DAVID L. NEUHOFF

Joseph E. and Anne P. Rowe Professor of Electrical Engineering

Department of Electrical Engineering and Computer Science
University of Michigan, Ann Arbor

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Education:

BSE, Cornell University, 1970, Electrical Engineering
MS, Stanford University, 1972, Electrical Engineering
PhD, Stanford University, 1974, Electrical Engineering

Employment:

Department of Electrical Engineering and Computer Science, University of Michigan

Assistant Professor, 1974-79
Associate Professor, 1979-84
Professor, 1984 to present
Associate Chair, 1984-89
Associate Chair, 2008-

Sabbaticals

ATT Bell Laboratories, Sept.-June 1989-90
Lucent Bell Laboratories, Jan.-May 1997
Eschbach Visiting Scholar, Electrical Engineering and Computer Science Dept., Northwestern University, Sept.-Dec. 2005

Honors and Awards:

1938E Distinguished Service Award, College of Engineering, Univ. of Mich., 1978.

College of Engineering Excellence in Service Award, Univ. of Mich., 1992.

IEEE Fellow, 1994.

EECS Dept. Outstanding Achievement Award, 1999.

IEEE Information Theory Society Service Award, 2001.

Stephen S. Atwood Award, College of Engineering, Univ. of Mich. 2003.

Endowed Chair -- Joseph E. and Anne P. Rowe Professor of Electrical Engineering, 2005.

University Service:

ECE Representative Committee, 1975-76, Winter 77, 82-84
ECE Dept. Seminar Committee, 1975-76, chair, 1984-86
College Course Evaluation Committee, 1975-76
Communications Curriculum Subcommittee Committee, chair, 1976-77, 1979-80
CICE Curriculum Committee, 1977-81, Chairman 1978-81
CE Curriculum Committee, 1977-81, Chairman 1978-81
Marshal at Graduation, 1977-80, 83
Faculty Search Committee in Communications, chair, 1979-83
Systems Engineering Lab. Chair, 1979-80
CICE Program Committee, 1980-82
Curriculum Subcommittee on CE Circuits, chair, 1980-81
CICE Financial Aid Chair,1982-89
CICE Review Committee, chair, 1982-83
CICE Transition Committee, 1983-84
ECE/CCS Merger Committee, 1983
Associate Chair, EECS Dept., 1984-1989
EE Executive Committee, 1984-86
EECS Administrative Committee, 1984-89
EECS Graduate Affairs Committee, chair, 1984-87
EECS Computing Services Committee, 1984-86
SSE Faculty Search Committee, 1984-89,90-91, 92-95; chair, 1984-85, 88-89, 90-91
Control Coordinating Committee, 1984-89
Search Committee for Department Chair, chair, 1986-87
EECS Executive Committee, 1986-89, 1999-2001.
SSE Executive Committee, chair, 1986-89
EECS Financial Aid Committee, chair, 1984-87
SSE Graduate Committee, 1990-95
Graduate Advisor in Communications 1990-93
College Nominating Committee, 1991-92; chair, 1992
ESE/SSE Curriculum Committee, chair, 1993-96
Communications Area Chair of the EECS Dept., 1990-1996
Communications and Signal Processing Laboratory Director, 1992-1996
CSPL Seminar Series Organizer, 1990-94
Undergraduate EE Advisor, 1997-2000
Faculty Search Committee in Communications, 1997-1999
Systems Faculty Search Committee, 1999-2001; chair 2000-2001
Organizer of the Claude Shannon statue installation and ceremony, 2001
EECS Undergraduate Degrees Committee, 1999-2000
ECE Executive Committee, 2002-2005, 2007-
ECE Administrative Committee, 2008-
EECS Administrative Committee, 2008-
EECS Honors and Awards Committee, 2001-2002, 2006-; chair, 2006-8
ECE Faculty Search Committee, chair, 2002-05; member 2009
EECS Building Renovation Committee, 2003-06

Rackham Faculty Grants Board, 2003
College Honors and Awards Committee, 2006-7
College Scholarship Committee, 2006-07
College Research Strategy Committee, 2007
ECE Chair Search Advisory Committee, chair, 2007-08
ECE Graduate Affairs Committee, chair, 2009-2011
ECE Graduate Academics Committee, chair, 2009-2011
University Library Council, 2009-2010
ECE ABET Committee, 2011
ECE Fundraising and Development Committee, 2011-12

Professional Activities:

Director, Division I, Southeastern Michigan Section, IEEE, 1978

Publicity Chair for the 1981 IEEE International Symposium on Information Theory

Co-Chair, IEEE International Symposium on Information Theory, 1986

Associate Editor, *IEEE Transactions on Information Theory,* 1986-89

Member, Board of Governors, IEEE Information Theory Society 1988-1990, 2002-2008.

Member, NSF Grant Review Panels: Nov. 1991, June 1994, Nov. 1995, Feb. 2000, Oct. 2003, Oct. 2008.

