

Curriculum Vitae for
Charles G. Boncelet Jr.

1 Employment History:

University of Delaware

- Currently *Associate Chair of the ECE Department and Professor in the Departments of Electrical & Computer Engineering (ECE) and Computer & Information Sciences (CIS)*.
- First employed in 1984, promoted to Associate in 1989 and to Full Professor in 1995.
- Associate Chair of the ECE Dept. 2004–2006 and 2009–present, Interim Chair of the EE Dept., 1/94–8/94, Assistant Chair EE Dept., 1/90–6/90.
- *Visiting Associate Professor of Electrical Engineering and Computer Science*, University of Michigan, 8/92–12/92.
- *Visiting Professor*, Signal Processing Laboratory, Tampere University of Technology, Tampere Finland, 7/99–12/99.
- *Honorary Visiting Professor*, Australian Defence Force Academy, Canberra Australia, 1/00–7/00.
- President of the University of Delaware Faculty Senate, 2004–05.
- Member of the University of Delaware Faculty Senate, 1991–95, 2001–04.
- Chair of the following committees:
 - ECE Promotion & Tenure Committee, 2013.
 - ECE Undergraduate Committee, 2002–2006, 2009–present.
 - ECE Curriculum Committee, 2000–2001;
 - ECE Faculty Search Committee, 1999;
 - Faculty Senate Committee on Student and Faculty Honors, 1989–90;
 - Faculty Senate Committee on Committees, 1994–95;

Member of the following committees:

- University of Delaware Promotions and Tenure Committee, 2012–2014.
- College of Engineering Educational Activities Committee, 2009–present.
- College of Engineering Conflict of Interest Committee, 2008–2011.

- College of Engineering ABET Committee, 2000–2006, 2008.
 - College of Engineering First Year Committee, 2004–2006.
 - College of Engineering Promotion and Tenure Committee, 1997-99;
 - Computer and Information Sciences Chair Search Committee, 1998–99;
 - University Graduate Student Competitive Fellowship Committee, 1999;
 - College Support Services Committee, 1996;
 - University TA Development Advisory Committee, 1996-97;
 - College of Engineering Educational Ethics Committee, 1986–88;
 - EE graduate committee, 1985–94.
- Taught graduate courses in multimedia, signals and systems, information theory, and communications. Taught undergraduate courses in networking, multimedia, random signals and noise, digital circuit theory, analog circuit theory, digital signal processing, and freshman engineering.

Bell Telephone Laboratories: *Member of Technical Staff*, 1980–81. Studied interference in satellite communications.

2 Education

Ph.D., Electrical Engineering and Computer Science Princeton University, 1984. Advisor: Professor Bradley Dickinson. Dissertation title: *Approaches and Algorithms for Robust Signal Processing*.

M.S., Electrical Engineering and Computer Science Princeton University, 1981. Participated in the Bell Labs One Year On Campus (OYOC) program.

B.S., Applied and Engineering Physics Cornell University, 1980. Graduated with distinction (3.9 average). Received McMullen-Dean’s scholarship. Rowed on freshman lightweight crew.

3 Professional Activities and Research Summary

Professional Activities:

- Associate Editor, IEEE Transactions on Image Processing, 2013–present.
- Member, Electronics and Computer Engineering Technology Advisory Committee, Delaware Technical and Community College, 2012–present.
- Conference Co-Chair, 2012 Spring Meeting of the Mid-Atlantic Section of the ASEE.
- Conference Board, 2005 ICASSP Conference;
- Publications Chair, 2001 NSIP Conference;
- General Conference Chair, ARL/ATIRP Annual Conference, Jan. 1998;
- Member, IEEE Signal Processing Society Publications Board, 1997-2000;
- CD-ROM Publications Chair, *1995 IEEE International Conference on Image Processing*, Washington DC, Oct. 1995;
- Conference Co-Chair, *1991 and 1992 SPIE Conferences on Nonlinear Image Processing*, San Jose, CA;
- Reviewer for many journals and textbooks, including the IEEE Transactions on Signal Processing, Information Theory, Image Processing, Automatic Control, and Signal Processing Letters.
- Senior Member of IEEE. Member of SIAM, ASEE, the Delaware Academy of Science, Eta Kappa Nu, and Tau Beta Pi. Listed in Who's Who in America.

