

LEONARD JOSEPH CIMINI, JR.

PROFESSIONAL EMPLOYMENT

2002-Present UNIVERSITY OF DELAWARE, NEWARK, DE (Professor)

- Teach undergraduate courses in linear systems, probability, and communications
- Teach graduate courses in digital and wireless communications
- Eta Kappa Nu faculty advisor
- Supervised 20 graduate students (8 received MS, 10 received PhD), 3 post-docs, and 6 visiting scholars
- Research topics: multiuser MIMO networks, cooperative networking

1996-2002 AT&T LABORATORIES - RESEARCH, MIDDLETOWN, NJ. (Technology Consultant)

- Studied the effect of channel mismatch on adaptive modulation for OFDM for wireless applications.
- Invented and analyzed techniques for robust channel estimation and peak power reduction in OFDM.
- Invented and analyzed solutions to both the physical layer and MAC layer challenges for providing high-bit-rate packet data to wide-area cellular users, using OFDM.

1985-1996 AT&T BELL LABORATORIES, HOLMDEL, NJ. (Member of Technical Staff)

- Invented, analyzed, designed and built a 20-Mbps packet-based wireless modem using clustered OFDM and another using a DFE with fast signal recovery techniques.
- Invented a technique for fast frequency synthesis using a remodulator carrier recovery technique.
- Proposed and analyzed the use of multicarrier techniques to overcome the limitations to high-bit-rate wireless transmission caused by multipath.
- Invented and analyzed new algorithms for dynamic channel selection in wireless communication systems.
- Proposed, analyzed, and demonstrated a TDMA-based technique for indoor wireless communications using slow cyclical frequency hopping and Reed-Solomon coding.
- Derived the fundamental limitations of Erbium-doped fiber amplifiers for cable TV distribution.
- Invented, analyzed, and demonstrated the use of a Fabry-Perot filter as a fiber-dispersion equalizer in high-bit-rate, long-haul, lightwave systems.
- Proposed and demonstrated an optical frequency synthesizer.
- Invented, analyzed, and demonstrated polarization switching as a means of achieving polarization-insensitive single-photodiode coherent detection.

1982-1985 AT&T BELL LABORATORIES, WEST LONG BRANCH, NJ. (Member of Technical Staff)

- Proposed and analyzed new speech privacy techniques for cellular mobile radio systems.
- Designed and demonstrated 10- and 18-GHz hardware for a personal communication system.
- Proposed and analyzed the use of OFDM in mobile radio systems. This was the first application of OFDM to wireless systems and has been the basis for much of the current widespread work in this area.

1976-1978 IN-COLLEGE EMPLOYMENT

- RCA, MISSILE AND SURFACE RADAR DIVISION, MOORESTOWN, NJ. Designed hardware and software for testing of a phased array radar system. Also worked on several radar detection problems.
- UNIVERSITY OF PENNSYLVANIA, PHILADELPHIA, PA. Investigated the feasibility of using frequency diversity as a means of enhancing images in microwave holography.

TEACHING AND CONSULTING EXPERIENCE

1996-Present Gave numerous tutorials at IEEE conferences and workshops on High-Speed Wireless Data and OFDM for Wireless Communications.

1994-2001 UNIVERSITY OF PENNSYLVANIA, PHILADELPHIA, PA.

Adjunct Professor in Dept. of Electrical Engineering. Taught course in wireless systems.

1983-1988 MONMOUTH COLLEGE, WEST LONG BRANCH, N.J.

Adjunct Professor in the Dept. of Elec. Eng. Taught several graduate and undergraduate courses.

2002-2003 MITSUBISHI ELECTRIC RESEARCH LABS, MURRAY HILL, NJ. Consultant.

2004-Present Patent litigation - consultant and expert witness.

