] A. O. Yilmaz and W. E. Stark, "Performance of turbo coded continuous phase modulation in fading cahnnels," *Proceedings of the IEEE Military Communications Conference*, vol. 1, pp. 697–702, 2002.

[113] J. Choi and W. Stark, "Performance analysis of rake receivers for ultra-wideband communications with PPM and OOK in multipath channels," *IEEE International Conference on Communications*, vol. 3, pp. 1969–1973, 2002.

[114] J. Choi and W. Stark, "Performance of autocorrelation receivers for ultra-wideband communications with PPM in multipath channels," in *IEEE Conference on Ultra Wideband Systems and Technologies*, pp. 213–217, 2002.

[115] J. Choi and W. E. Stark, "Performance analysis of ultra-wideband spread-spectrum communications in narrowband interference," *Proceedings of the 2002 IEEE Military Communications Conference*, vol. 2, pp. 1075–1080, October 2002.

[116] P. Kabamba, S. Meerkov, W. Stark, and C. Tang, "Feedforward control of data rate in wireless networks," *Proceedings of the 40th IEEE Conference on Decision and Control*, vol. 2, pp. 1043–1048, 2001.

[117] A. Yilmaz and W. Stark, "Turbo coded continuous phase modulation," *IEEE Military Communications Conference*, vol. 2, pp. 1405–1409, 2001.

[118] D.-S. Yoo and W. E. Stark, "Characterization of frequency selective fading channels," *IEEE Sarnoff Symposium*, pp. 20–23, 2001.

[119] S. Hong and W. E. Stark, "Decoding performance and complexity analysis for analog and digital channel decoders," *IEEE Vehicular Technology Conference*, vol. 2, pp. 703–706, 2001.

[120] S. Hong and W. E. Stark, "Performance effects of using analog memory in baseband signal processing systems design," *IEEE International Symposium on Circuits and Systems*, 2001.

[121] T. C. Nolan and W. E. Stark, "Mitigation of cosite interference in nonlinear receivers with MEMS filters," *Proceedings of the IEEE Military Communications Conference*, vol. 2, pp. 769–773, 2000.

[122] W. Stark, H. Wang, A. Worthen, P. Liang, A. Hero, S. Lafortune, and D. Teneketzis, "Low energy wireless communication network design," *2000 Allerton Conference on Communication, Control and Computing*, pp. 785–794, October 2000.

[123] A. Worthen and W. E. Stark, "Interference mitigation in frequency-hopped spread-spectrum systems," in *IEEE Sixth International Symposium on Spread Spectrum Techniques and Applications*, pp. 58–62, September 2000.

[124] D.-S. Yoo and W. E. Stark, "Characterization of wideband communication channels," *IEEE International Symposium on Antennas and Propagation*, vol. 1, pp. 59, 2000.

[125] D.-S. Yoo and W. E. Stark, "An index of frequency selectivity: frequency mean square correlation," *IEEE Vehicular Technology Conference*, vol. 3, pp. 2546–2550, 2000.

[126] S. Hong, R. Gupta, and W. E. Stark, "Performance and complexity analysis of VLSI multi-carrier receivers for low-energy wireless communications," in *Proceedings of the IEEE Vehicular Technology Conference*, pp. 1–5, May 2000.

[127] T. Ji and W. Stark, "Rate compatible product codes," in *Proceedings of 2000 IEEE Milcom Conference*, pp. 412–416, 2000.

[128] P. Liang and W. E. Stark, "Energy and information efficiency of turbo-coded CDMA mobile packet radio networks," in *International Third Generation Wireless Communications Conference*, June 2000.

[129] P. Liang and W. E. Stark, "Algorithm for joint decoding of turbo-codes and m-ary orthogonal modulation," in *Proceedings of 2000 IEEE International Symposium on Information Theory*, p. 191, June 2000.

[130] C.-P. Liang and W. Stark, "Iterative multiuser detection for turbo-coded FHMA communications," *IEEE Wireless Communications and Networking Conference*, vol. 1, pp. 73 –78, 2000.

