

LEONARD JOSEPH CIMINI, JR.

PROFESSIONAL EMPLOYMENT

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

- Teach courses in linear systems, probability, and digital and wireless communications
- Supervised 20 graduate students (7 received MS, 12 received PhD), 4 post-docs, and 7 visiting scholars
- Research topics: multiuser MIMO networks, cooperative networking, underwater acoustic communications

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.
- Proposed and analyzed the use of OFDM to overcome limitations to high-bit-rate wireless transmission.
- 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.
- 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.

OTHER TEACHING AND CONSULTING EXPERIENCE

1996-2004 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.

1998-2010 Technical Advisory Board for Adaptix, Inc., and Walbell, Inc.

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, 2017-2019)
- 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 1994-2017
- 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

UNIVERSITY OF DELAWARE ACTIVITIES

FUNDING - GRANTS

- ARL/Telcordia Cooperative Technology Alliance, “Sparse Multicarrier for Very Wideband Wireless Communications” \$59K (awarded 11/03, 1 year)
- ARL/Telcordia CTA, “Wireless Communications in Uncertain Environments” \$65K (awarded 11/04, 1 year)
- AFOSR, “Cooperative Networking” \$270K (11/05-10/08)
- CERDEC, “Leveraging Diversity Transmission and Reception to Improve EW System Performance” (w/ S. Bohacek and C. Cotton), \$72K (awarded 9/09, received 2/10)
- AFOSR, “Decentralized Cooperative Networking” \$418K (3/09-11/11)
- NSF CIF, “Distributed PHY/MAC Optimization for Energy and Spectral Efficient Wireless Networks” (collaborative w/ Y. Li, Georgia Tech), \$250K (UD) (8/10-8/13)
- AFOSR, “Overhead-Performance Tradeoffs in Distributed Wireless Networks” (w/ J. Walsh and S. Weber, Drexel, and J. Garcia-Frias), \$1,441,809 (Cimini \$490K) (4/12-3/15)
- NSF NeTS, “In-Band Full-Duplex Underwater Acoustic Networks” (w/ A. Song, Alabama, C.-C. Shen, and X.-G. Xia), \$200K (UD) (6/17-5/20) + \$15K REU 2019

FUNDING - GIFTS

- Broadcom, \$20K (awarded 9/06)
- Intel University Sponsored Research “Resource Allocation for Multiuser MIMO/OFDM in Highly Mobile Environments,” \$44K (awarded 9/07), \$67K (6/09)
- Cisco Undergraduate Research Program
 - “Adaptive Beamforming for IEEE802.11n,” \$69.5K (6/06)
 - “Beamforming in IEEE802.11n for Wide-Area Applications,” \$75K (6/07)
 - “Interference Consideration in Outdoor IEEE 802.11n Systems Using MIMO Beamforming Techniques,” \$78K (6/08)
 - “Beamforming for Backhaul in Outdoor IEEE801.11n Networks,” \$81K (6/09)
 - “Beamforming in Very High Throughput Multiuser Wireless Networks,” \$83K (6/10)
 - “Optimizing Resources for Multiuser MIMO in IEEE 802.11ac Networks Using Beamforming,” \$85K (6/11)
 - “New Approaches for Maximizing Throughput and Quality of Multiuser MIMO Wireless LANs,” \$89K (6/12)
 - “Interference Management for Multiuser MIMO Wireless Networks in Uncertain and Heterogeneous Environments,” \$91K (6/13)
 - “The Impact of Multiple Radio Access Technologies Sharing the Same Spectrum,” \$93K (6/14)
 - “Fair and Spectrally Efficient Coexistence of Multiple Radio Access Technologies in the Same Spectrum Band,” \$98K (8/15)
 - “Fair and Spectrally Efficient Coexistence of LAA-LTE and Wi-Fi,” \$99K (8/16)
 - “Aggregation and Determinism in Next-Generation Wireless Networks,” \$101K (01/18)
 - “Smart Scheduling and Coexistence in Next Generation Heterogeneous Wireless Networks,” \$104K (08/19)

STUDENTS/VISITORS

PhD

- Erdem Bala, Winter 2007, “Multichannel, Multiuser and Multiple Antenna Wireless Communication Systems” (now with Interdigital)
- Bo Gui, Fall 2008, “Cooperative OFDM Networking” (Cisco)
- Lu Zhang, Summer 2009, “Decentralized Cooperative Communications for Wireless Relaying Networks” (Ericsson, Shanghai)
- Xiantao Sun, Summer 2010, “Beamforming for MIMO-OFDM Wireless Systems” (co-advisor L. Greenstein) (Apple) 5/20/21
- Chenzi Jiang, Fall 2012, “Interference Management and Energy-Efficient Transmission in Wireless Communications Systems” (Apple)

