

# VITA

04/09

**Name:** Jan P. Allebach

## Education

<i>Degree</i>	<i>Date</i>	<i>School</i>
BSEE	1972	University of Delaware
MSE (EE)	1975	Princeton University
Ph.D. (EE)	1976	Princeton University

*Thesis:*

“Digital - Optical Signal Processing,” Professor Bede Liu, advisor.

## Honorary Society Memberships

Eta Kappa Nu  
Phi Kappa Phi  
Tau Beta Pi

## Honors

### External Awards and Recognition

- [1] National Science Foundation Graduate Fellowship (1972-1975).
- [2] 1987 Senior Best Paper Award of the IEEE Acoustics, Speech, and Signal Processing Society for the paper: “Design of Antialiasing Patterns for Time-Sequential Sampling of Spatio Temporal Signals,” published in the *IEEE Trans. Acoust., Speech, Signal Processing*, Vol. ASSP-32, pp. 137-144, February 1984.
- [3] Senior Member IEEE (1989).
- [4] Fellow, IEEE; citation: “For contributions to the theory of sampling and reproduction of multidimensional signals. ” (1991).
- [5] Fellow, Society for Imaging Science and Technology (1996).
- [6] Raymond C. Bowman Award, Society for Imaging Science and Technology; citation: “In recognition of leadership in advancing and promoting excellence in digital imaging education and research.” (1998).
- [7] Electronic Imaging Scientist of the Year, Society for Imaging Science and Technology and SPIE; citation: “For his leadership as an educator and researcher in the electronic imaging community, for his contributions to image halftoning, color image processing, and the use of our understanding of the human visual

system in image processing. He is recognized worldwide as an outstanding researcher and visionary.” (2004).

- [8] Fellow, SPIE “for specific achievements in electronic imaging” (2007).
- [9] Honorary Membership, Society for Imaging Science and Technology (IS&T), “for many and diverse contributions to imaging science; including halftoning, digital image processing, color management, visual perception, and image quality” (2007). Honorary Membership is the highest award bestowed by IS&T.

### **Internal Awards and Recognition**

- [1] Craven Prize in American History (1970).
- [2] Graduation with honors from the University of Delaware (1972).
- [3] Wallace Memorial Fellowship (1975-1976).
- [4] Eta Kappa Nu William H. Hayt Outstanding Teacher Award given by Purdue Beta Chapter (1991).
- [5] D. D. Ewing Best Teacher Award given by Purdue School of Electrical and Computer Engineering (1991).
- [6] University of Delaware Engineering Alumni Association Outstanding Alumni Award (only 4 awarded each year for all of engineering) (1996).
- [7] Eta Kappa Nu Outstanding Faculty Award given by Purdue Beta Chapter (2002).
- [8] Michael J. and Katherine R. Birck Professor of Electrical and Computer Engineering, Purdue University, West Lafayette, IN, November 2002.
- [9] Wilfred “Duke” Hesselberth Award for Teaching Excellence given by Purdue School of Electrical and Computer Engineering (2003).
- [10] Co-recipient with C. A. Bouman, G. T. Chiu, M. R. Lehto, Z. Pizlo, and Y. Yih of the 2006 Purdue University College of Engineering Team Award in recognition of the HP Digital Printing Systems Team.
- [11] Professor of Quantitative Psychology, Courtesy Appointment in the Department of Psychological Sciences, Purdue University, West Lafayette, IN (2006 – present).
- [12] Hewlett-Packard Professor of Electrical and Computer Engineering, Purdue University, West Lafayette, IN, March 2008.
- [13] 2008 Sigma Xi Faculty Research Award (recipient chosen from all faculty members in science and engineering at Purdue University).
- [14] 2008 Purdue University College of Engineering Mentoring Excellence Award, “For his commitment to fostering a rich and enabling research environment made strong by a genuine interest in students and creative endeavor, attention to detail, and dedication to the pursuit of excellence.”
- [15] Hewlett-Packard Distinguished Professor of Electrical and Computer Engineering, Purdue University, West Lafayette, IN, November 2008.

