

Won Mee Jang
Associate Professor
Computer and Electronics Engineering
University of Nebraska- Lincoln

A. Professional Preparation

- D.Sc. in Electrical Engineering (CDMA Wireless Communications, Multiuser Detection), George Washington University, Washington, DC, (1996)
- M.S. in Computer Engineering (Computer Networks and Communications), George Mason University, Fairfax, VA, (1987)
- B.A. in Computer Science, University of Minnesota, Minneapolis, MN, (1984)

B. Appointments

- Associate Professor, University of Nebraska-Lincoln (Sep 2006-Present), Omaha, NE
- Assistant Professor, University of Nebraska-Lincoln (Mar 1998-Aug 2006), Omaha, NE
- Engineer, Comsearch (Jan 1995-Feb 1998), Wireless Engineering, Reston, VA
- Research Assistant, Research Institute of Science and Technology (RIST) (Jul 1988-Aug 1991), Information and Electronics, Pohang, Korea

C. Awards

- UNO Alumni Outstanding Teaching Award (2009)
- Faculty research and creative activity award (2007) University of Nebraska-Lincoln, College of Engineering
- Faculty fellow award (2002) University of Nebraska-Lincoln, College of Engineering and Technology

E. Publications - (a) Journal Publication

[37] W. M. Jang, "Diversity order and coding gain of general-order rectangular QAM in MIMO relay with TAS/MRC in Nakagami-m fading, IEEE Transactions on Vehicular Technology, vol. 63, no. 7, pp. 3157-3166, Sep. 2014.

[36] W. S. Chang and W. M. Jang, "Spectrum occupancy of cognitive radio networks: a queueing analysis using retrial queue," IET Networks, vol. 3, no. 3, pp. 218-227, 2014.

[35] W. M. Jang, "Blind cyclostationary spectrum sensing in cognitive radios," IEEE Communications Letter, vol. 18, no. 3, pp. 393-396, Mar. 2014.

[34] W. M. Jang and W. S. Chang, "Spectral occupancy rate of cognitive radio networks in queueing with adaptive modulation and coding over multiple-input and multiple-output transmit antenna selection/maximal ratio combining in Nakagami-m fading," IET Networks, vol. 3, no. 2, pp. 160-167, 2014.

- [33] P. Duraisamy, W. M. Jang and L. Nguyen, "Multipath error mitigation using self-encoded spread spectrum for binary-offset-carrier signals," *IET Communications*, vol. 8, no. 7, pp. 1048-1055, 2014.
- [32] W. M. Jang, "A simple performance approximation of general-order rectangular QAM with MRC in Nakagami-m fading channels," *IEEE Transactions on Vehicular Technology*, vol. 62, no. 7, pp. 3457-3463, Sep. 2013.
- [31] P. Duraisamy, W. J. Jang and L. Nguyen, "Multipath error mitigation using self-encoded spread spectrum for navigation," *IET Radar, Sonar and Navigation*, vol. 7, no. 4, pp. 433-442, 2013.
- [30] W. M. Jang and L. Chi, "Self-encoded multi-carrier spread spectrum with iterative despreading for random residual frequency offset," *J. of Communications and Networks*, vol. 15, no. 3, pp. 258-265, Jun. 2013.
- [29] W. M. Jang, "Dynamic integration using sampling in fading channels," *IEEE Transactions on Communications*, vol. 60, no. 10, pp. 2768-2775, Oct. 2012.
- [28] L. Chi, W. M. Jang and L. Nguyen, "Distributed and centralized iterative detection of self-encoded spread spectrum in multi-channel communication," *J. Communications and Networks*, vol. 14, no. 3, pp. 280-285, vol. 14, no. 3, Jun. 2012.
- [27] W. M. Jang, "Timing accuracy of self-encoded spread spectrum navigation with communications," *IET Radar, Sonar and Navigation*, vol. 5, no. 1, pp. 1-6, 2011.
- [26] W. M. Jang, "A simple upper bound of the Gaussian Q-function with closed-form error bound," *IEEE Communications Letters*, vo. 15, no.2, pp. 157-159, Feb. 2011.
- [25] W. M. Jang, "Quantifying performance in fading channels using the sampling property of delta function," *IEEE Communications Letters*, vo. 15, no. 3, pp. 266-268, Mar. 2011.
- [24] W. M. Jang, "Quantifying performance of cooperative diversity using the sampling property of a delta function," *IEEE Transactions on Wireless Communications*, vol. 10, no.7, pp. 2034-2039, Jul. 2011.
- [23] W. M. Jang, "Corrections to 'A simple upper bound of the Gaussian Q-function with closed-form error bound'," *IEEE Communications Letters*, vol. 15, no. 12, pp. 1274, Dec. 2011.
- [22] W. M. Jang, "Timing accuracy of self-encoded spread spectrum navigation with communication," *IET Radar, Sonar and Navigation*, vol. 5, no. 1, pp. 1-6, 2011.
- [21] L. Chi, W. M. Jang and L. Nguyen, "Chip interleaved multirate and multimedia transmission in self-encoded communication system with iterative detection over fading channels," *International Journal of Communications, Networks and System Science*, vol. 4, no. 10, pp. 630-637, Oct. 2011.