Session Co-Organizer, IEEE Information Theory Workshop, Salvador, Brazil, June 1992

Tutorials Chair, ICASSP '95

Session Co-Organizer, IEEE Information Theory Workshop, Rydyzna, Poland, June 1995

Associate Editor for special issue of *IEEE Transactions on Image Processing*, Feb. 1996

Session Co-Organizer, IEEE Information Theory Workshop, Killarney, Ireland, June 1998

Member, Committee of Visitors, NSF Networking and Communications Program, Feb. 1998

Program Committee, IEEE Int. Conf. on Image Processing (ICIP), 1998-2004

Program Committee, IEEE Int. Conf on Speech & Signal Processing (ICASSP), 2003

Program Committee, IEEE Data Compression Conference, 2001, 2002

Program Committee, IEEE International Symposium Information Theory (ISIT), 2003, 2012

Program Committee, IPSN, 2004-5

Chair, Ad-Hoc Committee of IEEE Information Theory Society for commissioning and installing the Claude Shannon Statue in Gaylord, MI, Oct. 6, 2000. Copies of the statue have also been installed at the Univ. of Michigan, MIT, Lucent Bell Labs, ATT Shannon Labs, UCSD.

Second Vice-President, First Vice-President, President, Junior Past President, Senior Past President, IEEE Information Theory Society, 2004-2008.

Technical Co-Chair, 2012 IEEE Statistical Signal Processing Workshop.

IEEE Information Theory Society Nominating Committee, 2011-2013.

MS Thesis Supervised

1. "Backward Adaptive Architecture for Progressive Image Coding," Kumar C. Gopalakrishnan, 1998.

PhD Theses Supervised:

1. "Rate Distortion Functions for Continuous Alphabet Memoryless Sources," Stephen Lynn Fix, 1977.
2. "Coding for a Class of Sources," Roberto García-Muñoz, 1980.
3. "Direct Sequence Spread Spectrum Communications: Applications to Multiple Access and Jamming Resistance," Kou-Tan Wu, 1981.
4. "Causal Encoding of Markov Sources," R. Kent Gilbert, 1983.
5. "Source Coding of Composite Sources," Michael J. Carter, 1984.
6. "Problems in Coding," Razmik Karabed, 1985.
7. "Fast Vector Quantization," Nader Moayeri, 1986.
8. "Source Coding for Line Drawings," Taejeong Kim, 1986.
9. "Predictive Quantization of Autoregressive and Composite Random Processes," Morteza Naraghi-Pour, 1987.
10. "Source Coding of Composite Sources with Segmental Fidelity Measures," Sangsin Na, 1989.
11. "Input-Constrained Channels and Finite-State Codes," Ali Khayrallah, 1989
12. "Asymptotic Quantization Error and Cell-Conditioned Two-Stage Vector Quantization," Don H. Lee, Dec. 1990.
13. "Source-Channel Coding with Applications to Digital Magnetic Recording", Stephen W. McLaughlin, May 1992.
14. "Fundamental Limits of Low-Rate Transform Codes," Daniel F. Lyons, Aug. 1992.
15. "Block-Constrained Methods of Fixed-Rate Entropy Constrained Quantization," Ahmed Balamesh, Jan. 1993.
16. "Hierarchical Data Compression," Chia-Yuan Teng, Sept. 1996.
17. "Optimizing the Motion Vector Accuracy in Block-Based Video Coding," Jordi Ribas-Corbera, Sept. 1996.
18. "Asymptotic Performance and Complexity of Quantization," Dennis Hui, Jan. 1998.
19. "Perceptual Image Coding Using a Cortical Snapshot Model of Human Vision," Michael Horowitz, Feb. 1998.
20. "Asymptotic Analysis of Lattice-Based Quantization," Peter Moo, Aug. 1998.
21. "Joint and Tandem Source-Channel coding with Complexity and Delay Constraints," Jongtae Lim, May 2001.
22. "Frog-in-the-Box Codes and Robust Quantization," Sungill Kim, Oct. 2001.
23. "Data Synchronization with Timing", Navin Kashyap, Oct. 2001.
24. "Lossless Image Compression Using Combinations of Simple Components," Marko Slyz, June, 2002.
25. "Methods and Design Algorithms for Predictive Quantization of Signals and Images," Kevin M. Holt, Jan. 2004.

26. "Asymptotic Quantization and Applications to Sensor Networks," Daniel Marco, Sept. 2004.
27. "Optimal Redundant Index Assignment for Robust Vector Quantization: An Approach to Joint Source-Channel Coding," Ilju Na, June 2007.
28. "Studies on the Asymptotic Behavior of Parameters in Optimal Scalar Quantization," Victoria Yee, Jan. 2010.
29. "Cutset Based Processing and Compression of Markov Random Fields," Matthew G. Reyes, Jan. 2011.
30. "Throughput Scaling and Data Gathering in Ad Hoc Wireless Networks," Awlok S. Josan, May 2011.