### **Distinguished External Service**

- [1] Visiting Lecturer, Society for Imaging Science and Technology (1991-1992)

- [2] Distinguished Lecturer, IEEE Signal Processing Society (1994-1995).
- [3] Editor, *Journal of Electronic Imaging*, jointly published by the Society for Imaging Science and Technology and SPIE, (2001 – present).

### **Keynote and Plenary Presentations**

- [1] Opening Plenary Lecture of the Turkish National Workshop on Signal Processing and Applications, “Digital Color Imaging: Bringing Color to the Desktop,” Cappadocia, Turkey, 26 April 1995.
- [2] Track Keynote Paper, “Recent Progress in Digital Halftoning: From Theory to Applications,” *SPSTJ/ISJ/IS&T International Congress of Imaging Science*, Tokyo, Japan, 13-17 May 2002.
- [3] Plenary Address, “Quality Control By Artificial Vision: a Unifying View with Applications in Desktop Printing,” Sixth International Conference on Quality Control by Artificial Vision, Gatlinburg, TN, 19-23 May 2003.
- [4] 2004 Electronic Imaging Scientist of the Year Plenary Address, “Digital Printing – An Image Processor’s Perspective,” IS&T/SPIE 16<sup>th</sup> Annual Symposium on Electronic Imaging Science and Technology, San Jose, CA, 20 January 2004.
- [5] Keynote address, “Image Analysis: Bringing Computational Intelligence to the Imaging Pipeline and Product Life Cycle,” HP Imaging and Color Symposium, Hewlett-Packard Imaging and Printing Group, Cupertino, CA, 16 November 2004 (three day internal conference attended by over 200 imaging scientists and engineers from HP’s worldwide imaging divisions. There were three keynote addresses).
- [6] Keynote address, “Print Quality: Measurement, Analysis, and Perception,” Samsung 4-th Technical Paper Contest of the Digital Printing Division, Samsung Electronics Company, Suwon City, South Korea, 19 November 2004 (one day internal conference attended by over 150 imaging scientists and engineers from Samsung’s digital printing division. There was only one keynote address.).
- [7] Invited plenary address, “Digital Printing – A Rich Domain for Image Analysis and Pattern Recognition,” DAGM 2005 the 27<sup>th</sup> Annual Meeting of the German Association for Pattern Recognition, Vienna, Austria, 30 August – 2 September 2005 (There were three plenary addresses.).

### **Professional Employment:**

Sep. 1972 - Aug. 1976	Research Assistant, Department of Electrical Engineering, Princeton University, Princeton, NJ.
Sep. 1976 - Sep. 1981	Assistant Professor, Department of Electrical Engineering, University of Delaware, Newark, DE.
June 1979 - Aug. 1979	Visiting Summer Faculty, Signal Processing Applications Group, IBM Thomas J. Watson Research Center, Yorktown Heights, NY.

Sep. 1981 - Dec. 1982	Associate Professor, Department of Electrical Engineering, University of Delaware, Newark, DE.
Jan. 1983 - Aug. 1987	Associate Professor, School of Electrical Engineering, Purdue University, West Lafayette, IN.
May, July - Aug. 1985	Visiting Summer Faculty, Diagnostics Research Division, Sandia National Laboratories, Livermore, CA.
Aug. 1987 – Nov. 2002	Professor, School of Electrical Engineering, Purdue University, West Lafayette, IN.
July - Aug. 1993 - 1998	Visiting Summer Faculty, Hewlett-Packard Research Laboratories, Palo Alto, CA
July - Aug. 1999	Visiting Summer Faculty, Hewlett-Packard Company, Boise, ID.
Nov. 2002 – Feb. 2008	Michael J. and Katherine R. Birck Professor of Electrical and Computer Engineering, Purdue University, West Lafayette, IN.
July 2006 – present	Professor of Quantitative Psychology, Courtesy Appointment in the Department of Psychological Sciences, Purdue University, West Lafayette, IN
March 2008 – November 2008	Hewlett-Packard Professor of Electrical and Computer Engineering, Purdue University, West Lafayette, IN
December 2008 – present	Hewlett-Packard Distinguished Professor of Electrical and Computer Engineering, Purdue University, West Lafayette, IN