- GuBong Lim, Fall 2013, “Energy Efficient Wireless Communications” (Qualcomm)
- Yao Xiao, Winter 2014, “Cross-Layer Design for Wireless Cooperative Networks” (Aibee)
- Hao Feng, Fall 2014, “Overhead, Uncertainty, and Interference in Wireless Networks” (Google)
- Qi Wang, Fall 2014, “Resource Management for Multi-User MIMO Systems” (Google)
- Li Li, Summer 2018, “Analysis and Management of Intra- and Inter-System Interference in Wireless Communications Systems” (Samsung)
- Bohan Zhang, Fall 2019, “Massive MIMO and Millimeter Wave Communications for 5G and Beyond Wireless Systems” (MediaTek)
- Guangyi Liu, Summer 2019, “Advanced Cellular Networks with Densely Deployed Antennas and Imperfect Network State Information” (Qualcomm)
- Mohammad Towliat (w/ X.-G. Xia), dissertation defense expected in January 2023

Masters

- Kemal Sucak, Winter 2005, “Statistical MIMO Radar”
- Mani Kishore Vajipeyajula, Summer 2005, “Clustered Multicarrier Systems for Very Wideband Wireless Communications”
- GuBong Lim, Summer 2005, “Analysis and Results for H-MIMO: A Hybrid of Spatial Multiplexing and Adaptive Beamforming”
- German Andres Mancera-Mendez, Summer 2006, “Ad Hoc Wireless Networks: Flooding and Statistical Understanding of Node Movement”
- Deokwon Kang, Summer 2009, “MIMO Beamforming in Multiuser Wireless Environments”
- Wooyoung Ryu, Summer 2010, “Performance Analysis of Beamforming for Femtocellular Applications”
- Chenzi Jiang, Fall 2010, “Interference Considerations in MIMO-Based Cellular Systems”

PostDocs

- Lin Dai (9/05-1/07)
- Lu Zhang (8/09-5/10)
- Hongzheng Wang (8/10-8/11)
- Seyedmohammad Salehi (5/20-2/21)

Research Fellow

Larry Greenstein 1/06-1/17

Visiting Faculty

- Yongzhao Li (Xidian University) 9/07-8/08, 8/16-10/16
- Jing Li (Xidian University) 3/14-3/15

Visiting Students/Scholars

- Patrick Svedman (Ericsson Research, Sweden) 1/05-8/05
- Haina Ye (Beijing Jiaotong University) 9/12-8/13
- Chengming Zhou (Xidian University) 9/13-8/15
- Lixing Fan (Southeast University) 8/14-8/15
- Tao Li (Xiaidan University) 10/15-9/16

Undergraduate Research/Independent Study

- Nuha Ahmed, Summer 2006
- Mohamed Dicko, Summer 2008
- Colin McLafferty, Summer 2008, Summer 2009 (w/ X. Li)
- Patrick Nelson, Spring 2009
- Brian Chlan, Summer 2009, Spring 2010
- Dora Maria Ballesteros, Summer 2010
- Jose Rugeles Uribe, Summer 2010
- Frank Shen, Summer 2010, Spring 2011 (w/ P. Dhurjati, ChemE)
- John Mullan, Fall 2011
- Ryan Petery and Ahmed Masood, NSF REU, Summer 2019
- Ryan Petery, Winter 2020

COURSES TAUGHT

- ELEG 212 Signals and Communications
- ELEG 305 Signals and Systems
- ELEG 310 Random Signals and Noise
- ELEG 403 Communication Systems Engineering
- ELEG 635 Digital Communications
- ELEG 812 Wireless Digital Communications

SERVICE – ECE DEPARTMENT AND COLLEGE OF ENGINEERING (COE)

- UD Representative, Telcordia CTA CMC (2004-05)
- Faculty Advisor, Eta Kappa Nu ECE Honor Society, Epsilon Omicron Chapter (2003-present)
- Organizer, ECE Distinguished Lecture Series (2007-present)
- Member, ECE Secondary Appointments Committee (2007-present)
- ECE Undergraduate Committee (2008-present)
- ECE Representative to COE Educational Activities Committee (2016-17)
- Chair, COE Nominations and Elections Committee (2016-18)
- Other: Chair, ECE promotion and Tenure Committee (2015); Member, ECE Faculty Search Committee; COE Space Planning and Optimization Committee (2015-16); Member, Faculty Search Committee for Continuing Track Faculty in Biomedical Engineering Department (2017)