Research Summary: Current Interests include image processing, computer networking, data compression, information theory, communications, multimedia, and information security including steganography and steganalysis.

Research highlights include the following: several techniques for image steganography, tamperproofing and steganalysis, methods for message authentication, block arithmetic coding (BAC) for entropy coding, new lossless image compression methods, new bilevel image compression methods, quadtree methods for lossless and lossy image compression, several families of non-linear filters including the LI-filters and the LUM filters, fast algorithms for doing order statistic computations, a robust version of the Kalman filter, and combinatorial algorithms for robust estimation.

4 Consulting Work:

The following is a list of my consulting work, to the best of my recollection:

1. I regularly consult for the National Science Foundation, usually serving once yearly on a panel evaluating research proposals.
2. In 1991, I consulted with Alcoa Corporation on developing an automated test ultrasonic materials testing facility.
3. In April, 2005, I signed a retention agreement with Covington & Burling, Washington DC, to work on a case involving DSL. However, I did not do any work for them on this case.
4. From August, 2005 through November, 2006, I worked with Ropes & Gray on Ampex v. Kodak. I presented an expert report and gave a deposition. The case involved digital cameras. My primary contribution was in testifying as to the meaning of certain terms in the patent and in how the Kodak cameras infringed.
5. In March, 2007, I signed a retention agreement with Gibson, Dunn, & Crutcher to work on a case involving modulation on cable modems. I consulted with them through October, 2007, but did not write any reports or testify.
6. In April, 2007, I signed a retention agreement with Kirkland & Ellis, Washington DC, to work on a case involving image and video data compression. I worked for them through August, 2008, when I was told a settlement was reached.
7. Between June and December 2008, I consulted with the US Army Research Laboratory on a project involving hidden communications in images and videos.
8. In November 2008, I signed a retention letter with Rothwell, Figg, Ernst, & Manbeck. The case settled before I did any work for them.
9. In March through June 2009, I worked for Alcatel-Lucent reviewing several of their patents, mostly in the area of data compression, and opined on whether any have been infringed.
10. In July through August 2009, I worked with Rembrandt Technologies advising them on the technology presented in several patents.
11. From April 2009 though approximately April 2011, I worked with Kirkland & Ellis on a patent infringement case involving video transmission over wireless systems. Work on this case may continue if the case progresses further.
12. In March 2012 through June 2013, I worked with McCarter & English on a case involving wireless communications.

5 Graduate Students Supervised

Ph.D. Degrees:

- N. Khan, *Energy Efficient Communication and Rate Control Algorithms for Wireless Sensor Networks*, 2009.
- Y. Liu, *Research on Extended Noise Tolerant Message Authentication Codes and Image Authentication*, 2007.
- S. Xiao, *Advances in Image Modeling and Data Communications*, 2006.
- L. Marvel, *Image Steganography for Hidden Communication*, 1999.
- M. Reavy, *Topics in block arithmetic coding*, 1998.
- J. Shin, *The UDel switch: an approach to very large fast packet switches*, 1997.
- J. Wunderlich, *Optimal kinematic design of redundant and hyper-redundant manipulators for constrained workspaces*, 1996.
- C. Myrie, *A high performance digital multi-window quadtree video compression encoding system*, 1994.
- A. Jackson, *Periodic multicast scheduling in reservation-based TDMA networks*, 1993.
- R. Hardie, *Nonlinear filters for signal restoration and enhancement*, 1992.
- R. Hakami, *High performance systems for robust image enhancement and restoration*, 1991.
- F. Palmieri, *Nonlinear filtering for robust signal processing*, 1987.

M.S. Degrees:

- B. Zhu, in progress, 2013–2014.
- C. Thorpe, *Compression aided feature based steganalysis of perturbed quantization steganography in JPEG images*, 2007.
- N. Belal, *Simple, High Performance Lossless Image Compression*, 2005.
- V. Dasari, *Detection of Denial of Service Attacks in Wireless Networks*, 2005.
- D. Ulmer, *Broadcast Effectiveness Enhancement for Vehicle Safety Communications Using IEEE 802.11A*, 2004.
- K. Bao, *A New Algorithm for Still Image Compression*, 1999.
- H. Taylor, *Hyperspectral image compression for scientific applications*, 1998.
- J. Zhou, *DCT image compression with subband coding*, 1998.
- C. Hong, *DCT image compression with adaptive block-size segmentation*, 1996.