PROFESSIONAL AND SERVICE ACTIVITIES

- IEEE, Member (1977-1988), Senior Member (1989-1999), Fellow (2000-Present)
- Director of Journals, IEEE Comm. Society (2014-2015)
- Vice President-Technical Activities, IEEE Comm. Society (2012-2013)
- Vice President-Publications, IEEE Comm. Society (2010-2011)
- Director of On-Line Content, IEEE Comm. Society, (2008-2009)
- Board of Governors, At-Large Member, IEEE Comm. Society (1999-2001, 2005-2007, 2016-2018))
- Chair, Emerging Technologies Committee, IEEE Comm. Society (2004-2007)
- Member, Strategic Planning Committee, IEEE Comm. Society (2004-2007)
- Member, Fellow Evaluation Committee, IEEE Vehicular Technology Society (2004-2016)
- Member, Fellow Evaluation Committee, IEEE Comm. Society (2008-2010)
- Member, Awards Committee, IEEE Comm. Society (2004-2007, 2018)
- Member, Nominations and Elections Committee, IEEE Comm. Society (2003-2007, 2017-Present)
- Member/Chair, *IEEE Transactions on Wireless Communications* Steering Committee (2001-2009)
- Comm. Theory Committee, IEEE Comm. Society: Sec. (1987-1989), Vice Chair (1989-1992, 2001-2004)
- *IEEE Trans. on Comm.*, Ed. for Mobile Comm. (1989-1991), Area Ed. for Wireless Comm. (1991-1998)
- Founding Editor-in-Chief of the *IEEE-JSAC: Wireless Communications Series* (1998-2000)
- *IEEE JSAC*, Guest Ed., April/May 1996, on Wireless Local Comm.; Senior Ed., *IEEE JSAC* (2000-2009)
- Comm. Theory Symposium Co-Chair, *Globecom 2004*
- Technical Program Chair, *1999 Comm. Theory Workshop*
- Technical Program Committee for more than 30 international conferences from 1994 until the present
- Session Organizer and Chairman for many conferences as well as a reviewer for many archival journals
- Gave numerous invited university seminars, including NJIT, Polytechnic Institute, Princeton University, University of Pennsylvania, University of Alberta, and the Royal Institute Technology in Sweden

EDUCATION

- 1980-1982 UNIVERSITY OF PENNSYLVANIA (Ph.D. Electrical Eng. in May 1982, GPA 4.0/4.0)
Dissertation: "Some Results in Quantization for Filtering and Detection" (Advisor: S. A. Kassam)
- Fall 1979 MASSACHUSETTS INSTITUTE OF TECHNOLOGY
Research involved the analysis of free-space optical systems. GPA 5.0/5.0.
- 1978-1979 UNIVERSITY OF PENNSYLVANIA (M. S. Electrical Eng. in August 1979, GPA 4.0/4.0)
Thesis: "Minimax Estimation Filters" (Advisor: S. A. Kassam)
- 1974-1978 UNIVERSITY OF PENNSYLVANIA (B. S. Electrical Eng. in May 1978, GPA 3.9/4.0)

HONORS AND AWARDS

- Distinguished Lectured, IEEE Vehicular Technology Society (2012-2017)
- 2013 Highly Cited Author. <http://highlycited.com/institution/university-of-delaware.html>
- 2010 Service Award from the Communication Theory Committee of the IEEE Communications Society.
- 2010 Donald W. McLellan Meritorious Service Award from the IEEE Communications Society
- 2010 Recognition Award from the Wireless Communications Committee of the IEEE Comm. Society.
- 2010 Innovator's Award from the New Jersey Inventors Hall of Fame for innovative research related to high-speed wireless communications.
- 2010 Stephen O. Rice Prize from the IEEE Comm. Society for the best paper in the *IEEE Trans. on Commun.*
- 2007 James Evans Avante-Garde Award from the IEEE Vehicular Technology Society.
- July 1985 paper in *IEEE Trans. on Comm.*, "Analysis and Simulation of a Digital Mobile Channel Using Orthogonal Frequency Division Multiplexing," named one of the 50 most influential papers in the history of the IEEE Comm. Society.
- Elected IEEE Fellow for contributions to the theory and practice of high-speed wireless communications
- Best Paper Awards at *WCNC 2007*, *Chinacomm 2008*, and *ICC 2012*.
- National Science Foundation Fellowship (1978-1981); MIT Vinton Hayes Fellowship in Communications; University of Pennsylvania Graduate Fellowship; IEEE Fortescue Fellowship.