Courses Taught Since 2000 – all EECS

				Q1	Q2
Fall	2000	550	Information Theory	4.18	4.61
Fall	2001	206	Signals and Systems I	2.95	3.26
Fall	2001	206	Signals and Systems I	3.33	3.74
Winter	2001	651	Source Coding Theory	4.18	4.32
Winter	2002	206	Signals and Systems I	3.77	3.97
Winter	2002	206	Signals and Systems I	3.58	4.13
Fall	2002	501	Probability and Random Processes	4.08	4.43
Fall	2003	501	Probability and Random Processes	4.19	4.60
Winter	2003	651	Source Coding Theory	4.31	4.31
Fall	2004	550	Information Theory	4.38	4.86
Winter	2004	556	Image Processing	4.40	4.40
Winter	2005	651	Source Coding Theory	4.38	4.60
Fall	2006	455	Digital Communications Signals & Systems	4.58	4.20
Winter	2006	556	Image Processing	4.14	4.25
Fall	2007	501	Probability and Random Processes	4.62	4.58
Winter	2007	651	Source Coding Theory	3.75	3.88
Winter	2008	501	Probability and Random Processes	4.31	4.63
Fall	2008	550	Information Theory	4.28	4.63
Fall	2009	550	Information Theory	4.85	4.79
Fall	2010	651	Source Coding Theory	4.79	4.86
Fall	2011	550	Information Theory	4.69	4.85

Courses Created

EECS 206 Signals and Systems I, co-created with G. Wakefield; no longer offered
CICE 524, Introduction to Digital Communications and Coding; now EECS 554
CICE 625, Coding for Communications; now EECS 650, Channel Coding Theory
CICE 626, Source Coding; now EECS 651, Source Coding Theory

Publications:

Journal Articles

1. D.L. Neuhoff, "The Viterbi Algorithm as an Aid in Text Recognition," *IEEE Trans. Inform. Thy.,* Vol. IT-21, pp. 222-226, March 1975.
2. R.M. Gray, D.L. Neuhoff, and P.C. Shields, "A Generalization of Ornstein's $\overline{d}$ Distance with Applications to Information Theory," *Annals of Probability,* Vol. 3, No. 2, pp. 315-328, 1975.
3. David L. Neuhoff, R.M. Gray and L.D. Davisson, "Fixed-Rate Universal Block Source Coding with a Fidelity Criterion," *IEEE Trans. Inform. Thy.,* Vol. IT-21, pp. 511-523, September 1975.
4. R.M. Gray, D.L. Neuhoff, and J.K. Omura, "Process Definitions of Distortion-Rate Functions and Source Coding Theorems," *IEEE Trans. Inform. Thy.,* Vol. IT-21, pp. 524-532, September 1976.
5. R.M. Gray, D.L. Neuhoff and D.S. Ornstein, "Nonblock Source Coding with a Fidelity Criterion," *Annals of Probability,* Vol. 3, No. 3, pp. 478-491, 1975.
6. P.C. Shields and D.L. Neuhoff, "Block and Sliding-Block Codes," *IEEE Trans. Inform. Thy.,* Vol. IT-23, pp. 211-215, March 1977.
7. P.C. Shields, D.L. Neuhoff, L.D. Davisson and F. Ledrappier, "The Distortion-Rate Function for Nonergodic Sources, " *Annals of Probability,* Vol. 6, No. 1, pp. 138-143, 1978.
8. D.L. Neuhoff and P.C. Shields, "Fixed-Rate Universal Codes for Markov Sources," *IEEE Trans. Inform. Thy.,* Vol. IT-24, pp. 360-366, May 1978.
9. A. Leon-Garcia, L.D. Davisson and D.L. Neuhoff, "New Results on Coding of Stationary Nonergodic Sources," *IEEE Trans. Inform. Thy.,* Vol. IT-25, pp. 137-144, March 1979.
10. D.L. Neuhoff and P.C. Shields, "Channels with Almost Finite Memory," *IEEE Trans. Inform. Thy.,* Vol. IT-25, pp. 440-447, July 1979.
11. D.L. Neuhoff and P.C. Shields, "Indecomposable Finite State Channels and Primitive Approximation," *IEEE Trans. Inform. Thy.,* Vol. IT-28, pp. 11-18, January 1982.
12. R. Garcia-Muñoz and D.L. Neuhoff, "Strong Universal Source Coding Subject to A Rate-Distortion Constraint," *IEEE Trans. Inform. Thy.,* Vol. IT-28, pp. 285-295, March 1982.
13. D.L. Neuhoff and P.C. Shields, "Channel Entropy and Primitive Approximation," *Annals of Probability,* Vol. 10, No. 1, pp. 188-198, 1982.
14. D.L. Neuhoff and R.K. Gilbert, "Causal Source Codes," *IEEE Trans. Inform. Thy.,* Vol. IT-28, pp. 701-713, September 1982.
15. D.L. Neuhoff and P.C. Shields, "Channel Distances and Exact Representation," *Information and Control,* Vol. 55, Nos. 1-3, October/November/December 1982.
16. D.L. Neuhoff and K.G. Castor, "A Rate and Distortion Analysis of Chain Codes for Line Drawings," *IEEE Trans. Inform. Thy.,* Vol. IT-31, pp. 53-68, January 1985.

