

Dennis L. Goeckel

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Education

University of Michigan, Ann Arbor, MI 1992-1996

Ph. D. (Electrical Engineering: Systems) August 1996.

Major: Communications Minor: Signal Processing

Dissertation: "Performance Limits and Optimal Resource Allocation for Coded Multi-User Communication Systems." Advisor: Prof. Wayne E. Stark

M.S. (Electrical Engineering) December 1993.

Purdue University, West Lafayette, IN 1987-1992

B.S. (Computer and Electrical Engineering), with highest distinction, May 1992.

Research/Industrial Experience

University of Massachusetts 1996-present

(currently) Professor, Electrical and Computer Engineering Department

- Research: Conducting research on: (1) communications and networking, often for wireless systems, and, (2) signal processing, in particular for radar systems.
- Teaching: Undergraduate courses in probability and random processes, communication systems. Graduate courses in both basic and advanced digital communication theory, statistical signal processing.
- Consulting: Consultant with Quadrant Engineering, Inc. (1998-2000), M/A-COM, Inc. (2000-2005, 2007), and Mabuhay Networks (2001) on signal processing and communication theory topics.

University of Michigan 1992-1996

Rackham Pre-Doctoral Fellow, 1995-1996. Conducted research on equalization, interference suppression, and optimal system specifications for multi-user wireless communication systems.

National Science Foundation Graduate Fellow, 1992-1995. Conducted research in communication and signal processing techniques with emphasis on the application of these techniques to wireless communication systems.

Sundstrand Corporation, Co-op Engineer 1988-1992

Honors and Professional Activities

Lead Co-Chair, Technical Program Committee of the Wireless Communications Theory Symposium of the IEEE Global Communications Conference (2008).

Guest Editor, *IEEE Journal on Selected Topics in Signal Processing: Special Issue on Performance Limits of Ultra-Wideband Systems*, October 2007.

University of Massachusetts Distinguished Teaching Award (3 winners campus-wide each academic year, can only be won once per lifetime), 2007

Associate Editor for the *IEEE Transactions on Communications*, January 2006-present.

College Outstanding Teacher, College of Engineering, University of Massachusetts (2005-2006).

Senior Member of the IEEE.

Visiting Scientist, Laboratory for Information and Decision Sciences (LIDS), Massachusetts Institute of Technology (MIT), 2004-2005.

Technical Program Co-Chair (one of four equal co-chairs), Communication Theory Symposium of the IEEE Global Communications Conference (2004).

Outstanding Junior Faculty Member (shared with Jim Watkins), College of Engineering, University of Massachusetts (2001).

Faculty Speaker (selected by students), first annual Engineering Commencement Ceremony, 2001.

Lilly Teaching Fellow (2000-2001).

National Science Foundation CAREER Award (1999).

Associate Editor for the *IEEE Journal on Selected Areas in Communications: Wireless Communication Series* (later *IEEE Transaction on Wireless Communications*), 1999-2002.

Panelist for the National Science Foundation (1999,2000,2001,2003,2004,2006,2007,2008,2009).

Reviewer for *IEEE Transactions on Communications*, *IEEE Transactions on Signal Processing*, *IEEE Transactions on Wireless Communications*, *European Transactions on Telecommunications*, *IEEE Journal on Selected Areas in Communications*, *IEEE/ACM Transactions on Networking*, *IEEE Transactions on Information Theory*, *IEEE Communication Letters*, National Science Foundation, and various international associations.

Advisor to the IEEE Student Chapter at the University of Massachusetts, 1996-2008.

Technical Program Committee Member, Organizer, and/or Session Chair for Communication Theory at various conferences.

University of Massachusetts ECE Outstanding Advisor Award (1999, 2000) and University of Massachusetts ECE Outstanding Faculty Award (2001,2003) (selected by graduating students),

Rackham Pre-Doctoral Fellowship (1995-1996).

University of Michigan fellowship awarded to 60 students university-wide. Interdisciplinary panels select recipients from candidates nominated by their respective departments.

National Science Foundation Pre-Doctoral Fellowship (1992-1995).

Eta Kappa Nu Electrical Engineering Outstanding Senior - Purdue University (1991).