- L. Freed, *A comparison of block arithmetic coding with several other data compression techniques*, 1995.
- L. Marvel, *Robust source coding of images with predictive trellis coded quantization*, 1995.
- J. Donovan, *An interpolation scheme for image reconstruction with the MWQT algorithm*, 1995.
- M. Olds, *An interframe video modification of the JPEG image compression algorithm using differencing*, 1994.
- T. Hall, *A comparison of the JPEG standard for image compression with subband coding and the multi-window quadtree algorithm*, 1991.
- J. Holland, *Ocean thermal feature recognition, discrimination, and tracking using infrared satellite imagery*, 1991.
- B. Chang, *Applications for arithmetic coding: data compression, channel coding and error control*, 1991.
- S. Flynn, *Fast image decompression and display using the multi-window quadtree algorithm*, 1991
- G. Soemarwoto, *Robust Kalman filtering*, 1991.
- C. Buzzard, *Using a multi-window quadtree for image compression and decompression*, 1990.
- J. Cobbs, *Image compression using arithmetic coding techniques*, 1988.
- D. Hohman, *Robust smoothers applied to image filtering and enhancement*, 1987.
- S. Weber, *Ultrasonic nondestructive evaluation based upon complete waveform databases*, 1987.

6 Research Grants

- \$205,000, *Steganalysis of VOIP Steganography and Other Related Data and Data Analysis in Large Datasets*, CIA, Sept. 2010 – Sept. 2012.
- \$191,000, *Steganalysis of VOIP Telephone Calls*, Army Research Laboratory, Oct., 2009–Sept., 2011.
- \$15,200, *Undergraduate Projects at the University of Delaware*, Army CERDEC, Feb. 2010–Dec. 2010.
- \$40,000, *Undergraduate Projects at the University of Delaware*, Sept., 2009–March 2010.

- \$100,000, *University of Delaware Audio Study*, NSA, June–Dec, 2009.
- \$165,000, *Steganalysis of Image and Video Steganography*, NSF, Jan 2005–Dec. 2006.
- \$120,000, “Towards a Theory of Steganalysis for Images and Multimedia”, NGA, Aug. 2005–July 2006.
- \$4 million, Army Research Laboratory CTA on Telecommunications and Networking, C. G. Boncelet Jr. and 9 other UD faculty. Boncelet initially led UD’s participation in the larger consortium. 2001-2006.
- \$3.5 million, Army Research Laboratory Consortium on Telecommunications and Information Distribution, C. G. Boncelet Jr. and 8 other UD faculty. U. of D. is part of a large consortium with the consortium sharing \$46 million. Boncelet led the U.D. effort. Jan. 1996–2000.
- \$15,000, Delmarva Power, in support of research in telecommunications and the electric utilities, 1995.
- \$66,750, NSF-CISE Research Instrumentation, G. Arce *et al*, March 1994–July 1995.
- \$848,861, *Performance and policy dimensions in internet routing*, D. Mills and C. G. Boncelet Jr., Darpa/Nasa Ames, Feb. 1, 1990–Aug. 31, 1994.
- \$56,862, *Visual communications over networks*, C. G. Boncelet Jr. and G. Arce, DuPont Corporation and the State of Delaware Research Partnership, Dec. 1, 1989–May 31, 1991.
- \$25,000, *Research into routing in packet switched networks with arbitrary topologies*, C. G. Boncelet Jr., Bellcore, June 1, 1989–May 31, 1990.
- \$26,000, *Noiseless data compression with applications in digital radiography*, C. G. Boncelet Jr., DuPont Corporation, Sept. 1, 1987–Dec. 31, 1991.
- \$14,000, *A statistical and computational study of a new robust smoother*, C. G. Boncelet Jr., UDRF, Jan. 15, 1985–June 30, 1986.
- \$170,000, *A Computer Vision and Image Processing Laboratory*, I. Abdou, G. Arce, and C. G. Boncelet Jr. Unidel Foundation, 1985.