17. D.L. Neuhoff and R. Garcia-Muñoz, "Robust Source Coding of Weakly Compact Classes," *IEEE Trans. Inform. Thy.,* Vol. IT-33, No. 4, pp. 522-530, July 1987.
18. T. Kim and D.L. Neuhoff, "Delta Codes for Line Drawings," *IEEE Trans. on Inform. Thy.,* Vol. 34, No. 3, pp. 400-416, May 1988.
19. M. Naraghi-Pour and D.L. Neuhoff, "Mismatched DPCM Encoding of Autoregressive Processes," *IEEE Trans. Inform. Thy.*, Vol. 36, pp. 296-304, March 1990.
20. M. Naraghi-Pour and D.L. Neuhoff, "On the Continuity of the Stationary State Distribution of DPCM," *IEEE Trans. Inform. Thy.*, Vol. 36, pp. 305-311, March 1990.
21. M. Naraghi-Pour and D.L. Neuhoff, "Convergence of the Projection Method for an Autoregressive Process and A Matched DPCM Code," *IEEE Trans. Inform. Thy.*, Vol. 36, pp. 1255-1264, Nov. 1990.
22. N. Moayeri, D.L. Neuhoff and W.E. Stark, "Fine-Coarse Vector Quantization," *IEEE Trans. Signal Processing*, Vol. 39, pp. 1503-1515, July 1991.
23. N. Moayeri and D.L. Neuhoff, "Theory of Lattice-Based Fine-Coarse Vector Quantization," *IEEE Trans. Inform.Thy.*, Vol. 37, pp. 1072-1084, July 1991.
24. N. Merhav and D.L. Neuhoff, "Variable-to-Fixed Length Codes Provide Better Large Deviations Performance than Fixed-to-Variable Length Codes," *IEEE Trans. Inform. Thy.*, Vol. 37, pp. 135-139, Jan. 1992.
25. S.W. McLaughlin and D.L. Neuhoff, "Upper Bounds on the Capacity of the Digital Magnetic Recording Channel," *IEEE Trans. Magnetics*, Vol. 29, pp. 59-66, Jan. 1993.
26. T. Pappas, C-K Dong and D.L. Neuhoff, "Measurement of Printer Parameters for Model-Based Halftoning", *Jourrnal of Electronic Imaging*, Vol 2, pp. 193-204, July 1993.
27. D.L. Neuhoff and T.N. Pappas, "Perceptual Coding of Images for Halftone Display," *IEEE Trans. Image Processing*, Vol. 3, pp. 1-13, Jan. 1994; reprinted in Vol. 3, pp. 341-354, July, 1994 (due to errors in figure reproduction).
28. S.W. McLaughlin and D.L. Neuhoff, "Source-Channel Coding of Analog Data for Digital Magnetic Recording," *IEEE Trans. Magnetics*, Vol. 30, pp. 128-144, Jan. 1994.
29. N. Moayeri and D.L. Neuhoff, "Time-Memory Tradeoffs in Vector Quantizer Codebook Searching Based on Decision Trees," *IEEE Trans. Speech and Audio Proc.*, Vol. 2, pp. 490-506, Oct. 1994.
30. T.N. Pappas and D.L. Neuhoff, "Printer Models and Error Diffusion," *IEEE Trans. Image Processing*, Vol. 4, pp. 66-80, Jan. 1995.
31. S. Na and D.L. Neuhoff, "Bennett's Integral for Vector Quantizers," *IEEE Trans. Inform. Thy.*, Vol. 41, pp. 886-900, July 1995.
32. S.W. McLaughlin, J. Ashley and D.L. Neuhoff, "Optimal Binary Index Assignments for a Class of Equiprobable Scalar and Vector Quantizers," *IEEE Trans. Inform. Thy.*, Vol. 41, pp. 2031-2037, Nov. 1995.
33. D.H. Lee and D.L. Neuhoff, "Asymptotic Distribution of the Errors in Scalar and Vector Quantizers," *IEEE Trans. Inform. Thy.*, Vol. 42, pp. 446-460, March 1996.

34. D.L. Neuhoff, "On the Asymptotic Distribution of the Errors in Vector Quantization," *IEEE Trans. Inform. Thy.*, Vol. 42, pp. 461-468, March 1996.

36. A.S. Khayrallah and D.L Neuhoff, "Coding for Channels with Cost Constraints," *IEEE Trans. Inform. Thy.*, Vol. 42, pp. 854-867, May 1996.

36. D.L. Neuhoff and T.N. Pappas, "One-Dimensional Least-Squares Model-Based Halftoning," *Journal of the Optical Society of America A*, Vol. 14, pp. 1707-1723, Aug. 1997.

37. J. Ribas-Corbera and D.L. Neuhoff, "Optimizing Block Size in Motion Compensated Video Coding," *Journal of Electronic Imaging*, Vol. 7, pp. 155-165, Jan. 1998.

38 D.L. Neuhoff and P.C. Shields, "Simplistic Universal Coding," *IEEE Trans. Inform. Thy.*, Vol. 44, pp. 778-781, March 1998.

39. D. Hui, D.F. Lyons and D.L. Neuhoff, "Reduced Storage VQ via Secondary Quantization," *IEEE Trans. Image Processing*, Vol. 7, pp. 477-495, April 1998.

40. R.M. Gray and D.L. Neuhoff, "Quantization," *IEEE Trans. Inform. Thy.*, Vol. 44, pp. 2325-2383, Oct. 1998.

41. T. N. Pappas and D.L Neuhoff, "Least-Squares Model-Based Halftoning," *IEEE Trans. Image Processing*, Vol. 8, pp. 1102-1116, Aug. 1999.

42. N. Memon, D.L. Neuhoff and S. Shende, "An Analysis of Some Common Scanning Techniques for Lossless Image Coding," *IEEE Trans. Image Proc.*, Vol. 9, pp. 1837-1848, Nov. 2000.

43. D. Hui and D.L. Neuhoff, "Asymptotic Analysis of Optimal Fixed-Rate Uniform Scalar Quantization," *IEEE Trans. Inform. Thy.*, Vol. 47, pp. 957-977, Mar. 2001.