- [20] S. Ma, L. Nguyen, Y. Yang and W. M. Jang, "Performance analysis of MIMO-SESS with Alamouti scheme over Rayleigh fading channels", *EURASIP Journal on Wireless Communications and Networking*, vol. 2011, article no: 145, Oct. 2011.
- [19] S. Ma, L. Nguyen, W. M. Jang, Y. Yang, "MIMO self-encoded spread spectrum system with iterative detection over Rayleigh fading channels," *Hindawi Journal of Electrical and Computer Engineering*, vol. 2010, Article ID 492079, 2010.
- [18] K. Hua, L. Nguyen and W. M. Jang, "Synchronisation of self-encoded spread spectrum system," *Electronics Letter*, vol. 44, no. 12, pp. 749-751, Jun. 2008.
- [17] W. M. Jang, L. Nguyen and P. Bidarkar, "MAI and ICI of Synchronous Downlink MC-CDMA with Frequency Offset," *IEEE Transactions on Wireless Communications*, vol. 5, no. 3, pp. 693-703, March 2006.
- [16] Y. S. Kim, W. M. Jang and L. Nguyen, "Self-encoded TH-PPM UWB system with iterative detection," *IEICE Transactions on Communications*, vol. E90-B, no. 1, pp. 63-68, Jan. 2007.
- [15] Y. S. Kim, W. M. Jang, Y. Kong and L. Nguyen, "Chip-interleaved self-encoded multiple access with iterative detection in fading channels," *Journal of Communications and Networks*, vol. 9, no. 1, pp. 50-55, Mar. 2007.
- [14] W. M. Jang and M. W. Lee, "Performance analysis of synchronous downlink MC-CDMA with precoding and frequency offset," *Journal of Communications and Networks*, vol. 9, no. 2, pp. 192-197, Jun. 2007.
- [13] W. M. Jang, L. Nguyen and M. W. Lee, "MAI and ICI of asynchronous uplink MC-CDMA with frequency offset," *IEEE Transactions on Vehicular Technology*, vol. 57, no. 4, pp. 2164-2179, Jul. 2008.
- [12] W. M. Jang and W. Wu, "Distributed and centralized multiuser detection with antenna arrays," *IEEE Transactions on Wireless Communications*, vol. 4, no. 3, pp. 855-860, May 2005.
- [11] W. M. Jang, L. Nguyen and P. Bidarkar, "Multiple access and inter-carrier Interference in OFDM-CDMA with random sequences," *Journal of Communications and Networks*, vol. 7, no. 1, pp. 21-28, Mar. 2005.
- [10] W. M. Jang and W. Wu, "Distributed versus centralized multiuser detection with antenna arrays in frequency selective multipath channels," *IEEE Transactions on Vehicular Technology*, vol. 54, no. 1, pp. 100-109, Jan. 2005.
- [9] W. M. Jang, "A Geometrical analysis of OFDM-CDMA with frequency offset," *IEICE Transactions on Communications*, vol. E87-B, no. 10, pp. 3021-3031, Oct. 2004.
- [8] W. M. Jang, L. Nguyen and M. Hempel, "Precoded random spreading multiple access in AWGN channels," *IEEE Transactions on Wireless Communications*, vol. 3, no. 5, pp. 1477-1480, Sept. 2004.