- Mayor's Scholar (1974-1978); RCA Scholar (1975-1978); Benjamin Franklin Scholar (1974-1978).
- Dean's List (1974-1978); Graduated (1978) with summa cum laude honors and awarded A. Atwater Kent Prize in Electrical Engineering.
- Member of Tau Beta Pi (Vice-President 1977-1978); Member of Eta Kappa Nu (Secretary 1977-1978)

COMMUNITY ACTIVITIES AND MENTORING

- Received AT&T Research Affirmative Action Award for 1995
- Tutored minority students at a local middle school as part of affirmative action program at AT&T
- Supervised and mentored many students as part of the Summer Research Program at AT&T

PUBLICATION LIST - Leonard J. Cimini, Jr.

JOURNAL ARTICLES

1. Liu, Li, Shen, and Cimini, "Extending Proportional Fair Scheduling to Buffer-aided Relay Access Networks," *IEEE Trans. on Veh. Technol.*, accepted 2018, DOI: 10.1109/TVT.2018.2879757.
2. Li, Li, Cimini, and Zhang, "Hypothesis Testing Based Fast-Converged Blind Estimation of Transmit-Antenna Number for MIMO Systems," *IEEE Trans. on Veh. Tech.*, June 2018, pp. 5084-5095.
3. Li, Seymour, Cimini, and Shen, "Coexistence of Wi-Fi and LAA Networks With Adaptive Energy Detection," Nov. 2017, pp. 10384-10393.
4. Li, Li, Cimini, and Zhang, "Blind Estimation of Transmit-Antenna Number for Non-Cooperative Multiple-input Multiple-output Orthogonal Frequency Division Multiplexing Systems," *IET Communications*, Nov. 2017, pp. 2637-2642.
5. Li, Li, Chen, Cimini, and Zhang, "Estimation of MIMO Transmit-Antenna Number Using Higher-Order Moments Based Hypothesis Testing," *IEEE Wireless Commun. Letts.*, 2017.
6. Li, Cimini, Ge, Zhang, and Feng, "Optimal and Suboptimal Joint Relay and Antenna Selection for Two-Way Amplify-and-Forward Relaying," *IEEE Trans. on Wireless Commun.*, Feb. 2016, pp. 980-993.
7. Ye, Lim, Cimini, and Tan, "Energy-Efficient Scheduling and Resource Allocation in Uplink OFDMA Systems," *IEEE Commun. Letts.*, March 2015, pp. 439-442.
8. Feng, Xiao, and Cimini, "Net Throughput of Centralized and Decentralized Cooperative Networks with Relay Selection," *IEEE Wireless Commun. Letts.*, Oct. 2014, pp. 477-480.
9. Liu, Tan, Hu, Cimini, and Li, "Channel Estimation for OFDM," *IEEE Commun. Surveys and Tutorials*, Fourth Quarter 2014, pp. 1891-1908.
10. Wang, Greenstein, Cimini, Chan, and Hedayat, "Multi-User and Single-User Throughputs for Downlink MIMO Channels with Outdated Channel State Information," *IEEE Wireless Commun. Letts.*, June 2014, pp. 321-324.