Externally Funded Research Grants/Contracts

Robust Adaptive Coded Modulation for Time-Varying Channels (sole-PI)

Funding source: National Science Foundation 1/15/98-12/31/00

Amount: \$241,399 (with REU Supplement)

CAREER: Coded Modulation for High-Speed Wireless Communications (sole-PI)

Funding source: National Science Foundation 7/1/99-6/30/04

Amount: \$200,000

Single Carrier (VSB) versus Multi-Carrier (COFDM) Modulation for Digital Terrestrial Broadcast Applications in the United States (sole-PI)

Funding Source: Association for Maximum Service Television 11/1/99-12/31/00

Amount: \$25,500 (\$3,500 subcontract to General Electric Corporate R&D)

Analog Devices Graduate Fellowship at UMass-Amherst (sole-PI)

Funding source: Analog Devices, Inc. 1/1/00-12/31/01, 9/1/01-8/31/03

Amount: \$100,000

Element Location Measurement for Millimeter Wave Airborne Antenna (PI: Goeckel, Co-PI: Frasier)

Funding Source: Quadrant Engineering, Inc. 6/01/00-7/15/01

Amount: \$74,136

Antenna Array Calibration Algorithms for Millimeter Wave, Airborne Antennas (PI: Goeckel, Co-PI: Frasier)

Funding Source: DARPA (sub-contract from Quadrant Engineering) 12/01/00-8/31/01

Amount: \$74,318

Broadband Wireless Access: Design and Construction (PI: Goeckel, Co-PI: Jackson, Co-PI: Pozar)

Funding Source: Narad Networks, Inc. 9/01/00-12/31/01

Amount: \$95,367

Research Infrastructure: Infrastructure to Support Research on Mixed Wired/Wireless Information Systems (PI: Towsley, Co-PI: Adler, Co-PI: Ganz, Co-PI: Goeckel, Co-PI: Shenoy, ten total senior personnel)

Funding Source: National Science Foundation 9/15/00-8/31/05

Amount: \$992,585

Multidisciplinary University Research Initiative (MURI): Short-Range Ultra-Wideband Systems (PI: Schaubert, Co-PI: Goeckel, Co-PI: Pozar)

Funding Source: Army Research Office (sub-contract from USC) 5/01/01-8/31/06
Amount: \$1,482,753

Orthogonal Frequency Division Multiplexing Systems (sole-PI)

Funding Source: Mabuhay Networks 8/09/01-8/08/02
Amount: \$13,500

Signal Processing for Radar and Communication Systems (sole-PI)

Funding Source: M/A-COM, Inc. 10/01/01-8/31/02
Amount: \$35,000

Space Time Codes for Antenna Diversity (sole-PI)

Funding Source: M/A-COM, Inc. 10/01/02-9/30/03
Amount: \$36,000

Propagation and Capacity Studies for Multi-Polarized MIMO Communication Systems (PI: Janaswamy, Co-PI: Goeckel)

Funding Source: National Science Foundation 6/01/03-5/31/06
Amount: \$299,999

Center for Collaborative Adaptive Sensing of the Atmosphere (CASA) (one of many, many senior personnel spread across four universities)

Funding Source: National Science Foundation 9/01/03-8/31/08
Amount: \$17,000,000

Next Generation Wireless Communication Systems (sole-PI)

Funding Source: Analog Devices, Inc. 5/01/04-12/31/09
Amount: \$210,889

Simulation of Communication Systems (sole-PI)

Funding Source: M/A-COM, Inc. 9/01/04-8/30/07
Amount: \$126,000

Macroscopic Space-Time Codes for Homeland Security (sole-PI)

Funding Source: National Science Foundation (with M/A-COM matching) 9/01/04-8/31/06
Amount: \$57,034

Implementation of Communication Systems (PI: Goeckel, Co-PI: Tessier)

Funding Source: M/A-COM, Inc. 9/01/06-8/30/07
Amount: \$20,000

MIMO System Implementation (sole-PI)

Funding Source: M/A-COM, Inc. 2/15/07-6/15/07
 Amount: \$17,000

Low Data Rate Frequency-Shifted Reference Ultra-Wideband (UWB) Communication Systems (PI: Goeckel, Co-PI: Jackson)

Funding Source: Army Research Office (sub-contract from NewLANs) 7/23/07-1/22/08
 Amount: \$60,000

Cooperative Networking (PI: Towsley, Co-PI: Goeckel, Co-PI: Kurose)

Funding Source: Army Research Laboratory (sub-contract from IBM) 3/11/07-5/11/09
 Amount: \$655,000