- [7] W. M. Jang, L. Nguyen and M. Hempel, "Self-encoded spread spectrum and Turbo coding," *Journal of Communications and Networks*, vol. 6, no. 1, pp. 9-18, Mar, 2004.
- [6] W. M. Jang, B.Vojcic and R. Pickholtz. "Joint Transmitter/Receiver Optimization in Synchronous Multiuser Communications over Multipath Channels," *IEEE Transactions on Communications*, vol. 46, no. 2, pp. 269-278, February 1998.
- [5] B. Vojcic and W. M. Jang, "Transmitter Precoding in Synchronous Multiuser Communications," *IEEE Transactions on Communications*, vol. 46, no.10, pp. 1346-1355, October 1998.
- [4] N. Bourbakis, W. Jang, "An Efficient Symmetric Thinning Algorithm and its Hardware Implementation," *Microprocessing and Microprogramming*, vol. 23, no.1-5, pp. 115-21, March 1988.
- [3] Kun Hua, Won Mee Jang and Lim Nguyen, "Cooperative self encoded spread spectrum in fading channels," *International Journal of Communications, Network and System Science*, vol. 2, no, 2, pp. 91-96, May 2009.
- [2] Jong Hak Jung, Won Mee Jang and Lim Nguyen, "Self-encoded multiple access multiuser convolutional codes in uplink and downlink cellular systems," *International Journal of Communications, Network and System Science*, vol. 2, no. 4, pp. 249-257, July 2009.
- [1] Won Mee Jang and Jong Hak Jung, "Performance of Block Space-Time Code in Wireless Channel Dynamics," *International Journal of Communications, Networks and System Science*, vol. 2, no. 6, pp. 461-468, Sept. 2009.

E. Publications - (b) Conference Presentation

- [37] W. M. Jang and W. S. Chang, "Queueing with transmission rate selection for cognitive radio networks in Nakagami-m fading", *International Conference on Computing, networking and communications*, ICNC 2013, pp. 247-251, Jan. 2013.
- [36] L. Chi, P. Duraisamy, W. M. Jang and L. Nguyen, "Power controlled multirate multimedia transmission in self-encoded spread spectrum over dynamic fading channels," *45h Annual Conference on Information Science and Systems*, CISS2011, Baltimore, MD, March 23-25, 2011.
- [35] P. Duraisamy, L. Chi, W. M. Jang and L. Nguyen, "Power controlled coded-sequence self-encoded spread spectrum communications," *45h Annual Conference on Information Science and Systems*, CISS2011, Baltimore, MD, March 23-25, 2011.
- [34] L. Chi, W. M. Jang and L. Nguyen, "Self-encoded spread spectrum for multirate multimedia communication in multipath channel," *The 7th International Conference on Digital Content, Multimedia Technology and its Applications*, IDCTA2011, pp. 60-63, Busan Korea, 16-18 Aug. 2011.