[131] C.-P. Liang and W. Stark, "Transmission range control and information efficiency for FH packet radio networks," in *Proceedings of 2000 IEEE Milcom Conference*, pp. 861–865, 2000.

[132] J. Choi, D. Yoo, and W. Stark, "Asymptotic performance of orthogonal signaling with coding and diversity in Rayleigh fading," *IEEE Global Telecommunications Conference*, vol. 2, pp. 917–921, 2000.

[133] D.-S. Yoo, A. Hafeez, and W. E. Stark, "Trellis-based multiuser detection for DS-CDMA systems with frequency-selective fading," *Proceedings of 1999 IEEE Wireless Communications and Networking Conference*, pp. 829–833, September 1999.

[134] J. D. Choi, K. M. Wasserman, and W. E. Stark, "Effect of channel memory on retransmission protocols for low energy wireless data communications," in *IEEE International Conference on Communications*, pp. 1552–1556, 1999.

[135] A. P. Worthen, S. Hong, R. Gupta, and W. E. Stark, "Performance optimization of VLSI transceivers for low-energy communications systems," in *Proceedings of MILCOM'99*, pp. 1434–1438, October 1999.

[136] C.-P. Liang and W. E. Stark, "Turbo codes in DS-SS with adaptive nonlinear suppression of impulsive interference," in *Proceedings of 1999 IEEE Milcom Conference*, pp. 408–412, October 1999.

[137] J.-H. Jong and W. E. Stark, "Power-controlled MC-CDMA in the presence of nonlinearities—Part II: Coded system performance," in *Proceedings of the 1999 IEEE Military Communications Conference*, pp. 172–176, 1999.

[138] J.-H. Jong and W. E. Stark, "Power-controlled MC-CDMA in the presence of nonlinearities on — Part I: System analysis," in *Proceedings of the IEEE Vehicular Technology Conference (VTC'99)*, pp. 238–242, September 1999.

[139] J.-H. Jong, K. Yang, W. E. Stark, and G. I. Haddad, "Performance of OFDM systems with adaptive nonlinear amplifiers," in *Proceedings of the 1999 IEEE Military Communications Conference*, pp. 1110–1114, October 1999.

[140] J.-H. Jong, K. Yang, W. E. Stark, and G. I. Haddad, "Power optimization of OFDM systems with with dc bias controlled nonlinear amplifiers," in *Proceedings of the IEEE Vehicular Technology Conference (VTC'99)*, pp. 268–272, September 1999.

[141] T. Ji and W. Stark, "Modified Viterbi algorithm for predictive TCQ," in *Proceedings of the 1999 Data Compression Conference*, p. 532, Snowbird, Utah, March 1999.

[142] T. Ji and W. Stark, "Concatenated punctured turbo Reed-Solomon codes in a hybrid FEC/ARQ DS/SSMA data network," in *Proceedings of the 1999 IEEE Vehicular Technology Conference*, pp. 1678–1682, Houston, Texas, May 1999.

[143] T. Ji and W. Stark, "Turbo-coded ARQ schemes for DS-CDMA data networks over fading and shadowing channels," in *Proceedings of the 1999 IEEE Military Communications Conference*, pp. 76–80, Atlantic City, New Jersey, October 1999.

[144] T. Ji and W. Stark, "Adaptive redundancy retransmission protocols for wireless networks," in *Proceedings of the 37th Allerton Conference on Communications, Control, and Computing*, Motecello, IL, September 1999.

[145] S. Hong, S. Kim, M. C. Papaefthymiou, and W. E. Stark, "Power-complexity analysis of pipeline VLSI FFT architecture for low energy wireless communication applications," in *MWSCAS-99*, August 1999.

[146] S. Hong and W. E. Stark, "Power consumption vs. decoding performance relationship of VLSI decoders for low energy communication system design," in *ICECS-99*, pp. 1593–1596, August 1999.

[147] S. Hong and W. E. Stark, "Performance driven coefficient optimization for high throughput energy efficient digital matched filter design," in *PACRIM-99*, pp. 321–324, August 1999.