7 Patents

- “Safety System Electrical Connection and Methods,” C. G. Boncelet Jr., U. S. Patent #8770998.
- “Spread Spectrum Image Steganography,” C. G. Boncelet Jr., L. M. Marvel, and C. T. Retter, U. S. Patent #6557103.
- “Watermarking Methods for Digital Images and Videos,” X. Xia, C. G. Boncelet Jr., and G. Arce, U. S. Patent #6556689.

8 Publications

Refereed Journal Publications:

1. "Detecting Anomalies in Streams," M. Piccollelli, L. M. Marvel, and C. G. Boncelet Jr., *submitted*, 2013.
2. "On Relative Likelihood Ratios in Statistical Inference in Signal Processing," C. G. Boncelet Jr., Lisa M. Marvel, and Michael E. Piccollelli, submitted to *IEEE Trans. on Signal Processing*, April 2012.
3. "VoIP Steganalysis," C. G. Boncelet Jr. and Lisa M. Marvel, *Journal of Intelligence Community Research and Development*, 2012.
4. "The CRC-NTMAC for Noisy Message Authentication," Yu Liu and C. G. Boncelet Jr., *IEEE Trans. on Information Forensics and Security*, December 2006.
5. "On the Use of Context Weighting in Lossless Bilevel Image Compression," S. Xiao and C. G. Boncelet Jr., *IEEE Trans. on Image Processing*, November 2006.
6. "The NTMAC for Authentication of Noisy Messages," C. G. Boncelet Jr., *IEEE Trans. on Information Forensics and Security*, March 2006.
7. "Spread Spectrum Message Authentication," S. Xiao, D. Carman, and C. G. Boncelet Jr., submitted to *IEEE Trans. on Communications*, 2005.
8. "A New Message Authentication Approach with Less Overhead and Greater Reliability", D. Carman and C. G. Boncelet Jr., *Advanced Security Research Journal*, McAfee Security, vol. VI, no. 1, Spring 2004.
9. "An Algorithm for Compression of Bi-level Images," M. D. Reavy and C. G. Boncelet Jr., *IEEE Trans. on Image Processing*, May 2001.
10. "Extending the BACIC algorithm for robust transmission over a noisy channel," M. D. Reavy and C. G. Boncelet Jr., *IEEE Trans. on Image Processing*, Vol. 9, No. 12, December 2000.
11. "Robust source coding of images for very noisy channels," L. M. Marvel, A. Khayrallah, and C. G. Boncelet Jr., *IEEE Trans. on Signal Processing*, April 1999.
12. "Spread Spectrum Image Steganography", L. M. Marvel, C. G. Boncelet Jr., and C. T. Retter, *IEEE Transactions on Image Processing*, August 1999
13. "A Technique for Hiding Information in DCT Compressed Images and Videos," C. G. Boncelet Jr. and L. M. Marvel, submitted to the *IEEE Transactions on Image Processing*, July 1999.