11. Lim, Xiong, Cimini, and Li, "Energy-Efficient Resource Allocation for OFDMA-Based Multi-RAT Networks," *IEEE Trans. on Wireless Commun.*, May 2014, pp. 2696-2705.
12. Wang, Feng, Cimini, Greenstein, Chan and Hedayat, "Comparison of Quantization Techniques for Downlink Multi-User MIMO Channels with Limited Feedback," *IEEE Wireless Commun. Letts.*, April 2014, pp. 165-168.
13. Feng, Wang, Dai, and Cimini, "To Cooperate or Not to Cooperate: An Outage Analysis of Interference-limited Wireless Networks," *IEEE Trans. on Wireless Commun.*, Feb. 2014, pp. 822-833.
14. Jiang and Cimini, "Energy-Efficient Transmission for MIMO Interference Channels," *IEEE Trans. on Wireless Commun.*, June 2013, pp. 2988-2999.
15. Xiao and Cimini, "Impact of Overhead on Spectral Efficiency of Cooperative Relaying," *IEEE Trans. on Wireless Commun.*, May 2013, pp. 2228-2239.
16. Lim, Wilson, Cimini, and Taylor, "On Higher Order Modulations for OFDM in Frequency-Selective Fading Channels," *IEEE Commun. Letts.*, April 2013, pp. 641-644.
17. Lim and Cimini, "Energy-Efficient Cooperative Beamforming in Clustered Wireless Networks," *IEEE Trans. on Wireless Commun.*, March 2013, pp. 1376-1385.
18. Jiang, Cimini, and Himayat, "MIMO Precoding and Mode Adaptation in Femtocellular Systems," *EURASIP Journal on Wireless Commun. and Networking*, Jan. 2013.
19. Feng, Jiang, Lim, Cimini, Feng, and Li, "A Survey of Energy-Efficient Wireless Communications," *IEEE Commun. Surveys and Tutorials*, Jan. 2013, pp. 167-178.
20. Jiang and Cimini, "Antenna Selection for Energy-Efficient MIMO Transmission," *IEEE Wireless Commun. Letts.*, Dec. 2012, pp. 577-580.
21. Lim and Cimini, "Energy-Efficient Cooperative Relaying in Heterogeneous Radio Access Networks," *IEEE Wireless Commun. Letts.*, Oct. 2012, pp. 476-479.
22. Zhang, Li, and Cimini, "Statistical Performance Analysis for MIMO Beamforming and STBC When Co-Channel Interferers Use Arbitrary MIMO Modes," *IEEE Trans. on Commun.*, Oct. 2012, pp. 2926-2937.
23. Li, Li, Zhang, Cimini, and Fang, "Integer Frequency Offset Estimation for OFDM Systems With Residual Timing Offset Over Frequency Selective Fading Channels," *IEEE Trans. on Veh. Tech.*, July 2012, pp. 2848-2853.
24. Sun, Wang, Cimini, Greenstein, and Chan, "ICI/ISI Aware Beamforming for MIMO-OFDM Wireless Systems," *IEEE Trans. on Wireless Commun.*, Jan. 2012, pp. 378-385.