44. J. Ribas-Corbera and D.L. Neuhoff, "Optimizing Motion Vector Accuracy in Block-Based Video Coding," *IEEE Trans. Circuits and Systems for Video Technology*, Vol. 11, pp. 497-511, Apr. 2001.

45. N. Kashyap and D.L. Neuhoff, "Data Synchronization with Timing," *IEEE Trans. Inform. Theory*, Vol. 47, pp. 1444-1460, May 2001.

46. N. Kashyap and D.L. Neuhoff, "On Quantization with the Weaire-Phelan Partition," *IEEE Trans. Inform. Theory*, vol. 47, pp. 2538-2543, Sept. 2001.

47. S. Na and D.L. Neuhoff, "On the Support of MSE-Optimal Fixed-Rate Scalar Quantizers," *IEEE Trans. Inform. Theory*, vol. 47, pp. 2972-2982, Nov. 2001.

48. Jongtae Lim and D.L. Neuhoff, "Joint and Tandem Source-Channel Coding with Complexity and Delay Constraints," *IEEE Trans. Commun.,* Vol. 51, pp. 757-766, May 2003.

49. T.N. Pappas, J.P. Allebach, D.L. Neuhoff, "Model-Based Digital Halftoning," *IEEE Signal Processing Magazine*, vol. 20, pp. 14-27, July 2003.

50. D. Marco and D.L. Neuhoff, "The Validity of the Additive Noise Model for Uniform Scalar Quantizers", *IEEE Trans. Inform. Theory,* pp. 1739-1755, May 2005.

51. N. Kashyap and D.L. Neuhoff, "Periodic Prefix-Synchronized Codes: A Generating Function Approach," *IEEE Trans. Inform. Theory*, vol. 52, pp. 538-548, Feb. 2006.

52. D. Marco and D.L. Neuhoff, "Low Resolution Scalar Quantization for Gaussian Sources and Squared Error," *IEEE Trans. Inform. Theory*, vol. 52, pp. 1689-1697, April 2006.
53. D. Marco and D.L. Neuhoff, "Low Resolution Scalar Quantization for Gaussian Sources and Absolute Error," *IEEE Trans. Inform. Theory*, vol. 53, pp. 1177-1179, Mar. 2007.
54. K.M. Holt and D.L. Neuhoff, "Deterministic Annealing for Entropy Constrained Vector Quantizer Design, *IEEE Trans. Inform. Theory*, vol. 54, pp. 4305-4323, Sept. 2008.
55. N. Kashyap and D.L. Neuhoff, "Data Synchronization with Timing: The Variable-Rate Case," *IEEE Trans. Inform. Theory*, vol. 55, pp. 46-52, Jan. 2009.
56. D. Marco and D.L. Neuhoff, "Entropy of Highly Correlated Quantized Data," *IEEE Trans. Inform. Theory*, vol. 56, pp. 2455-2478, April 2010.
57. S. Na and D.L. Neuhoff, "Asymptotic MSE Distortion of Mismatched Uniform Scalar Quantization," *IEEE Trans. Inform. Theory*, vol. 58, pp. 3169-3181, May, 2012.
58. A. Josan, D. Marco and D.L. Neuhoff, "Reliability and Efficiency of Distributed Source Coding Schemes for Wireless Sensor Networks," submitted to *IEEE Trans. Inform. Theory*, Jan. 2011.
59. D.L. Neuhoff and S.S. Pradhan, "Information Rates of Densely Sampled Gaussian Data: Distributed Vector Quantization and Scalar Quantization with Transforms," submitted to *IEEE Trans. Inform. Theory*, Dec. 2011.
60. J. Zujovic, T.N. Pappas and D.L. Neuhoff, "Structural Texture Similarity Metrics for Image Analysis and Retrieval," submitted to *IEEE Trans. Image Proc.*, April 2012.
61. T.N. Pappas, D.L. Neuhoff, H. de Ridder and J. Zujovic, "Image Analysis: Renewed Focus on Texture," invited, submitted to *IEEE Proceedings*, June 2012.
62. J. Zujovic, T.N. Pappas, D.L. Neuhoff, R. van Egmond and H. de Ridder, "Effective and Efficient Subjective Testing of Texture Similarity Metrics," submitted to *IEEE Trans. Image Proc.*, Sept. 2012.
63. M.G. Reyes, D.L. Neuhoff and T.N. Pappas, "Lossy Cutset Coding of Bilevel Images Based on Markov Random Fields," submitted to *IEEE Trans. Image Proc.*, Dec. 2012.

Book Chapters

1. David L. Neuhoff and S. Sandeep Pradhan, "On the Number of Bits to Encode the Outputs of Densely Deployed Sensors", in *Networked Sensing Information and Control,* V. Saligrama, Ed, Springer-Science, 2008.