14. "Tamper Detection Schemes for Compressed Images and Noisy Channels," L. M. Marvel, G. W. Hartwig, C. G. Boncelet Jr., submitted to the *IEEE Transactions on Multimedia*, September 1999.
15. "Wavelet Transform Based Watermark for Digital Images," X. Xia, C. G. Boncelet Jr., and G. A. Arce, *Optics Express*, vol 3, no. 12, December 1998.
16. "Capacity of the Steganographic Channel," L. M. Marvel and C. G. Boncelet Jr., submitted to the *IEEE Transactions on Communications*, May 1998.
17. "An Efficient DCT Based Embedded Image Coder," J. Zhou and C. G. Boncelet Jr., submitted to *IEEE Trans. on Image Processing*, March 1998.
18. "Geometric modeling of redundant manipulator kinematics in constrained workspaces using a local-optimization path planning technique," J. T. Wunderlich and C. G. Boncelet Jr., submitted to *IEEE Trans. on Robotics and Automation*.
19. "Gradient based edge detection using nonlinear edge enhancing prefilters," R. Hardie and C. G. Boncelet Jr., *IEEE Trans. on Image Processing*, Nov. 1995.
20. "A new VLSI architecture suitable for multi-dimensional order statistics filtering," R. Hakami, P. J. Warter, and C. G. Boncelet Jr., *IEEE Trans. on Signal Proc.*, April 1994.
21. "Block arithmetic coding for source compression," C. G. Boncelet Jr., *IEEE Trans. on Information Theory*, Sept. 1993.
22. "LUM filters: A class of rank-order-based filters for smoothing and sharpening," R. Hardie and C. G. Boncelet Jr., *IEEE Trans. Signal Proc.*, vol. 41, no. 3, pp. 1061–1076, March 1993.
23. "A labeling algorithm for just-in-time scheduling in TDMA networks," C. G. Boncelet Jr. and D. Mills, *Computer Communication Review*, vol. 22, no. 4, pp. 170–175, Oct. 1992.
24. "Order statistic distributions with multiple windows," C. G. Boncelet Jr., *IEEE Trans. on Information Theory*, vol. 37, no. 2, March 1991.
25. "Frequency analysis and synthesis of a class of nonlinear filters," F. Palmieri and C. G. Boncelet Jr., *IEEE Trans. on Acoust., Speech, and Signal Proc.*, vol. 38, no. 8, pp. 1363–1372, August 1990.
26. "LI-filters—A new class of order statistic filters," F. Palmieri and C. G. Boncelet Jr., *IEEE Trans. on Acoust., Speech, and Signal Proc.*, vol. 37, no. 5, pp. 691–701, May 1989.
27. "Algorithms to compute order statistic distributions," C. G. Boncelet Jr., *SIAM J. Sci. Stat. Comput.*, vol. 8, no. 5, September 1987.
28. "An extension to the SRIF Kalman filter," C. G. Boncelet Jr. and B. W. Dickinson, *IEEE Trans. on Automatic Control*, February 1987.
29. "A rearranged DFT algorithm requiring $N^2/6$ multiplications," C. G. Boncelet Jr., *IEEE Trans. on Acoust., Speech, and Signal Proc.*, December 1986.

30. "A variant of Huber robust regression," C. G. Boncelet Jr. and B. W. Dickinson, *SIAM J. Sci. Stat. Comput.*, vol. 5, no. 3, pp. 720-734, September 1984.

Books and Book Chapters

1. "Probability, Statistics, and Random Signals," C. G. Boncelet (in preparation, to be published by Oxford University Press, 2015).
2. "Image Noise Models," C. G. Boncelet, *The Essential Guide to Image Processing*, A. Bovik, Ed., Academic Press, 2008.
3. "Binary Image Compression", C. G. Boncelet, *Document and Image Compression*, M. Barni, Ed., CRC Press, 2006.
4. "Image Noise Models," C. G. Boncelet, *Handbook of Image and Video Processing*, A. Bovik, Ed., Academic Press, 2005.
5. "Image Noise Models," C. G. Boncelet, *Handbook of Image and Video Processing*, A. Bovik, Ed., Academic Press, 2000.

Technical Conference Publications and Presentations:

1. "Detecting Clustering in Streams," M. Picollelli, C. G. Boncelet Jr., and L. Marvel, *Proceedings of the 2012 Conference on Information Sciences and Systems*, Princeton NJ, March 2012.
2. "On the Use of Relative Likelihood Ratios in Statistical Inference," C. G. Boncelet Jr., L. Marvel, and M. Picollelli, *Proceedings of the 2011 Defense Applications In Signal Processing Conference*, Brisbane Australia, July 2011.
3. "Detecting Anomalies in Streams," M. Picollelli, C. G. Boncelet Jr., L. Marvel, *Network Mapping and Measurement Conference 2011*, Madison Wisconsin, May 2011.
4. "Detecting Clustering in Binary Sequences," M. Picollelli, C. G. Boncelet Jr., and L. Marvel, *Proceedings of the 2011 Conference on Information Sciences and Systems*, Baltimore MD, March 2011.
5. "Detection of Network Data Exfiltration Using Entropy and Encryption Characteristics of Network Traffic," T. Fawcett, C. G. Boncelet Jr., Chase Cotton, and W. David Sincoskie, *Proceedings of the 27th Army Science Conference*, Orlando FL, November 2010.
6. "Steganalysis of VOIP telephone calls," L. Marvel and C. G. Boncelet Jr., *Proceedings of SPIE Defense, Security, and Sensing Conference*, Orlando FL, April 2010.