[148] S. Hong and W. E. Stark, "Evaluating power-performance tradeoff of VLSI transceiver architecture for low-energy communication system design," in *PACRIM-99*, pp. 250–253, August 1999.

[149] S. Hong and W. E. Stark, "Power consumption vs. decoding performance tradeoffs of low complexity VLSI decoders," in *MILCOM-99*, October 1999.

[150] S. Hong, S. Kim, M. Papaefthymiou, and W. E. Stark, "Low power parallel multiplier design for DSP applications through coefficient optimization," in *ASIC/SOC-99*, September 1999.

[151] M. C. D. Goeckel and W. E. Stark, "Improved markov models for fading channels: Analysis and design," in *Proceedings of the 37th Annual Allerton Conference on Communication, Control, and Computing*, pp. 525–534, October 1999.

[152] M. J. Chu, D. L. Goeckel, and W. E. Stark, "On the design of Markov models for fading channels," in *Proceedings of the 1999 IEEE Fall Vehicular Technology Conference*, volume 4, pp. 2372–2376, October 1999.

[153] T. C. Nolan, W. E. Stark, and C. T.-C. Nguyen, "Direct down conversion of passband signals using MEMS filters and sub-sampling," in *Proceedings of the IEEE Vehicular Technology Conference*, pp. 1896–1899, May 1999.

[154] A. P. Worthen and W. E. Stark, "Low-density parity check codes for fading channels with memory," in *Proceedings of the 36th Annual Allerton Conference on Communications, Control, and Computing*, pp. 117–125, September 1998.

[155] J. Kang, W. Stark, and A. Hero, "Turbo codes for fading and burst channels," in *IEEE Global Communication Conference: Communication Theory Mini Conference*, pp. 40–45, November 1998.

[156] J. H. Kang and W. E. Stark, "Performance of turbo-coded FH-SS with partial-band interference and Rayleigh fading," in *Proceedings of the 1998 IEEE Military Communications Conference*, pp. 977–981, October 1998.

[157] T. C. Nolan and W. E. Stark, "A recursive method for calculating error probabilities for a Reed-Solomon codeword," in *IEEE Vehicular Technology Conference*, volume 2, pp. 1613–1617, May 1998.

[158] T. C. Nolan and W. E. Stark, "A recursive method for calculating error probabilities for a Reed-Solomon codeword with bounded distance errors and erasures decoding," in *Proceedings of the IEEE Military Communications Conference*, pp. 998–1002, November 1998.

[159] A. Hafeez and W. E. Stark, "Decision feedback sequence estimation," *Proceedings of the IEEE International Symposium on Information Theory*, p. 124, August 1998.

[160] A. Hafeez and W. E. Stark, "Decision feedback sequence estimation for unwhitened ISI and multiuser CDMA channels," in *IEEE Vehicular Technology Conference*, pp. 424–429, May 1998.

[161] M. J. Chu and W. E. Stark, "Asymptotic performance of a coded communication system with orthogonal signalling in partial-band interference," in *IEEE Military Communications Conference*, volume 3, pp. 1003–1007, October 1998.

[162] S. Hong, J. Yi, and W. E. Stark, "Low-complexity VLSI design and implementation of FFT based multi-carrier direct sequence spread spectrum transceiver," in *IEEE Workshops on Signal Processing Systems: Design and Implementation*, pp. 223–242, October 1998.

[163] S. Hong and W. E. Stark, "An efficient timing synchronization technique for FFT based multi-carrier direct-sequence spread-spectrum transceiver," in *IEEE Military Communications Conference*, pp. 713–717, October 1998.

[164] S. Hong and W. E. Stark, "Low power VLSI DS/FH hybrid spread spectrum IF/baseband transceiver design," in *IEEE Vehicular Technology Conference*, pp. 1573–1577, May 1998.

[165] S. Hong and W. E. Stark, "Low-complexity iterative block decoding algorithm for low-power wireless mobile communication applications," in *IEEE International Symposium on Wireless Communications*, p. 10, May 1998.