Technical Reports

1. "Extended Function Integrated Communication and Identification (ICNI) System," with A. Naylor, R. Howe, J. Meyer, W. Ribbens, and J. Waller; The University of Michigan Systems Engineering Laboratory; Report No. 89, October 1975.
2. "On the Converse Information Transmission Theorem," The University of Michigan Computer, Information and Control Engineering (CICE) Technical Report, No. 77-4, January 1977.
3. "The Probability Distribution of Bursts of Errors and the Gaps Between Them in the Data Retrieved from Disks," with R. Karabed, technical report presented to IBM, June 1983.
4. "Reduced Tolerance Imaging II," with J.R. Fienup, et. al., ERIM Technical Report, September 1987.
5. "The Capacity of Costly Noiseless Channels," with R. Karabed and A. Khayrallah, IBM Technical Report RJ6040 (59639), January 1988.
6. "Estimating the Key Parameter in Scalar Quantization," with S. Na, The University of Michigan Communications & Signal Processing Laboratory, Technical Report No. 266, January 1989.
7. D.L. Neuhoff and T.N. Pappas, "Perceptual Coding for Halftone Display," AT&T Technical Memorandum, #11224-910326-05TM, March 26, 1991.
8. T.N. Pappas and D.L. Neuhoff, "Model-Based Halftoning," AT&T Technical Memorandum, # 11224-910326-05TM, March 26, 1991.
9. A. Khayrallah and D.L. Neuhoff, "Bounds to the Capacity of Discrete Memoryless Channels," EE Dept. Report Series, Univ. of Delaware.
10. A. Khayrallah and D.L. Neuhoff, "On Sliding-Block Decoders for Input-Constrained Channels", EE Dept. Report Series, Univ. of Delaware.
11. D.L. Neuhoff and S.W. McLaughlin, "Source-Channel Coding of Analog Data for Digital Magnetic Recording, Final Report Part I," Final Technical Report, IBM SUR Grant 719311, July 29, 1991.
12. D.L. Neuhoff, "Coding for Costly Noiseless Channels, Final Report Part II," Final Technical Report, IBM SUR Grant 719311, July 29, 1991.
13. D.L. Neuhoff and T.N. Pappas, "One-Dimensional Least-Squares Model-Based Halftoning," AT&T Technical Memorandum, Nov., 1991.
14. A.S. Balamesh and D.L. Neuhoff, "Block-Constrained Methods of Entropy-Coded Scalar Quantization," CSP Tech. Report TR 350, Sept. 1992.
15. D. Marco and D.L. Neuhoff, "Low Resolution Scalar Quantization for Gaussian and Laplacian Sources with Absolute and Squared Error Distortion Measures," CSPL Tech Report TR 372, Jan. 2006.

Conference Proceedings

1. R.M. Gray, D.L. Neuhoff and L.D. Davisson, "Distance Measures on Classes of Random Processes with Applications to Source Coding," *Proc. Princeton Conf. on Information Sciences and Systems,* 1974.