Cooperative Wireless Networking: Foundations and Practice (PI: Towsley, Co-PI: Goeckel)

Funding Source: National Science Foundation 9/01/07-8/31/10
 Amount: \$350,001

Frequency-Shifted Reference Ultra-Wideband (UWB) Communications (sole-PI)

Funding Source: National Science Foundation 9/01/07-8/31/10
 Amount: \$257,434

Sphere Decoding in MIMO Systems (sole-PI)

Funding Source: M/A-COM, Inc. 12/31/07-11/30/08
 Amount: \$91,220

Ultra-Wideband Radio for Low-Power Security (PI: Bursleson, Co-PI: Goeckel, Co-PI: Jackson)

Funding Source: National Science Foundation 9/01/08-8/31/10
 Amount: \$200,000

Publications**Theses/Dissertations Advised**

- C. Kose, *M.S. Thesis: Optimal Adaptive Transmitter and Receiver Techniques*, September 2000.
 P. Ormeci, *M.S. Thesis: Adaptive Coded Modulation for Fading Channels*, September 2000.
 G. Ananthaswamy, *Ph.D. Dissertation: Coded Modulation and Equalization for Highly Bandwidth Efficient Communication on Broadband Wireless Channels*, April 2001.
 K. Kamath, *M.S. Thesis: Minimizing Outage in Adaptive Signaling Systems*, September 2001.
 B. Kwak, *M.S. Thesis: On the Performance Evaluation of Coded OFDM Systems*, January 2003.

- R. Zhao (co-chair with P. Kelly), *Ph.D. Dissertation: Iterative Posterior Probability Estimation, Optimal Filtering, and Object Detection*, March 2003.
- S. Wei, *Ph.D. Dissertation: Convergence Results on Broad-band Wireless Communication Systems and Their Implications*, May 2003.
- A. Mehrabi, *M.S. Thesis: Non-Coherent Macroscopic Space-Time Block Codes*, August 2005.
- S. Song, *M.S. Thesis: On the Asymptotic Connectivity Properties of Collaborative Ad Hoc Networks*, August 2005.
- Q. Zhang, *Ph.D. Dissertation: Slightly Frequency-Shifted Reference Ultra-Wideband (UWB) Communications*, August 2006.
- S. Li, *M.S. Thesis: Surface Refractive Index Field Estimation by Factor Graph*, August 2006.
- L. Wang, *M.S. Thesis: Connectivity in Cooperative Wireless Ad Hoc Networks*, May 2007.
- H. Zhang, *Ph.D. Dissertation: Rapid Acquisition of Ultra-Wideband Radio Signals and Implementation Issues of Closed-loop Multiple-Antenna Systems*, July 2007.
- Y. Hao, *Ph.D. Dissertation: Communications and Radar Signal Processing from Multiple Base Stations*, July 2007.
- K. Liu, *Ph.D. Dissertation: Peak-to-average Power Ratio Reduction in WCDMA Systems and Cooperative Group Transmission in Sensor Networks*, July 2007.
- A. Menon, *M.S. Thesis: Power Amplifier Linearization and Implementation*, August 2007.
- C. Capar, *M.S. Thesis: Radar Waveform Design for Classification and Linearization of Digital-to-Analog Converters*, August 2008.

Refereed Journal Articles

- [1] Z. Ding, K. Leung, D. Goeckel, and D. Towsley, "On the Study of Network Coding with Diversity," to appear in the *IEEE Transactions on Wireless Communications*.
- [2] J. Liu, D. Goeckel, and D. Towsley, "Bounds on the Throughput Gain of Network Coding in Unicast and Multicast Wireless Networks," to appear in the *IEEE Journal on Selected Areas in Communications: Special Issue on Network Coding for Wireless Networks*, 2nd Quarter, 2009.
- [3] H. Liu, A. Molisch, D. Goeckel, and P. Orlik, "Hybrid Coherent and Frequency-Shifted-Reference Ultrawideband Radio," submitted to the *Elvesier Physical Communication Journal Special Issue on Advances in Ultra-Wideband Wireless Communications*, February 2009.
- [4] D. Goeckel, B. Liu, D. Towsley, L. Wang, and C. Westphal, "Asymptotic Connectivity Properties of Cooperative Wireless Ad Hoc Networks," revision submitted to the *IEEE Journal on Selected Areas in Communications: Special Issue on Stochastic Geometry and Random Graphs for Wireless Networks*, January 2009.
- [5] J. Xu, D. Goeckel, and R. Janaswamy, "The Capacity of MIMO Systems with Increasing SNR by Electromagnetic Analysis," submitted to the *IEEE Transactions on Wireless Communications*, September

2008.