- [33] S. Ma, L. Nguyen, W. M. Jang, Y. Yang, "Multiple-input multiple-output self-encoded spread spectrum system with iterative detection," in Proc. IEEE International Conference on Communication, ICC'10, Cape Town, South Africa, May 2010.
- [32] L. Chi, Y. H. Jung, W. M. Jang and L. Nguyen, "Self-encoded spread spectrum with iterative detection in multi-rate multimedia communication systems," 6th International Conference on Digital Content, Multimedia Technology and its application, IDC2010, Seoul, Korea, 15-18 August, 2010.
- [31] Won Mee Jang and Lim Nguyen, "Pre-filtering of self-encoded spread spectrum in dense multipath channels," 3rd International Conference on Signal Processing Communication Systems, 2009, ICSPCS 2009, pp. 1-5, Omaha, NE, 28-30 Sept. 2009.
- [30] K. Hua, W. M. Jang and L. Nguyen, "Convolutional coding in cooperative relay systems with spread spectrum, 4th International Conference on Networked Computing and Advanced Management, NCM 2008, pp. 239-243, Gyeongju, Korea, 2-4 Sep. 2008.
- [29] K. Hua, L. Nguyen, W. M. Jang, "Self-encoded spread spectrum synchronization with genetic Algorithm and markov chain analysis, 42nd Conference on Information Science and Systems, CISS08, Princeton, New Jersey, Mar. 2008.
- [28] Won Mee Jang and Lim Nguyen, "Capacity Analysis of Two-user Self- Encoded Multiple Access System in AWGN Channels," 34th Annual Conference on Information Sciences and Systems, Dept. of Electrical Engineering, Princeton University, Princeton, NJ, Mar. 15-17, 2000.
- [27] W. Jang and L. Nguyen, "Capacity Analysis of m-user Self-encoded Multiple Access System in AWGN channels," IEEE Sixth International Symposium on Spread Spectrum Techniques & Applications, Parsippany, New Jersey, Sept. 2000.
- [26] Won Mee Jang and Lim Nguyen, "Self-Encoded Multiple Access System in Flat Fading Channels", 35th Annual Conference on Information Sciences and Systems, The Johns Hopkins University, Baltimore, Maryland, Mar. 21-23, 2001.
- [25] Michael Hempel, Won Mee Jang and Lim Nguyen, " Self- Encoding Multiple Access with Turbo Coding", The 6th CDMA International Conference (CIC 2001), Seoul, Korea, Oct. 30-Nov 2, 2001.
- [24] Michael Hempel, Won Mee Jang and Lim Nguyen, "Self-Encoding Multiple Accss with Turbo-Coding of Transmitter-based Precoding", The 36th Annual Conference on Information Sciences and Systems, Princeton University, Princeton, NU. Mar 20-22, 2002.
- [23] Jong-Hak Jung, Won Mee Jang and Lim Nguyen, "Implementation of Self-encoded Spread Spectrum Multiple Access with Convolutional Coding", of the IASTED International Conference, Wireless and Optical Communications (WOC 2002), Banff, Alberta, Canada, July 17-19, 2002. Chaired the session of Fading channels II.

[22] Won Mee Jang, Lim Nguyen and Michel Hempel, "Performance Analysis of All- optical CDMA with Bipolar Codes," The 7th CDMA International Conference (CIC02), Seoul, Korea, Oct. 2002.

[21] Weixin Wu, Won Mee Jang, "The performance of CDMA system with Antenna Arrays and Various Detection," The 7th CDMA International Conference (CIC02), Seoul, Korea, Oct. 2002.

[20] W. M. Jang, Wireless Track Panel Discussion (8:00am to 12:00): Wireless Technology: Where's it at and where's it headed?, Presentation topic: "3G CDMA and Qualcomm CDMA," 30th annual conference and exhibition, Infotec 2003. www.infotech.org, Omaha, NE, April 7, 2003.

[19] W. M. Jang, Presentation topic (9:15am to 10:30 am): "Wireless and Bluetooth Technology," 30th annual conference and exhibition, Infotec 2003. www.infotech.org, Omaha, NE, April 8, 2003.

[18] Won Mee Jang and Lim Nguyen, "Comparison of multiple access interferences in synchronous and asynchronous binary direct sequence spread spectrum with random sequences," International Conference on Computer, Communication and Control Technologies (CCCT '03), Orlando, FL, July31-August 2, 2003. Chaired the session of Mobile and wireless technologies I.

[17] P. Bidarkar, W. M. Jang and L. Nguyen, "Self-encoded multiple access with OFDM," accepted to The 7th CDMA International Conference on Cellular and Intelligent Communications (CIC03), Seoul, Korea, Oct. 2003.

[16] Y. Kong, L. Nguyen and W. M. Jang, "Self-encoded spread spectrum modulation with differential encoding, Proc. of the 7th IEEE International Symposium on Spread Spectrum Techniques and Applications (ISSST 02), Prague, Czech Republic, Sep 2002.

[15] W. M. Jang, B. Vojcic and R. Pickholtz, "Joint Transmitter/Receiver Optimization in Synchronous Multiuser Communications over Multipath Channels," IEEE Military Communications Conference, Milcom 96, Virginia, October 1996.

[14] W. M. Jang, and B. Vojcic, "Transmitter Precoding in Synchronous Multiuser Communications over Multipath Channels," Wireless 96, Calgary Alberta, Canada, July 1996.

[13] W. M. Jang, and B. Vojcic, "Transmitter Precoding in Synchronous Multiuser Communications over Multipath Channels," Symposium on Interference Rejection and Signal Separation in Wireless Communications, IRSS 96, Newark NJ, March 1996.