7. "Rate Insensitive Steganalysis of ± 1 Embedding in Images," C. G. Boncelet Jr., L. Marvel, and B. Henz, *Proceedings of the 2008 IEEE International Conference on Image Processing*, October 2008.
8. "Steganalysis for ± 1 Embedding by Fusing Rate-Specific SVM Classifiers," L. Marvel, B. Henz, and C. G. Boncelet Jr., *Proceedings of 2008 CISS*, March 2008.
9. "A Performance Study of ± 1 Steganalysis Employing a Realistic Operating Scenario," L. Marvel, B. Henz, and C. G. Boncelet Jr., *Proceedings of 2007 MILCOM*, October 2007.
10. "Steganalysis of ± 1 Embedding using Lossless Image Compression," C. G. Boncelet Jr. and L. Marvel, *Proceedings of the 2007 IEEE International Conference on Image Processing*, September 2007.
11. "Lossless Image Compression with BCTW," C. G. Boncelet Jr., *Proceedings of the IEEE International Conference on Image Processing*, October 2006.
12. "PMAC: Energy Efficient Medium Access Control Protocol for Wireless Sensor Networks," N. Khan and C. G. Boncelet Jr., *Proceedings of the 2006 MILCOM*, October 2006.
13. "The BCH-NTMAC for Noisy Message Authentication," Y. Liu and C. G. Boncelet Jr., *Proceedings of the 2006 CISS*, Mar. 2006.
14. "Efficient Noise-Tolerant Message Authentication Codes Using Direct Sequence Spread Spectrum Technique," S. Xiao and C. G. Boncelet Jr., *Proceedings of the 2006 CISS*, Mar. 2006.
15. "Compression-Based Steganalysis of LSB Embedded Images," C. G. Boncelet Jr., L. M. Marvel, and A. Raglin, *Proceedings of Electronic Imaging '06*, Jan 2006.
16. "Efficient Message Authentication for Spread Spectrum Wireless Communications," S. Xiao, D. Carman, and C. G. Boncelet Jr., *Proceedings of MILCOM 2005*, Oct. 2005.
17. "The CRC-NTMAC for Noisy Message Authentication," Y. Liu and C. G. Boncelet Jr., *Proceedings of MILCOM 2005*, Oct. 2005.
18. "Image Authentication and Tamperproofing for Noisy Channels," C. G. Boncelet Jr., *Proceedings of ICIP 2005*, Sept. 2005.
19. "An Efficient Message Authentication Scheme Using Direct Sequence Spread Spectrum," S. Xiao and C. G. Boncelet Jr., *Proceedings of the 2005 CISS*, Mar. 2005.
20. "Parity Noise Tolerant Message Authentication Code (PNTMAC) for Noisy Message Authentication," Y. Liu and C. G. Boncelet Jr., *Proceedings of the 2005 CISS*, Mar. 2005.
21. "A Context-Weighting Algorithm Achieving Model Adaptability in Lossless Bi-Level Image Compression," S. Xiao and C. G. Boncelet Jr., *Proceedings of ICIP 2003*, Sept. 2003.
22. "Simple, High Performance Lossless Image Compression," C. G. Boncelet Jr., *Proc. IEEE ICIP Conference*, Thessaloniki, Greece, October 2001.