[6] Z. Ding, K. Leung, D. Goeckel, and D. Towsley, "A Relay Assisted Cooperative Transmission Protocol for Wireless Multiple Access Systems," submitted to the *IEEE Transactions on Communications*, August 2008.

[7] S. Wei, D. Goeckel, and P. Kelly, "The Complex Envelope of a Bandlimited OFDM Signal Converges Weakly to a Gaussian Random Process," submitted to the *IEEE Transactions on Information Theory*, June 2008.

[8] H. Zhang, S. Wei, G. Ananthaswamy, and D. Goeckel, "Adaptive Signaling under Statistical Measurement Uncertainty in Wireless Communications," *Proceedings of the IEEE*, Vol. 95: pp. 2337-2353, December 2007.

[9] H. Zhang and D. Goeckel, "Peak Power Reduction in Closed-Loop MIMO-OFDM Systems via Mode Reservation," *IEEE Communication Letters*, Vol. 11: pp. 583-585, July 2007.

[10] D. Goeckel and Q. Zhang, "Slightly Frequency-Shifted Ultra-Wideband (UWB) Radio," *IEEE Transactions on Communications*, Vol. 55: pp. 508-519, March 2007.

[11] A. Scaglione, D. Goeckel, and J. Laneman, "Cooperative Communications in Mobile Ad-Hoc Networks: Rethinking the Link Abstraction," *IEEE Signal Processing Magazine: Special Issue on Signal Processing for Ad hoc Communication Networks*, Vol. 23: pp. 18-29, September 2006.

[12] D. L. Goeckel and J. B. Mead, "Linear Filtering Approaches for Self-Calibration of Airborne Arrays," *IEEE Transactions on Aerospace and Electronic Systems*, Vol. 42: pp. 806-824, July 2006.

[13] S. Wei, D. L. Goeckel, and M. Valenti, "Asynchronous Cooperative Diversity," *IEEE Transactions on Wireless Communications*, Vol. 5: pp. 1547-1557, June 2006.

[14] Y. Hao, D. Goeckel, R. Janaswamy, and S. Frasier, "Surface Refractive Index (RI) Field Estimation from Multiple Radars," *Radio Science*, American Geophysical Union (AGU), Vol. 41, June 2006 (18 pages).

[15] H. Zhang, S. Wei, D. Goeckel, and M. Win, "Rapid Hybrid Acquisition of Ultra-Wideband Signals," *Journal of VLSI Signal Processing: Special Issue on Ultra-Wideband Radio*, Kluwer Publishers, Vol. 43, pp. 7-23, April 2006.

[16] S. Wei, D. L. Goeckel, and R. Janaswamy, "On the Asymptotic Capacity of MIMO Systems with Antenna Arrays of Fixed Length," *IEEE Transactions on Wireless Communications*, Vol. 4: pp. 1608-1621, July 2005.

[17] R. Tessier, S. Swaminathan, R. Ramaswamy, D. Goeckel, and W. Burlison, "A Reconfigurable, Power-Efficient Adaptive Viterbi Decoder," *IEEE Transactions on VLSI Systems*, Vol. 13: pp. 484-488, April 2005.

[18] K. Kamath and D. L. Goeckel, "Adaptive Modulation Schemes for Minimum Outage Probability in Wireless Systems," *IEEE Transactions on Communications*, Vol. 52: pp. 1632-1635, October 2004.

[19] W. Burlison, R. Tessier, D. Goeckel, S. Swaminathan, P. Jain, J. Euh, S. Venkatraman, and V. Thyagaran, "Dynamically Parameterized Algorithms and Architectures to Exploit Signal Variations for Improved Performance and Reduced Power," *Journal of VLSI Signal Processing: Special Issue on Reconfigurable Computing*, Kluwer Publishers, Vol. 36: pp. 27-40, January 2004.

[20] S. Wei and D. L. Goeckel, "On the Minimax Robustness of the Uniform Transmission Power Strategy

in MIMO Systems,” *IEEE Communication Letters*, Vol. 7: pp. 523-524, November 2003.