[166] S. W. Kim and W. E. Stark, "Performance limits of Reed-Solomon coded CDMA with orthogonal signalling in a Rayleigh faded channel," in *1998 Information Theory Workshop*, pp. 32–33, February 1998.

[167] J. H. Kang and W. E. Stark, "Performance of turbo-coded FH-SS with partial-band interference," in *1998 IEEE International Symposium on Information Theory*, p. 456, August 1998.

[168] J.-H. Jong and W. E. Stark, "Performance of nonlinearly amplified multicarrier spread spectrum systems in the presence of multipath fading," in *Proceedings of the IEEE Vehicular Technology Conference (VTC'98)*, pp. 2027–2031, 1998.

[169] J.-H. Jong and W. E. Stark, "Performance of nonlinearly amplified coded multicarrier spread spectrum systems in the presence of multipath fading," in *Proceedings of the IEEE Military Communications Conference (MILCOM'98)*, pp. 693–697, 1998.

[170] K. Ban, M. Katayama, T. Yamazato, and A. Ogawa, "Convolutionally coded DS/CDMA system using multi-antenna transmission," in *IEEE Global Telecommunications Conference*, pp. 92–96, 1997.

[171] M. J. Chu and W. E. Stark, "Effect of vehicular velocity on ITS communication using CDPD modems," in *Proceedings of the 1997 IEEE Intelligent Transportation Systems Conference*, pp. 566–571, November 1997.

[172] J. H. Kang and W. E. Stark, "Turbo codes for coherent FH-SS with partial band interference," in *Proceedings of the 1997 IEEE Military Communications Conference*, pp. 5–9, November 1997.

[173] J.-H. Jong and W. E. Stark, "Performance of coded multicarrier spread spectrum systems in the presence of nonlinearity," in *Proceedings of the 1997 IEEE Milcom Conference*, pp. 570–574, November 1997.

[174] T. C. Nolan and W. E. Stark, "Analysis of product codes for frequency-hopped spread-spectrum with partial band interference," in *Proceedings of the 1997 IEEE Milcom Conference*, pp. 603–607, November 1997.

[175] M. J. Chu and W. E. Stark, "The effect of mobile velocity on a communication system operating over multipath fading channels," in *Proceedings of 1997 IEEE Military Communications Conference*, volume 1, pp. 109–113, November 1997.

[176] D. L. Goeckel and W. E. Stark, "Optimal diversity allocation for multi-user systems operating over jammed multipath fading channels," in *Proceedings of the 1997 IEEE Milcom Conference*, pp. 847–851, Nov 1997.

[177] A. Hafeez and W. E. Stark, "Soft-output multiuser estimation for asynchronous CDMA channels," in *Proceedings of the 1997 IEEE Vehicular Technology Conference*, pp. 465–469, May 1997.

[178] W. E. Stark, V. W.-K. Cheng, and Y.-P. Wang, "Coded modulation for communication in a noisy channel with noncoherent demodulation," in *Proceedings of the 1997 IEEE Pacific Rim Conference*, pp. 620–623, August 1997.

[179] A. Hafeez and W. E. Stark, "A family of soft-output multiuser demodulators for coded asynchronous CDMA channels," in *Proceedings of the Interference Rejection and Signal Separation in Wireless Communication Conference*, March 1997.

[180] A. Hafeez and W. E. Stark, "Decision feedback sequence estimation for unwhitened ISI channels," in *Proceedings of the 35rd Annual Allerton Conference on Communication, Control and Computing*, pp. 493–502, September 1997.

[181] D. Goeckel and W. E. Stark, "A coded multicarrier framework for the optimization of coherent multiuser communication systems over fading channels," in *Proceedings of the 1997 IEEE Vehicular Technology Conference*, pp. 2075–2079, May 1997.

[182] V. W.-K. Cheng and W. E. Stark, "Adaptive coding and modulation for spread-spectrum signals," in *Proceedings of the 1997 IEEE Vehicular Technology Conference*, pp. 1987–1991, May 1997.