2. D.L. Neuhoff, "Optimal Source Coding for Stationary Nonergodic Sources," *Proc. Allerton Conf.,* Monticello, IL, pp. 325-334, Oct. 1975.
3. D.L. Neuhoff, "Causal Source Codes," *Proc. AFOSR Workshop in Communication Theory and Applications,* Provincetown, MA, Sept. 1978.
4. D.L. Neuhoff, "Causal Source Coding," *Proc.. Allerton Conf.,* Monticello, IL, pp. 735-743, Oct. 1978.
5. R.K. Gilbert and D.L. Neuhoff, "Bounds to the Performance of Causal Codes for Markov Sources," *Proc. Allerton Conf.,* pp. 284-292, Monticello, IL, Oct. 1979.
6. K.T. Wu and D.L. Neuhoff, "Average Error Probability for Direct Sequence Spread Spectrum Multiple Access Communication Systems," *Proc. Allerton Conf.,* Monticello, IL, pp. 359-368, Oct. 1980.
7. D.L. Neuhoff and K.G. Castor, "A Rate and Distortion Analysis for Grid Intersect Quantization of Line Drawing Images," *Proc. Allerton Conf.,* pp. 976-984, Monticello, IL, Oct.1980.
8. R. Garcia-Muñoz and D.L. Neuhoff, "Coding for a Bank of Sources," *Proc. IEEE ICC,* pp. P.65.2.1-P.65.2.4, Denver, CO, June 1981.
9. D.L. Neuhoff and K.G. Castor, "A Rate and Distortion Analysis for Grid Intersect Encoding of Line Drawings," *Proc. IEEE Computer Society Conf. on Pattern Recognition and Image Processing,* pp. 237-239, Dallas, TX, Aug. 1981.
10. M.J. Carter and D.L. Neuhoff, "DPCM Encoding of Regenerative Composite Sources," *Proc. Allerton Conf.,* pp. 51-59, Monticello, IL, Oct.1981.
11. R. Garcia-Muñoz and D.L. Neuhoff, "Strong Robust Source Coding," *Proc. NTC,* pp. F4.6.1-F4.6.5, Nov. 1981.
12. R. Garcia-Muñoz and D.L. Neuhoff, "On the Existence of Strong Robust Codes," *Proc. IEEE ICC,* Vol. 2, pp. 4H.5.1-4H.5.4, Philadelphia, PA, June 1982.
13. M.J. Carter and D.L. Neuhoff, "Bounds to the Rate-Distortion Function for Regenerative Composite Sources," *Proc. Allerton Conf.,* pp. 680-681, Monticello, IL, Oct.1982.
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18. "Non-Block Source Coding of Regenerative Composite Sources," with M.J. Carter, IEEE Int'l Symp. on Inform. Thy, Les Arcs, France, June 1982.
19. "Bounds to the Performance of Causal Source Codes for Discrete Markov Sources," with R.K. Gilbert, IEEE Int'l Symp. on Inform. Thy, St. Jovite, Quebec, Canada, Sept. 1983.
20. "On the Rate-Distortion for Composite and Interrupted Sources," with M.J. Carter, IEEE IEEE Int'l Symp. on Inform. Thy, St. Jovite, Quebec, Canada, Sept. 1983.
21. "The Capacity of a Class of Constrained Input Noiseless Channels," with R. Karabed, IEEE Int'l Symp. on Inform. Thy, Brighton, England, June 1985.
22. "Efficient Chain Codes for Slowly Curving Lines," with T. Kim, IEEE Int'l Symp. on Inform. Thy, Brighton, England, June 1985.
23. "Performance Analysis of a Fast Vector Quantization Scheme," with N. Moayeri, IEEE Int'l Symp. on Inform. Thy, Ann Arbor, MI, Oct. 1986.
24. "The Asymptotic Distribution of the Error in Scalar and Vector Quantizers," with D.H. Lee, IEEE Int'l Symp. on Inform. Thy, San Diego, Jan. 1990.
25. "Bennett's Integral for Vector Quantizers, and Applications," with S. Na, IEEE Int'l Symp. on Inform. Thy, San Diego, Jan. 1990.
26. "Bounds to the Capacity of Discrete Memoryless Channels with Input Constraints," with A. Khayrallah, *IEEE Int'l Symp. on Inform. Thy*, San Diego, Jan. 1990.
27. N. Merhav and D.L. Neuhoff, "Variable-to-Fixed Lengh Codes Provide Better Large Deviations than Fixed-to-Variable Length Codes," IEEE Information Theory Workshop, Eindhoven, Netherlands, June 1990.
28. T.N. Pappas, D.L. Neuhoff and N. Seshadri, "Model-Based Halftoning," IEEE Signal Workshop on Multidimensional Signal Processing, Lake Placid, NY, Sept. 1991.
29. D.L. Neuhoff, "The Other Asymptotic Theory of Lossy Source Coding," IEEE Information Theory Workshop, Salvador, Brazil, pp. 15-17, June 1992.
30. D.F. Lyons and D.L. Neuhoff, "A Coding Theorem for Low-Rate Transform Codes," Joint DIMACS/IEEE Workshop on Coding and Quantization, Rutgers, October 1992.
31. D.L. Neuhoff, "Shift Spaces, Encoders and Decoders," IT Workshop on Coding, System Theory and Symbolic Dynamics," Mansfield, MA, Oct. 1993.
32. N. Kashyap and D.L. Neuhoff, "Synchronization with Timing," *IEEE Int'l Symp Inform. Thy.*, Cambridge, MA, Aug. 1998.
33. D.L. Neuhoff, "Time Stamp Coding: A Problem Shannon Did Not Address," invited, Shannon Symposium, U.C. San Diego, Oct. 16, 2001.
34. D. Marco, E.J. Duarte-Melo, M. Liu and D.L. Neuhoff, "On the Many-to-One Transport Capacity of a Dense Wireless Sensor Network and the Compressibility of Its Data," NSF ANIR PI Workshop, Reston, VA, Jan. 2003.
35. D.L. Neuhoff, "Field Gathering Sensor Network, Distributed Encoding and Oversampling," Canadian Workshop on Information Theory, Waterloo, Ont., May 2003.
36. M. Liu, D. Marco, E.J. Duarte-Melo, and D.L. Neuhoff, "The Limitations on Distributed Coding for Dense Field-Gathering Sensor Networks Due to Scalar

Quantization," IEEE Workshop on Statistical Signal Processing, St. Louis, Oct. 2003.

37. D.L. Neuhoff, "Lossy Source Coding of Oversampled Data,"Workshop on Information Theory and Its Applications," UC San Diego, Feb. 2006 (invited).
38. D. Neuhoff, "On the Number of Bits to Enocde the Outputs of Densely Deployed Sensors," NSF Workshop: Future Directions in Systems Research for Networked Systems, Boston, May 2006 (invited).
39. M.G. Reyes and D.L. Neuhoff, "Arithmetic Coding for Binary Markov Random Fields," ITA, San Diego, Feb. 2009.
40. D.L. Neuhoff, "Performance Limits of Dense Field Gathering Sensor Networks," Third Int'l Workshop on Inform. Thy. for Sensor Networks (WITS), IEEE Int'l Conf. on Distributed Computing in Sensor Systems (DCOSS), Marina Del Rey, CA, June 10, 2009 (keynote).
41. A. Farmer, A. Josan, M. Prelee, D.L. Neuhoff, M.G. Reyes, and T.N. Pappas, "Cutset Sampling and Reconstruction of Two-Dimensional Data," presented at ITA, San Diego, Feb. 2011.
42. D.L. Neuhoff and S.S. Pradhan, "High-Rate Performance of Continuous-Time Lossy Source Coding," presented at ITA, San Diego, Feb. 2012.