25. Li, Zhang, Cimini, and Zhang, "Statistical Analysis of MIMO Beamforming with Co-Channel Unequal-Power MIMO Interferers Under Path-Loss and Rayleigh Fading," *IEEE Trans. on Sig. Proc.*, Aug. 2011, pp. 3738-3748.
26. Li, Cimini, and Himayat, "Outage Analysis of Interference-Limited Systems Using STBC with Co-Channel MIMO Interferers," in *Frontiers of Computer Science in China*, Springer-Verlag 2009.
27. Yackoski, Zhang, Shen, Cimini, and Gui, "Networking with Cooperative Communications: Holistic Design and Realistic Evaluation," *IEEE Commun. Mag.*, Aug. 2009, pp. 113-119.
28. Song, Li, and Cimini, "Joint Channel- and Queue-Aware Scheduling for Multiuser Diversity in Wireless Multicarrier Networks," *IEEE Trans. on Commun.*, July 2009, pp. 2109-2121. (Best Paper Award)
29. Dai, Chen, Cimini, and Ben-Letaief, "Fairness Improves Throughput in Energy-Constrained Cooperative Ad-Hoc Networks," *IEEE Trans. on Commun.*, July 2009, pp. 3679-3691.
30. Zhang and Cimini, "Efficient Power Allocation for Decentralized Distributed Space-Time Block Coding," *IEEE Trans. on Wireless Commun.*, March 2009, pp. 1102-1106.
31. Gui, Dai, and Cimini, "Routing Strategies in Multihop Cooperative Networks," *IEEE Trans. on Wireless Commun.*, Feb. 2009, pp. 843-855.
32. Haimovich, Blum, and Cimini, "MIMO Radar with Widely Separated Antennas," *IEEE Signal Proc. Mag.*, Jan. 2008, pp. 116-129.
33. Gui and Cimini, "Bit Loading Algorithms for Cooperative OFDM Systems," *EURASIP Journal on Wireless Commun. and Networking*, Jan. 2008.
34. Zhang and Cimini, "Power-Efficient Relay-Selection in Cooperative Networks Using Decentralized Distributed Space-Time Block Coding," *EURASIP Journal on Advances in Sig. Proc.*, Jan. 2008.
35. Leung, Clark, McNair, Kostic, Cimini, and Winters, "Outdoor IEEE 802.11 Cellular Networks: Radio and MAC Design and Their Performance," *IEEE Trans. on Veh. Tech.*, Sept. 2007, pp. 2673-2684.
36. Bala and Cimini, "Robust Adaptive OFDM with Diversity for Time Varying Channels," *EURASIP Journal on Wireless Commun. and Networking*, June 2007.
37. Lehmann, Fishler, Haimovich, Blum, Chizhik, Cimini, and Valenzuela, "Evaluation of Transmit Diversity in MIMO-Radar Direction Finding," *IEEE Trans. on Sig. Proc.*, May 2007, pp. 2215-2225.
38. Svedman, Wilson, Cimini, and Ottersten, "Opportunistic Beamforming and Scheduling for OFDMA Systems," *IEEE Trans. on Commun.*, May 2007, pp. 941-952.
39. Luo, Blum, Cimini, Greenstein, and Haimovich, "Decode-and-Forward Cooperative Diversity with Power Allocation in Wireless Networks," *IEEE Trans. on Wireless Commun.*, March 2007, pp. 793-799.
40. Ye, Blum, and Cimini, "Adaptive OFDM Systems with Imperfect Channel State Information," *IEEE Trans. on Wireless Commun.*, Nov. 2006, pp. 3255-3265.
41. Zhang, Xia, Cimini, and Ching, "Synchronization Techniques and Guard-Band-Configuration Scheme for Single-Antenna Vector-OFDM Systems," *IEEE Trans. on Wireless Commun.*, Sept. 2005, pp. 2454-2464.
42. Fishler, Haimovich, Blum, Cimini, Chizhik, and Valenzuela, "Spatial Diversity in Radars - Models and Detection Performance," *IEEE Trans. on Sig. Proc.*, March 2006, pp. 823-838.
43. Luo, Blum, Cimini, Greenstein, and Haimovich, "Power Allocation in a Transmit Diversity System with Mean Channel Gain Information," *IEEE Commun. Letts.*, July 2005, pp. 616-618.
44. Li and Cimini, "Bounds on the Interchannel Interference of OFDM in Time-Varying Impairments," *IEEE Trans. on Commun.*, March 2001, pp. 401-404.
45. Lin, Cimini, and Chuang, "Comparison of Convolutional and Turbo Codes for OFDM with Antenna Diversity in High-Bit-Rate Wireless Applications," *IEEE Commun. Letts.*, Sept. 2000, pp. 277-279.
46. Cimini and Sollenberger, "Peak-to-Average Power Ratio Reduction of an OFDM Signal Using Partial Transmit Sequences," *IEEE Commun. Letts.*, March 2000, pp. 86-88.
47. Daneshrad and Cimini, "Predicting the Outage Performance of an Equalized-QPSK System Over Indoor Wireless Channels," *IEEE Commun. Letts.*, May 1999, pp. 125-127.
48. Cimini, Chuang, and Sollenberger, "Advanced Cellular Internet Service," *IEEE Commun. Mag.*, Oct. 1998, pp. 150-159.
49. Li, Cimini, and Sollenberger, "Robust Channel Estimation for OFDM Systems with Rapid Dispersive Fading Channels," *IEEE Trans. on Commun.*, July 1998, pp. 902-915.
50. Li and Cimini, "Effects of Clipping and Filtering on the Performance of OFDM," *IEEE Commun. Letts.*, May 1998, pp. 131-133.

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