[183] A. A. Hassan, W. E. Stark, J. E. Hershey, and S. Chennakeshu, "Key distribution for mobile radio systems," in *Proceedings of the Japan-Canada International Workshop on Multimedia Wireless Communications and Computing*, September 1996.

[184] D. Goeckel and W. Stark, "Optimal diversity allocation in coherent multiuser systems," in *Proceedings of the 1996 Tactical Communications Conference*, pp. 459–467, April 1996.

[185] D. Goeckel and W. Stark, "Throughput optimization in multiple-access communication systems with decorrelator reception," in *1996 IEEE International Symposium on Information Theory and Its Applications*, pp. 653–656, September 1996.

[186] V. W. Cheng and W. E. Stark, "Performance of trellis coded direct-sequence spread-spectrum with noncoherent reception in a fading environment," in *Proceedings of the 1997 IEEE Personal, Indoor and Mobile Radio Communications Conference*, pp. 1125–1129, October 1996.

[187] A. Hafeez and W. E. Stark, "Combined decision-feedback multiuser detection/soft decision decoding for CDMA channels," in *IEEE Vehicular Technology Conference*, pp. 382–386, April 1996.

[188] M. A. Landolsi and W. E. Stark, "DS-CDMA chip waveform design for optimal power-bandwidth performance," in *Proceeding of the 1995 IEEE Personal Indoor Mobile Radio Communications Conference*, pp. 706–710, September 1995.

[189] D. L. Goeckel, I. Alfred O. Hero, and W. E. Stark, "Blind channel identification for direct-sequence spread-spectrum systems," in *IEEE Military Communications Conference*, pp. 368–372, 1995.

[190] D. L. Goeckel and W. E. Stark, "Throughput optimization in faded multicarrier systems," in *Proceedings of the 33rd Annual Allerton Conference on Communication, Control and Computing*, pp. 815–824, October 1995.

[191] Y.-P. Wang and W. E. Stark, "On the performance of a partial-response DS/SS systems in a specular multipath environment," in *1995 IEEE International Symposium on Information Theory*, p. 386, September 1995.

[192] V. W. Cheng and W. E. Stark, "Performance of trellis coded direct-sequence spread-spectrum with noncoherent reception in a fading environment," in *1995 IEEE International Symposium on Information Theory*, p. 215, September 1995.

[193] M. Asawa and W. E. Stark, "Throughput analysis of cellular digital packet data with applications to intelligent transportation systems," in *IEEE Vehicular Technology Conference*, pp. 564–568, July 1995.

[194] M. Asawa and W. E. Stark, "Optimal scheduling of soft handoffs in DS/CDMA communication systems," in *1995 IEEE INFOCOM*, pp. 105–112, April 1995.

[195] D. L. Goeckel and W. E. Stark, "Limits of coding and modulation in spread-spectrum systems," in *1995 Information Theory Workshop*, p. 50, April 1995.

[196] Y.-P. Wang and W. E. Stark, "On the performance of a DS/SS system in a band-limited multipath environment," in *International Phoenix Conference on Computers and Communications*, pp. 622–628, March 1995.

[197] M. Asawa and W. E. Stark, "A framework for optimal scheduling of handoffs in wireless networks," in *Proceedings of the 1994 IEEE Global Communications Conference*, pp. 1669–1673, December 1994.

[198] W. E. Stark and J. S. Lehnert, "Coding alternatives for spread-spectrum multiple-access communications," in *Thirty-Second Annual Allerton Conference on Communication, Control and Computing*, pp. 454–463, September 1994.

[199] D. L. Goeckel and W. E. Stark, "Performance of a direct-sequence spread-spectrum system with RAKE reception in a multipath fading environment," in *1994 International Symposium on Spread Spectrum Techniques & Applications*, pp. 465–469, July 1994.

[200] D. L. Goeckel and W. E. Stark, "Performance of coded direct-sequence systems in fading channels with rake reception," in *Proceedings of the 1994 IEEE Military Communications Conference*, pp. 791–795, October 1994.

[201] M. A. Klimesh and W. E. Stark, "Worst-case power-constrained noise for binary input channels with varying amplitude signals," in *Proceedings of the 1994 IEEE International Symposium on Information Theory*, p. 381, June 1994.