[21] G. Ananthaswamy and D. L. Goeckel, “A Fast-Acquiring Blind Predictive DFE,” *IEEE Transactions on Communications*, Vol. 50: pp 1557-1560, October 2002.

[22] S. Wei and D. L. Goeckel, “Error Statistics for Average Power Measurements in Wireless Communication Systems,” *IEEE Transactions on Communications*, Vol. 50: pp. 1535-1546, September 2002.

[23] D. L. Goeckel and G. Ananthaswamy, “On the Design of Multi-Dimensional Signal Sets for OFDM,” *IEEE Transactions on Communications*, Vol. 50: pp. 442-452, March 2002.

[24] P. Örmeci, X. Liu, D. L. Goeckel, and R. D. Wesel, “Adaptive Bit-Interleaved Coded Modulation,” *IEEE Transactions on Communications*, Vol. 49: pp. 1572-1581, September 2001.

[25] C. Köse and D. L. Goeckel, “On Power Adaptation in Adaptive Signaling Systems,” *IEEE Transaction on Communications*, Vol. 48: pp. 1769-1773, November 2000.

[26] D. L. Goeckel and W. E. Stark, “Optimal Diversity Allocation in Multi-User Communication Systems - Part II: Optimization,” *IEEE Transactions on Communications*, Vol. 48, pp. 45-52, January 2000.

[27] D. L. Goeckel and W. E. Stark, “Optimal Diversity Allocation in Multi-User Communication Systems - Part I: System Model,” *IEEE Transactions on Communications*, Vol. 47, pp. 1828-1836, December 1999.

[28] D. L. Goeckel, “Adaptive Coding for Time-Varying Channels Using Outdated Fading Estimates,” *IEEE Transactions on Communications*, Vol. 47, pp. 844-855, June 1999.

[29] D. L. Goeckel, A. O. Hero III, and W. E. Stark, “Data-Recursive Algorithms for Blind Channel Identification,” *IEEE Transactions on Signal Processing*, Vol. 46, pp. 2217-2220, August 1998.

[30] D. L. Goeckel and W. E. Stark, “Performance of Coded Direct-Sequence Systems with Rake Reception in a Multipath Fading Environment,” *European Transactions on Telecommunications, Special Issue on Spread Spectrum Techniques*, Vol. 6, pp. 41-49, January-February 1995.

[31] D. M. Newman, R. W. Hawley, D. L. Goeckel, R. C. Crawford, S. Abraham, and N. C. Gallagher, “Efficient Storage, Computation, and Exposure of Computer-Generated Holograms by Electron-Beam Lithography,” *Applied Optics*, Vol. 32, pp. 2555-2265, May 1993.

[32] D. L. Goeckel, K. J. Webb, and N. C. Gallagher, “Massively Parallel Iterative Determination of Stratified Dielectric Parameters from Scattered-Field Measurements,” *Journal of the Optical Society of America, A, Optics and Image Science*, Vol. 10, pp. 1093-1100, May 1993.

Book Chapters

[1] A. Scaglione, D. Goeckel, and J. Laneman, “Cooperative Communications in Mobile Ad-Hoc Networks: Rethinking the Link Abstraction,” to appear in *Distributed Antenna Systems, Open Architectures for Future Wireless Communications*, 2006.

[2] D. L. Goeckel, “Adaptive Coded Modulation for Transmission over Fading Channels” *The CRC Press Signal Processing for Mobile Communications Handbook*, 2003.

[3] D. L. Goeckel, “Bit-Interleaved Coded Modulation,” *Wiley Encyclopedia on Telecommunications*, Edited by John Proakis, 2002.