23. "Authentication for Low Power Systems," L. M. Marvel and C. G. Boncelet Jr., *Proceedings of MILCOM 2001*, Oct. 2001.
24. "Variable to Fixed Entropy Coders: Why and How? (And their application to H.263)," C. G. Boncelet Jr., *Proceedings of EUSIPCO 2000*, Tampere Finland, September 2000.
25. "Using Permutations to Hide Information," H. Huttunen and C. G. Boncelet Jr., *Proceedings of EUSIPCO 2000*, Tampere Finland, September 2000.
26. "Compression Compatible Fragile and Semi-Fragile Tamper Detection," L.M. Marvel, G. Hartwig, C. G. Boncelet Jr., *SPIE International Conf. on Security and Watermarking of Multimedia Contents II*, vol. 3971, No. 12, EI '00, San Jose, USA, Jan 2000.
27. "Applications of Information Hiding," G. A. Arce, C. G. Boncelet Jr., R. F. Graveman, L. M. Marvel, *ARL/ATIRP Federated Laboratory, 3rd Annual Symposium*, College Park, MD, Feb 1999.
28. "Recent Results in Image Steganography," L. M. Marvel and C. G. Boncelet Jr., *ARL/ATIRP Federated Laboratory, 3rd Annual Symposium*, College Park, MD, Feb 1999.
29. "Recent Work in DCT Image Compression," C. G. Boncelet Jr., *AMCOM Workshop on Data Compression Processing Techniques for Missile Guidance Data Links*, Huntsville AL, Dec. 1998.
30. "On Techniques for Hiding Information in Images and Videos," L. M. Marvel and C. G. Boncelet Jr., *AMCOM Workshop on Data Compression Processing Techniques for Missile Guidance Data Links*, Huntsville AL, Dec. 1998.
31. "Hiding Information in Images," L.M. Marvel, C.G. Boncelet, Jr., and C.T. Retter, *IEEE Conference on Military Communications (MILCOM'98)*, Boston, MA, Oct 1998
32. "Hiding Information in Images," L.M. Marvel, C.G. Boncelet, Jr., and C.T. Retter, *1998 IEEE International Conference on Image Processing*, Chicago, IL, Oct 1998.
33. "Reliable Blind Information Hiding for Images," L.M. Marvel, C.G. Boncelet, Jr., and C.T. Retter, *2nd International Workshop on Information Hiding*, Portland, OR, April 1998
34. "On Universal Estimation," C. G. Boncelet Jr., *Proceedings of the Conference on Information Science and Systems*, Princeton NJ, March 1998.
35. "Spread Spectrum Image Steganography", L.M. Marvel, C. G. Boncelet Jr., and C.T. Retter, *ARL/ATIRP Federated Laboratory, 2nd Annual Symposium*, College Park, MD, Feb 1998.
36. "A multiresolution watermark for digital images," X. Xia, C. G. Boncelet Jr., and G. Arce, *Proceedings of the 1997 IEEE International Conference on Image Processing*, Santa Barbara CA, 1997.
37. "On the use of the Huber estimator in nonlinear image processing," C. G. Boncelet Jr., *Proceedings of the 1997 IEEE/EURASIP Workshop on Nonlinear Signal and Image Processing*, 1997.