[202] W. E. Stark and A. A. Hassan, "Decoding algorithms with maximum error correction," in *Proceedings of the 1994 IEEE International Symposium on Information Theory*, p. 402, June 1994.

[203] G. Cherubini and W. E. Stark, "Capacity of coherent frequency-hopped spread-spectrum communications," in *Proceedings of the 1993 IEEE International Conference on Communications*, pp. 458–462, June 1993.

[204] W. E. Stark and A. Hassan, "Algorithms for parallel decoding," in *Proceedings of the 1993 IEEE International Symposium on Information Theory*, p. 111, January 1993.

[205] G. Cherubini and W. E. Stark, "Capacity of coherent frequency-hopped spread-spectrum communications," in *Proceedings of the 1993 IEEE International Symposium on Information Theory*, p. 253, January 1993.

[206] M. A. Landolsi and W. E. Stark, "Performance of DS/CDMA communications with continuous-phase signals," in *Proceedings of the 1993 IEEE Military Communications Conference*, pp. 748–752, October 1993.

[207] A. Hassan and W. E. Stark, "Parallel decoding for channels with jamming," in *IEEE Military Communications Conference*, pp. 594–598, October 1992.

[208] M. S. McKinley and W. E. Stark, "Exploiting error dependence in a slow frequency- hopped CDMA system," in *Proceedings of the Twenty-Ninth Annual Allerton Conference on Communication, Control, and Computing*, pp. 410–419, October 1991.

[209] B. Woerner and W. E. Stark, "Packet error probability of DS/SSMA communication with convolutional codes," in *Proceeding of the 1991 IEEE Military Communications Conference*, volume 1, pp. 127–131, November 1991.

[210] B. D. Woerner and W. E. Stark, "Interleaved trellis coded spread-spectrum for Rician fading channels," in *Proceedings of the 1991 Phoenix Conference of Computers and Communications*, pp. 434–440, March 1991.

[211] A. A. Hassan, M. Hegde, and W. E. Stark, "Decoding of concatenated codes over noncoherent channels," in *Proceeding of the 1990 International Symposium on Information Theory and Its Applications*, pp. 147–150, November 1990.

[212] A. Hassan, J. Hershey, and W. E. Stark, "Performance of a FHSS system in the presence of a follower partial-band jammer," in *Proceeding of the 1990 International Symposium on Information Theory and Its Applications*, pp. 787–788, November 1990.

[213] K. Cheun and W. E. Stark, "Performance of BFSK with noncoherent demodulation under tone interference with arbitrary offset," in *Proceeding of the 1990 International Symposium on Information Theory and Its Applications*, pp. 663–666, November 1990.

[214] B. D. Woerner and W. E. Stark, "Trellis coded spread-spectrum for fading channels," in *Proceedings of the 1990 IEEE Military Communications Conference*, pp. 389–393, October 1990.

[215] K. Cheun and W. E. Stark, "Performance of convolutional codes with Viterbi ratio thresholding in asynchronous FHSS-MA networks," in *Conference on Information Sciences and Systems*, pp. 86–91, March 1990.

[216] B. D. Woerner and W. E. Stark, "Performance of trellis-coded direct-sequence spread-spectrum communications," in *Proceedings of the 1990 Tactical Communications Conference*, pp. 137–153, April 1990.

[217] M. Hegde and W. E. Stark, "Interference capacity of spread-spectrum multiple-access systems," in *Proceedings of the 1989 Conference on Information Sciences and Systems*, pp. 40–45, March 1989.

[218] K. Cheun and W. E. Stark, "On the probability of error in asynchronous frequency-hop spread-spectrum multiple-access networks," in *Proceedings of the 1989 Conference on Information Sciences and Systems*, pp. 324–329, March 1989.

[219] W. E. Stark and B. D. Woerner, "The application of trellis coding techniques to direct-sequence spread-spectrum multiple-access communications," in *Twenty-sixth Annual Allerton Conference on Communication, Control, and Computing*, pp. 1070–1079, October 1988.