[12] Y. Kong, L. Nguyen and W. Jang, "On the BER of Self-Encoded Spread Spectrum Communication System", Proceedings of the IASTED International Conference, Wireless and Optical Communications, Banff, Alberta, Canada, June 27-29, 2001.

- [11] Y. Kong, L. Nguyen and W. M. Jang, "Self-encoded Spread Spectrum for Multiple Access Communications," 5th World Multi-Conference on Systemics, Cybernetics and Informatics, Aug. 2001.
- [10] Jong-Hak Jung, Won Mee Jang, and Lim Nguyen, "Convolutional codes with shift generator matrices in synchronous and asynchronous self-encoded spread spectrum multiple access," Conference on Information Sciences and Systems (CISS03), Baltimore MD, Mar. 12-14. 2003.
- [9] Weixin Wu, Won Mee Jang and Lim Nguyen, "The performance of OFDM-CDMA with various detections and spreading sequences", Conference on Information Sciences and Systems (CISS03), Baltimore MD, Mar. 12-14, 2003.
- [8] Won Mee Jang, "Pulse design in UWB communications using Nyquist criterion," The 8th International Conference on Advanced Communication Technology, ICACT2006, pp. 559-564, Phoenix Park, Korea. Feb. 20-22, 2006.
- [7] Won. Mee. Jang and Moon Woo Lee, "Asynchronous uplink MC-CDMA with multiuser detection and frequency offset," The 8th International Conference on Advanced Communication Technology, ICACT2006, pp. 1775-1780, Phoenix Park, Korea, Feb. 20-22, 2006.
- [6] Youn Seok Kim, Won Mee Jang and Lim Nguyen, "Self-encoded TH-PPM UWB system with iterative detection," The 8th International Conference on Advanced Communication Technology, ICACT2006, pp. 710-714, Phoenix Park, Korea. Feb. 20-22, 2006.
- [5] Messan Senouvo and Won Mee Jang, "Performance analysis of UWB communication systems using pulse with Nyquist Criterion," 40th Annual Conference on Information Sciences and Systems, CISS06, pp. 905-908, Princeton University, NJ, Mar. 22-24, 2006.
- [4] Won Mee Jang and Messan Senouvo, "Performance of MMSE pulse in UWB communications," 40th Annual Conference on Information Sciences and Systems, CISS06, pp. 909-913, Princeton University, NJ, Mar. 22-24, 2006.
- [3] Kun Hua, Lim Nguyen and Won Mee Jang, "Performance of coded frequency hopped OFDM systems in frequency selective channels," 8th International Conference on Signal Processing, ICSP'06, vol. 3, pp. 2290-2293, Guilin, China, Nov. 16-20, 2006.
- [2] Kun Hua, Lim Nguyen and Won Mee Jang, "Synchronization of self-encoded spread spectrum system with genetic algorithm and Markov chain analysis," 42nd Annual Conference on Information Sciences and Systems, CISS2008, pp. 324-329, Princeton, NJ, Mar. 18-20, 2008.
- [1] Kun Hua, Won Mee Jang and Lim Nguyen, "Convolutional coding in cooperative Relay systems with spread Spectrum," 4th International Conference on Networked Computing and Advanced Information Management, NCM2008, vol. 1, pp. 239-243, Gyeongju, Korea, Sept. 2-4, 2008.

F. Funded Grant Proposals

- DoD/AFOSR (Air Force Office of Scientific Research), Self-encoded spread spectrum modulation for robust anti-jamming communication, 06/01/2008-12/31/2011, amount granted: \$379,767 (co-PI)
- NSF/CCR, Code Modulated Self-Encoded Multiple Access Communications 06/01/2001-05/31/05, amount granted: \$85,383 (co-PI)
- EPSCoR/NSF Type II, Channel Coded Joint Transmitter/Receiver Optimization in Synchronous Multiluser Communications 05/15/01-12/31/003, amount granted: \$40,000 (PI)
- PKI-UNL-UNO Collaborative Research Grants
Co-PI
Title: Interdisciplinary Research on Ubiquitous Ultra-wideband (UWB) Sensor Networks for Emergency Response
Period: 05/01/05-05/01/06
Amount granted: \$10,000