Conference Publications

- [1] Z. Ding, K. Leung, D. Goeckel, and D. Towsley, "A New Form of Network Coded Cooperative Transmission for Multiple Access Channels," *IEEE Military Communications Conference*, November 2008.
- [2] H. Joshi, Z. Lai, and D. Goeckel, "Receiver Optimization in Frequency-Shifted Reference Ultra-Wideband (FSR-UWB) Systems," *Asilomar Conference on Signals, Systems, and Computers* (invited), October 2008.
- [3] K. Hardwick, D. Goeckel, and D. Towsley, "Antenna Beam Pattern Model for Cooperative Ad-Hoc Networks," *Allerton Conference on Control, Communication, and Computing* (invited), September 2008.
- [4] Z. Lai, D. Gupta, D. Gupta, H. Joshi, D. Goeckel, and A. Mathew, "Performance of UWB Systems in the Presence of Severe Multipath and Narrowband Interference," *IEEE International Conference on Ultra-Wideband (IC-UWB)*, September 2008.
- [5] L. Wang, B. Liu, D. Goeckel, D. Towsley, and C. Westphal, "Connectivity in Cooperative Wireless Ad Hoc Networks," *ACM MobiHoc*, May 2008.
- [6] H. Liu, A. Molisch, S. Zhao, P. Orlik, and D. Goeckel, "Hybrid Coherent and Frequency-Shifted Reference Ultrawideband Radio," *Proceedings of the Wireless Communications Symposium in association with the IEEE Global Communications Conference*, November 2007.
- [7] D. Goeckel, J. Mehlmann, and J. Burkhart, "A Class of Ultra Wideband (UWB) Systems with Simple Receivers," *Proceeding of the Military Communications Conference*, October 2007.
- [8] Y. Hao, D. Goeckel, Z. Ding, D. Towsley, and K. Leung, "Achievable Rates for Network Coding on the Exchange Channel," *Proceeding of the Military Communications Conference*, October 2007.
- [9] Q. Zhang and D. Goeckel, "Multiple-Access Slightly Frequency-Shifted Reference Ultra-Wideband Communications" *Proceedings of the Communication Theory Symposium in association with the IEEE International Conference on Communications (ICC)*, June 2007.
- [10] J. Liu, D. Goeckel, and D. Towsley, "Bounds on the Gains of Network Coding and Broadcasting in Wireless Networks," *Proceedings of IEEE InfoCom 2007*, May 2007.
- [11] D. Veronesi and D. Goeckel, "Multiple Frequency Offset Compensation in Cooperative Wireless Systems," *Proceedings of the Communication Theory Symposium in association with GlobeCom 2006*, November 2006.
- [12] H. Zhang, G. Ananthaswamy, and D. Goeckel, "Adaptive Modulation in MIMO Eigenbeamforming with Outdated Channel State Information," *Proceedings of the Wireless Communications Symposium in association with GlobeCom 2006*, November 2006.
- [13] H. Xu, L. Yang, and D. Goeckel, "Digital Multi-Carrier Differential Signaling for UWB Radios," *Proceedings of the Wireless Communications Symposium in association with GlobeCom 2006*, November 2006.
- [14] J. Liu, D. Goeckel, and D. Towsley, "The Throughput Order of Ad Hoc Networks Employing Network Coding and Broadcasting," invited for the *Proceedings of the 2006 Military Communications Conference*, October 2006.

- [15] Q. Zhang, D. Goeckel, J. Burkhart, B. Mui, N. Merrill, M. Carrier, and R. Jackson, "FSR-UWB (TR-UWB without the Delay Element): Effect of Impulse Dithering and Experimental Results," *Proceedings of the International Conference on Ultra Wideband*, September 2006.
- [16] S. Song, D. Goeckel, and D. Towsley, "Collaboration Improves the Connectivity of Wireless Networks," *Proceedings of InfoCom 2006*, April 2006.
- [17] S. Vasudevan, C. Zhang, D. Goeckel, and D. Towsley, "Optimal Power Allocation in Wireless Networks with Transmitter-Receiver Power Tradeoffs," *Proceedings of InfoCom 2006*, April 2006.
- [18] Q. Zhang and D. Goeckel, "Multi-Differential Slightly Frequency-Shifted Reference Ultra-wideband (UWB) Radio," *Proceeding of the Conference on Information Sciences and Systems (CISS)*, March 2006.
- [19] L. Atieno, J. Allen, R. Tessier, and D. Goeckel, "An Adaptive Reed Solomon Errors-and-Erasures Decoder," *Proceedings of the ACM SIGDA International Symposium on Field Programmable Gate Arrays*, Monterey, CA, February 2006.
- [20] D. Goeckel and Q. Zhang, "Slightly Frequency-Shifted Reference Ultra-Wideband (UWB) Radio: TR-UWB without the Delay Element," *Proceedings of the 2005 Military Communications Conference*, October 2005.
- [21] Y. Hao, D. Goeckel, R. Janaswamy, and D. Goeckel, "Surface Refractive Index Field Estimation from Multiple Radars," *Proceedings of the 2005 IEEE AP-S International Symposium on Antennas and Propagation*, July 2005.
- [22] S. Vasudevan, D. Goeckel, and D. Towsley, "Optimal Power Allocation in Channel-Coded Wireless Networks," *Proceedings of the Allerton Conference on Communication, Control, and Computing*, October 2004.
- [23] D. Goeckel and Y. Hao, "Space-Time Coding for Distributed Antenna Arrays," *Proceedings of the Communication Theory Symposium in association with the IEEE International Conference on Communications*, June 2004.
- [24] J. Liang, R. Tessier, and D. Goeckel, "A Dynamically-Reconfigurable, Power-Efficient Turbo Decoder," *Proceedings of the IEEE Symposium on Field-Programmable Custom Computing Machines (FCCM)*, April 2004.
- [25] S. Wei, D. Goeckel, and M. Valenti, "Asynchronous Cooperative Diversity," *Proceedings of the Conference on Information Sciences and Systems (CISS)*, March 2004.
- [26] H. Zhang and D. Goeckel, "Generalized Transmitted-Reference UWB Systems," *Proceedings of the Conference on Ultra-Wideband Systems and Technologies (UWBST)*, November 2003.
- [27] A. Klein, D.R. Brown, D. Goeckel, and C.R. Johnson, "rake Reception for UWB Communication Systems with Intersymbol Interference," *Proceedings of the Signal Processing Advances in Wireless Communications (SPAWC) Conference*, June 2003.
- [28] S. Wei, D. Goeckel, and R. Janaswamy, "On the Asymptotic Capacity of MIMO Systems with Fixed Length Linear Antenna Arrays," *Proceedings of the Communication Theory Symposium of the IEEE International Conference on Communications*, May 2003.