[220] M. V. Hegde and W. Stark, "Orthogonal signalling and diversity in partial-band interference," in *Proceedings of the 1988 Advances in Communications and Control Conference*, pp. 110–121, October 1988.

[221] A. A. Hassan and W. E. Stark, "Performance of a coded frequency-hop spread-spectrum communication system in Rayleigh fading," in *Proceedings of the 1988 IEEE Military Communications Conference*, October 1988.

[222] K. Cheun and W. E. Stark, "Performance of convolutional codes with diversity under worst case partial-band noise jamming," in *Proceedings of the 1988 IEEE International Conference on Communication*, pp. 1400–1404, June 1988.

[223] K. Cheun and W. E. Stark, "Asymptotic behavior of the self-normalized metric for noncoherent frequency-hop spread-spectrum systems under partial-band noise jamming," in *Proceedings of the 1988 Conference on Information Sciences and Systems*, pp. 1001–1006, March 1988.

[224] A. Hassan and W. E. Stark, "Soft decision decoding of concatenated codes," in *Proceedings of the Twenty-Fifth Annual Allerton Conference on Communication, Control, and Computing*, pp. 600–609, October 1987.

[225] M. Hegde, W. E. Stark, and D. Teneketzis, "Worst-case analysis of spread-spectrum systems with output quantization," in *Proceedings of the 25th Annual Allerton Conference on Communication Control and Computing*, pp. 564–573. University of Michigan, Sept 1987.

[226] B. G. Kim and W. E. Stark, "Multiple-access capability of Reed-Solomon coded frequency-hop spread-spectrum communications systems," in *Proceedings of the Twenty-Fourth Annual Allerton Conference on Communication, Control, and Computing*, pp. 530–539, October 1986.

[227] W. E. Stark, "Information and coding in spread-spectrum networks," in *Proceedings of the Tactical Communications Conference*, pp. 161–164, April 1986.

[228] W. E. Stark, D. Teneketzis, and S. K. Park, "Worst-case analysis of partial-band interference," in *Proceedings of the 1986 Conference on Information Sciences and Systems*, pp. 379–383, March 1986.

[229] K. Castor and W. E. Stark, "Parallel decoding of diversity/Reed-Solomon coded SSFH communications with repetition thresholding," in *Proceedings of the 1986 Conference on Information Sciences and Systems*, pp. 75–80, March 19-21 1986.

[230] K. Castor and W. E. Stark, "Performance of diversity/Reed-Solomon frequency-hopped communications with errors and erasures via ratio thresholding," in *Proceedings of the Twenty-Third Annual Allerton Conference on Communication, Control, and Computing*, pp. 869–877, October 1985.

[231] M. Hegde and W. E. Stark, "Multiple-access capability of frequency-hop spread-spectrum communication," in *Proceeding of the 1985 IEEE Military Communications Conference*, pp. 575–579, October 1985.

[232] N. Moayeri, D. L. Neuhoff, and W. E. Stark, "Fast vector quantizers," in *Proceedings of the Twenty-Second Annual Allerton Conference on Communication, Control, and Computing*, pp. 347–353, October 1985.

[233] W. E. Stark and J. H. Lee, "Two-dimensional block interference channels with applications to random-access memories," in *Proceedings of the Twenty-Second Annual Allerton Conference on Communication, Control, and Computing*, pp. 983–991, October 1984.

[234] M. B. Pursley and W. E. Stark, "Antijam capability of frequency-hop spread-spectrum with Reed-Solomon coding," in *Proceedings of the 1983 IEEE Military Communications Conference*, pp. 7–11, October 1983.

[235] W. E. Stark, "Coding for frequency-hopped spread-spectrum systems with bandwidth-limited interference," in *First Canadian Domestic and International Satellite Communications Conference Proceedings*, pp. 9.4.1–9.4.4, June 1983.

[236] R. J. McEliece and W. E. Stark, "The optimal code rate vs. a partial band jammer," in *Proceeding of the 1982 IEEE Military Communications Conference*, volume 1, pp. 8.5.1–4, October 1982.