Patents

1. J.D. Johnston, D.L. Neuhoff, T.N. Pappas, R.J. Safranek and N. Seshadri, "Image Processing System," US 5,309,526, May 3, 1994.
2. D.J. Anderson, D.H. Lee, O. Nemri and D.L. Neuhoff, "Digital Audio Compression System," US 5,388,181, Feb. 7, 1995.
3. D.L. Neuhoff, T.N. Pappas, "Model-Based Halftoning" US 5,463,472, Oct. 31, 1995.
4. D.L. Neuhoff, T.N. Pappas, N. Seshadri, "Display Model-Based Error Criterion Halftoning," US 5,469,268, Nov. 21, 1995.
5. D.L. Neuhoff, T.N. Pappas, N. Seshadri, "Two-Dimensional Display Model-Based Error Criterion Halftoning," US 5,475,497, Dec. 12, 1995.
6. J.D. Johnston, D.L. Neuhoff, T.N. Pappas, R.J. Safranek and N. Seshadri, "Image Processing System," US 5,682,442, Oct. 28, 1997.

Invited Presentations (from 1988)

"Source Coding of Composite Sources with Segmental Fidelity Measures," Rutgers Univ. April 13, 1988.

"Source Coding of Composite Sources with Segmental Fidelity Criteria," presented jointly with Sangsin Na, UM, Feb. 29, 1988 in "Research Seminars in Communications" series.

"Hidden Markov Models," June 28, 1988, a tutorial seminar, part of a spring-summer series of such in communications in EECS at U.M. .

"Tree Structured Vector Quantization with Interblock coding," Jan. 23, 1989, Research Seminars in Communications, EECS Dept. U.M.. "Structured Vector Quantization", Univ. of Delaware, May 8, 1989.

"Structured Vector Quantization", Codex Corp., Mansfield, Mass., July 25, 1989

"On the Complexity Performance Tradeoff for Structured Vector Quantization," Princeton, Feb. 8, 1990.

"Asymptotic Analysis of Structured Vector Quantization," ATT Bell Labs, Murray Hill, April 11, 1990.

"Asymptotic Analysis of Structured Vector Quantization," Univ. of Maryland, April 13, 1990.

"Asymptotic Analysis of Structured Vector Quantization," Princeton Section of the IEEE Information Theory Society, Rutgers Univ., June 12, 1990.

"Quantization: Introduction and Geometrical Analysis", Tutorial Seminars in Systems, EECS Dept., UM, March 19, 1990

"Universal Lossless Data Compression: Ziv-Lempel and Arithmetic Coding", Tutorial Seminars in Systems Science, EECS Dept., UM, April 16, 1991.

"Tutorial on Data Compression," Infoscope Seminar, UM, April 26, 1991. "Source-Channel Coding for Digital Magnetic Recording," IBM Amaden Research Center, May 6, 1991.

"Storing Analog Data on Digital Magnetic Recording," IBM Amaden Research Center, Aug. 16, 1991.

"Error Diffusion Halftoning with a Printer Model," Stanford University, Aug. 19, 1991.

"Error Diffusion Halftoning with a Printer Model," IBM Almaden Research Center, Aug. 22, 1991.

"Error Diffusion Halftoning with a Printer Model," Hewlett Packard, Palo Alto, Aug. 23, 1991.

"Image Halftoning with Printer Models," CSPL Seminar, UM, March 5, 1992.

"New Methods of Fixed-Rate Entropy-Code Quantization," IBM Almaden Research Center, May 15, 1992.

"Source Channel Coding for Digital Magnetic Recording," EE Colloquium, Washington Univ., St. Louis, Dec. 11, 1992.

"The Other Asymptotic Theory of Lossy Source Coding," Illinois Institute of Technology, Chicago, Feb. 10, 1995.

"The Other Asymptotic Theory of Lossy Source Coding," Statistics Dept., UM, April 5, 1996.

"Restructuring the BSEE Program at the University of Michigan," Dept. of Electrical Engineering, University of Maryland, College Park, Nov. 12, 1996.

"The Turing Complexity of Quantization," EE Dept., Princeton, May 8, 1997.

"Quadtree Predictive Image Coding," CS Dept., Univ. of Western Ontario, April 15, 1998.

"Data Synchronization with Timing," with Navin Kashyap, CSPL Seminar, UM, June 16, 1999.

"Coding for Data Synchronization and Timing," Birck Distinguished Lecture, ECE Graduate Seminar Series, Purdue University, April 12, 2001.

"Coding for Data Synchronization and Timing," IBM Watson, Nov. 12, 2002.

"Field Gathering Sensor Network, Distributed Encoding and Oversampling," Plenary Talk, Canadian Workshop on Information Theory, Waterloo, Ont., May 2003.

"Field-Gathering Sensor Networks, Distributed Encoding and Oversampling," EE Dept., Cornell University, Jan. 25, 2005.

"Scaling Laws for Distributed Lossy Source Coding and Their Implications for Field-Gathering Sensor Networks," ECE Dept., Northwestern Univ., Nov. 3, 2005.

"Is Dense Sampling Good for Lossy Data Compression?" ECE Dept., Michigan State Univ., Oct. 31, 2008.

“Performance Limits of Dense Field Gathering Sensor Networks,” EECS Dept., Seoul National Univ., July 2009.

Tutorials

"Quantization Analysis (Theory of Lossy Data Compression)," half-day tutorial, IEEE ICASSP, Atlanta, May 1996.

"Model-Based Halftoning," with T. Pappas, half-day tutorial, IEEE ICIP, Kobe, Japan, Oct. 1999.