- [29] D. Goeckel and Y. Hao, "Macroscopic Space-Time Coding: Motivation, Performance Criteria, and a Class of Orthogonal Designs," *Proceedings of the Conference on Information Sciences and Systems*, March 2003.
- [30] B. Liu, D. Goeckel, and D. Towsley, "TCP-Cognizant Adaptive Forward Error Correction in Wireless Networks," *Proceedings of the Global Telecommunications Conference*, November 2002.
- [31] H. Zhang, S. Wei, D. Goeckel, and M. Win, "Hybrid Acquisition of Ultra-Wideband Communication Signals," (invited) *Proceedings of the 36th Asilomar Conference on Signals, Systems, and Computers*, November 2002.
- [32] S. Wei, D. Goeckel, and P. Kelly, "On Calculating the Distribution of the Peak-to-Average Power Ratio in OFDM Systems," *Proceedings of the 2002 IEEE International Conference on Telecommunications*, June 2002.
- [33] S. Wei, D. Goeckel, and P. Kelly, "A Modern Extreme Value Theory Approach to Calculating the Distribution of the Peak-to-Average Power Ratio in OFDM Systems," *Proceedings of the IEEE International Conference on Communications*, May 2002.
- [34] S. Wei, D. Goeckel, and R. Janaswamy, "On the Capacity of Fixed Length Linear Antenna Arrays Under Bandlimited Correlated Fading," *Proceedings of the 2002 Conference on Information Sciences and Systems*, March 2002.
- [35] K. Kamath and D. Goeckel, "Outage in Adaptive Wireless Communication Systems," (invited) *Proceedings of the 35th Asilomar Conference on Signals, Systems, and Computers*, pp. 1031-1035, November 2001.
- [36] K. Kamath and D. Goeckel, "Adaptive Modulation Schemes for Minimum Outage Probability in Wireless Systems," *Proceedings of the Global Telecommunications Conference*, pp. 1267-1271, November 2001.
- [37] S. Wei, D. Goeckel, and P. Kelly, "The OFDM Signal Envelope Converges Weakly to a Gaussian Random Process: Proof and Application," full paper (10 pages) in the *Proceedings of the 39th Annual Allerton Conference*, October 2001.
- [38] W. Bursleson, R. Tessier, D. Goeckel, S. Swaminathan, P. Jain, J. Euh, S. Venkatraman, V. Thyagarajan, "Dynamically Parameterized Algorithms and Architectures to Exploit Signal Variations for Improved Performance and Reduced Power," *Proceedings of the 2001 Conference on Acoustics, Speech, and Signal Processing*, pp. 901-904, May 2001.
- [39] S. Wei and D. L. Goeckel, "Power Control Based on Measurements with Statistical Uncertainty," *Proceedings of the 2001 Conference on Modeling and Design of Wireless Networks*, August 2001.
- [40] C. Köse, D. L. Goeckel, and S. Wei, "Minimum Complexity Sequential Multihypothesis Detection," *Proceedings of the 2001 International Symposium on Information Theory*, pp. 18, June 2001.
- [41] S. Wei and D. L. Goeckel, "Error Statistics for Average Power Measurements in Wireless Communication Systems," *Proceedings of the 2001 International Communications Conference*, pp. 1073-1077, June 2001.
- [42] G. Ananthaswamy and D. L. Goeckel, "A Fast-Converging Blind Predictive DFE," *Proceedings of the*