38. "A New Algorithm For Bi-level Image Compression," M. D. Reavy and C. G. Boncelet Jr., *Proceedings of the Conference on Information Science and Signals, 1997*. Baltimore MD, March 1997.
39. "BASIC: A New Method For Lossless Bi-level and Grayscale Image Compression," M. D. Reavy and C. G. Boncelet, *Proceedings of the 1997 International Conference on Image Processing*, Santa Barbara CA, 1997.
40. "Look-ahead predictive trellis coded quantization with nonlinear filters for image transmission over tactical channels", L.M. Marvel and C.G. Boncelet, Jr., *Proceedings of the 1997 SPIE Photonics West - Electronic Imaging Science and Technology*, San Jose, CA, February 1997.
41. "A new method for transmitting binary and facsimile images," C. G. Boncelet Jr. and M. D. Reavy, *Proceedings of the Advanced Telecommunications/Information Distribution Program*, College Park MD, January 1997.
42. "Performance issues of tactical internet architectures," S. Chamberlain and C. G. Boncelet Jr., *Proceedings of the Advanced Telecommunications/Information Distribution Program*, College Park MD, January 1997.
43. "Block arithmetic coding and its application to the JBIG algorithm," M. D. Reavy and C. G. Boncelet Jr., *Proceedings of the 1996 ISITA Conference*, Vancouver Canada, Sept. 1996.
44. "Robust source coding for images over very noisy channels," L. M. Marvel, A. Khayrallah, and C. G. Boncelet Jr., *Proceedings of the 1996 IEEE International Conference on Image Processing*, Lausanne Switzerland, Sept. 1996.
45. "Robust source coding of images for tactical channels," L. M. Marvel and C. G. Boncelet Jr., *Proceedings of the 20th Army Science Conference*, Norfolk VA, June 1996.
46. "Local optimization of redundant manipulator kinematics within constrained workspaces," J. Wunderlich and C. G. Boncelet Jr., *Proceedings of the 1996 IEEE International Conference on Robotics and Automation*, April 1996.
47. "Moment solutions for the block arithmetic code", M. D. Reavy and C. G. Boncelet Jr., *Proceedings of the 1996 Conference on Information Sciences and Systems*, Princeton NJ, March 1996.
48. "Block arithmetic coding and error correcting coding," C. G. Boncelet Jr., *Proceedings of the 1994 IEEE International Symposium on Information Theory*, June 1994.
49. "On Multi-Access Schemes for High Speed Broadcast Channels With Erasures," C. G. Boncelet Jr., *Proceedings of the 1994 Conference on Information Science and Systems*, March 1994.
50. "Block arithmetic coding for Markov sources," C. G. Boncelet Jr., *Proceedings of the 1993 IEEE International Symposium on Information Theory*, January 1993.

51. "A labeling algorithm for just-in-time scheduling in TDMA networks," C. G. Boncelet Jr. and D. Mills, *Proceedings of the ACM SIGCOMM 92*, August 1992.
52. "Extensions to block arithmetic coding," C. G. Boncelet Jr., *Proceedings of the 1992 Conference on Information Science and Systems*, March 1992.
53. "VLSI architectures for recursive and multiple-window order statistic filtering," R. Hakami, P. Warter, C. G. Boncelet Jr., and D. Nassimi, *Proceedings of the 6th International Parallel Processing Symposium*, March 1992.
54. "Generalized and adaptive LUM smoothers for image filtering," R. Hakami and C. G. Boncelet Jr., *Proceedings of the 1992 SPIE Conference on Nonlinear Image Processing III*, February 1992.
55. "The application of nonlinear filters to edge detection," R. Hardie and C. G. Boncelet Jr., *Proceedings of the 1992 SPIE Conference on Nonlinear Image Processing III*, February 1992.
56. "A new class of order statistic based filters for smoothing and sharpening", R. Hardie and C. G. Boncelet Jr., *Proceedings of the Twenty-Fifth Annual Conference on Information Sciences and Systems*, March 1991.
57. "A class of recursive VLSI architectures for order statistic filtering", R. Hakami, P. Warter, and C. G. Boncelet Jr., *Proceedings of the Twenty-Fifth Annual Conference on Information Sciences and Systems*, March 1991.
58. "LUM filters for smoothing and sharpening," C. G. Boncelet Jr., R. Hardie, R. Hakami, and G. Arce, *Proceedings of the 1991 SPIE Symposium on Electronic Imaging Science and Technology*, February 1991.
59. "Evaluation of the JPEG lossy sequential compression algorithm on 12 bit medical images," T. H. Hall, A. R. Moser, and C. G. Boncelet Jr., *Proceedings of the 1990 SPIE Symposium on Electronic Imaging*, November 1990.
60. "The MWQT image compression algorithm," C. G. Boncelet Jr., *Proceedings of the 1990 Conference on Information Sciences and Systems*, Princeton NJ, March 1990.
61. "A simple routing protocol for packet switched networks with arbitrary topologies," A. Jackson and C. G. Boncelet Jr., *Proceedings of the 1990 Conference on Information Sciences and Systems*, Princeton NJ, March 1990.
62. "Video coding with the MWQT algorithm," C. G. Boncelet Jr., *Proceedings of the 1990 Picture Coding Symposium*, Cambridge MA, March 1990.
63. "Some uses for order statistic filtering in image compression," C. G. Boncelet Jr., *Proceedings of the 1990 SPIE Symposium on Electronic Imaging*, February 1990.
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9 Personal:

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