[237] W. E. Stark, "Coding for coherent frequency-hopped spread-spectrum communications in the presence of jamming," in *Proceedings of the 1982 IEEE Military Communications Conference*, volume 1, pp. 14.2.1–5, October 1982.

[238] W. E. Stark, "Capacity and cutoff rate of frequency-hopped channels with slow Rayleigh fading," in *Twentieth Annual Allerton Conference on Communication, Control, and Computing*, pp. 697–701, October 1982.

[239] W. E. Stark, "Performance of concatenated codes on channels with jamming," in *IEEE International Conference on Communications*, pp. B7.4.1–B7.4.5, June 1982.

[240] W. E. Stark and R. J. McEliece, "Capacity and coding in the presence of fading and jamming," in *National Telecommunications Conference Record*, pp. B7.4.1–B7.4..5, November 1981.

[241] R. J. McEliece and W. E. Stark, "An information theoretic study of communication in the presence of jamming," in *Proceedings of the 1981 IEEE International Conference on Communication*, pp. 45.3.1–45.3.5, June 1981.

[242] W. E. Stark and D. V. Sarwate, "Kronecker sequences for spread-spectrum communications," in *Proceedings of the 1980 Conference on Informations Sciences and Systems*, pp. 320–325, March 1980.

[243] M. B. Pursley, D. V. Sarwate, and W. E. Stark, "On the average error probability for direct-sequence spread-spectrum multiple access systems bounds," in *Proceedings of the 1980 Conference on Informations Sciences and Systems*, pp. 326–329, March 26-28 1980.

[244] D. E. Borth, M. B. Pursley, D. V. Sarwate, and W. E. Stark, "Bounds on error probability for direct-sequence spread-spectrum multiple-access communication," in *MIDCOM Proceedings*, pp. 15.1–15.14, November 1979.

Abstracts

[245] B. D. Woerner and W. E. Stark, "Performance bounds for trellis coded direct sequence spread-spectrum multiple-access systems," in *Abstracts of Papers for the 1990 IEEE International Symposium on Information Theory*, p. 67, January 1990.

[246] W. E. Stark and J. H. Lee, "Channels with two-dimensional block interference and their applications to random-access memories," in *Abstracts of Papers for the 1985 IEEE International Symposium on Information Theory*, p. 30, June 23–28 1985.

[247] W. E. Stark, "Capacity and cutoff rate of nonselective Rician fading channels," in *Abstracts of Papers for the 1983 IEEE International Symposium on Information Theory*, p. 23, September 1983.

[248] R. J. McEliece and W. E. Stark, "Interference channels," in *Abstracts of Papers for the 1982 IEEE International Symposium on Information Theory*, pp. 78–79, June 21-25 1982.

[249] K. Cheun and W. E. Stark, "Channel capacity and cutoff rate for frequency-hopped noncoherent spread-spectrum channels with one-dimensional tone jamming," in *Abstracts of Papers of the 1988 IEEE International Symposium on Information Theory*, p. 24, June 1988.

[250] A. A. Hassan and W. E. Stark, "Parallel decoding of concatenated codes," in *Abstracts of Papers of the 1988 IEEE International Symposium on Information Theory*, p. 213, June 1988.

[251] M. Hegde and W. E. Stark, "The capacity region of frequency-hopped spread-spectrum communications," in *Abstracts of Papers for the 1986 IEEE International Symposium on Information Theory*, p. 143, 1986.

Reports

[252] W. E. Stark, "Coding for frequency-hopped spread-spectrum channels with partial-band interference," Technical Report R-945, University of Illinois, Coordinated Science Laboratory (also Ph.D. Thesis), July 1982.

[253] M. Hegde, W. E. Stark, and D. Teneketzis, "On the capacity of channels with unknown interference," Technical Report Communications and Signal Processing Laboratory Report 251, University of Michigan, August 1987.

[254] B. D. Woerner and W. Stark, "Trellis coded direct-sequence spread-spectrum communications," Technical Report Communication and Signal Processing Laboratory Report 271, University of Michigan, June 1990.