2001 *International Communications Conference*, pp. 1068-1072, June 2001.

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[2] D. L. Goeckel, "Slightly Frequency-Shifted Ultra-Wideband Radio," Worcester Polytechnic Institute, September 2006.

[3] D. L. Goeckel, "Slightly Frequency-Shifted Ultra-Wideband Radio," Mitsubishi Electronics Research Laboratory, September 2006.

[4] D. L. Goeckel, "Cooperation in Wireless Networks: Police Radio and Percolation," Massachusetts Institute of Technology Laboratory for Information and Decision Systems (LIDS) Colloquium, February 2005.

[5] D. L. Goeckel, "Asynchronous Cooperative Diversity," University of Connecticut, February 2004.

[6] D. L. Goeckel, "Asynchronous Cooperative Diversity," Boston University, February 2004.

[7] D. L. Goeckel, "Generalized Transmitted-Reference UWB Systems," University of Virginia, November 2003.

[8] D. L. Goeckel, "Space-Time Coding," MIT Lincoln Labs, May 2003.

[9] D. L. Goeckel, "Macroscopic Space-Time Coding," University of West Virginia, March 2003.

[10] D. L. Goeckel, "Orthogonal Frequency Division Multiplexing for Wireless Communications," University of Notre Dame, January 2003.

[11] D. L. Goeckel, "Orthogonal Frequency Division Multiplexing for Wireless Communications," Tsinghua University (China), June 2002.

[12] D. L. Goeckel, "Orthogonal Frequency Division Multiplexing for Wireless Communications," Massachusetts Institute of Technology (MIT) Laboratory for Information and Decision Systems (LIDS) Seminar, April 2002.

- [13] D. L. Goeckel, "Adaptive Signaling Under Measurement Uncertainty," University of Minnesota, March 2001.
- [14] D. L. Goeckel, "Adaptive Signaling Under Measurement Uncertainty," Ericsson Research and Development, August 2000.
- [15] C. Köse and D. L. Goeckel (speaker), "Minimum Complexity Sequential Multihypothesis Detection," AT&T Research, July 2000.
- [16] D. L. Goeckel, "A Coded Modulation Scheme Matched to Wireless OFDM Systems: Design, Performance, and Its Impact on the Single-Carrier vs Multicarrier Debate," Communication Theory Workshop - Haines City, FL, May 2000.
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- [18] D. L. Goeckel, "Adaptive Signaling Under Measurement Uncertainty," Purdue University Communications and Signal Processing Laboratory Seminar, March 2000.
- [19] D. L. Goeckel, "On the Design of Multidimensional Signal Sets for OFDM Systems," Information Processing Systems Seminar, Ohio State University, February 2000.
- [20] C. Köse (speaker) and D. L. Goeckel, "Sequential Multihypothesis Testing with Minimum Computational Effort," University of California - Los Angeles Electrical Engineering Department Area Seminar, February 2000.
- [21] C. Köse (speaker) and D. L. Goeckel, "Sequential Multihypothesis Testing with Minimum Computational Effort," University of Southern California Electrical Engineering Department Area Seminar, February 2000.
- [22] D. L. Goeckel, "Adaptive Signaling Under Measurement Uncertainty," Information Systems Laboratory Seminar, Stanford University, October 1999.
- [23] D. L. Goeckel, "Adaptive Signaling over Multipath Fading Channels," University of Washington Electrical Engineering Department Area Seminar, June 1999.
- [24] D. L. Goeckel, "Adaptive Signaling over Wireless Channels," University of Southern California Electrical Engineering Department Area Seminar, May 1999.
- [25] D. L. Goeckel, "Robust Adaptive Coded Modulation for Time-Varying Channels," University of California - Los Angeles Electrical Engineering Department Area Seminar, May 1999.
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