**Consulting Activities:**

May 1981 - June 1984	Member, FORTRAN and Pascal Editorial Review Boards for Lower Division Engineering Curriculum, Control Data Corporation, Minneapolis, MN.
July 1983 - June 1985	3M Company, St. Paul, MN
Jan. 1986 - Dec. 1990	Sandia National Laboratories, Livermore, CA

Sept. 1985 - July 1988	Gallagher Associates, Inc., West Lafayette, IN
Oct. 1985 - July 1989	Mead Imaging, Dayton, OH
May 1988 - July 1988	Polaroid Corporation, Cambridge, MA
Jan. 1991 - June 1991	Thomson Consumer Electronics, Inc., Indianapolis, IN
July 1991	NBS Imaging Systems, Inc., Fort Wayne, IN
Dec. 1991	Presstek, Inc., Hudson, NH
Jan. - Feb. 1992	R. R. Donnelley and Sons Company, Lisle, IL
Oct. - Dec. 1993	Hewlett-Packard Research Laboratories, Palo Alto, CA
Oct. 1995 – Nov. 1997	Pennie & Edmonds LLP, Palo Alto, CA
June 1998	Fenwick & West LLP, Palo Alto, CA
Oct. 1999	Texas Instruments, Inc., Dallas, TX
Nov. 2000 – Jan. 2002	Jenkins & Gilchrist, Chicago, IL
Jan. 2001 – May 2001	Hewlett-Packard Company, Vancouver, WA
Aug. 2002 – Nov. 2005	Klarquist Sparkman LLP, Portland, OR
Feb. – April 2006	Lexjus Genova, Genova, Italy
June 2006 – April 2007	Baker Botts LLP, Washington, DC
Feb. 2007 – Feb. 2008	Fish & Richardson, Boston, MA
May – June 2008	Telemarket Spa, Roncadelle, Italy
May 2008 – Feb. 2009	Howrey LLP, Irvine, CA
Aug. 2008 – present	Sidley Austin LLP, Dallas, TX
Jan. 2008 – Aug. 2009	HP Labs, Palo Alto, CA

**Research Grants and Contracts Received:**

- [1] Principal Investigator: University of Delaware Research Foundation, “Test Signals for Maximum Information,” 1-15-77 to 6-30-77, \$8,000.

- [2] Principal Investigator: NSF, ENG77-06410, Engineering Research Initiation Grant, "Binary Representation of Continuous-Tone Images," 4-1-77 to 9-30-79, \$20,000.
- [3] Principal Investigator: NSF, ENG78-25840, "Digital Representation of Analog Signals," 9-1-79 to 2-28-82, \$54,679.
- [4] Co-Principal Investigator with N. C. Gallagher: NSF, ECS 8203754, "Multi-Dimensional Imaging and Digital Holography," 9-1-82 to 2-28-85, \$110,000.
- [5] Principal Investigator: NSF, ECS 8443337, "Digital Image Processing: Time-Varying and Nonlinear Problems," 6-1-82 to 2-28-86, \$118,877.
- [6] Co-Principal Investigator with N. C. Gallagher and C. L. Chen: DARPA, NTP0864, "Analysis and Fabrication of Diffractive Optical Elements," 7-1-85 to 6-30-86, \$133,768.
- [7] Co-Principal Investigator with N. C. Gallagher: NSF, ECS 8419997, "Wavefront Synthesis and Retrieval: Digital Diffractive Elements and Speckle Noise Modelling, Analysis, and Removal," 8-1-85 to 7-31-88, \$420,000.
- [8] Co-Principal Investigator with E. J. Delp: General Electric Aircraft Engine Business Group, 1116670, "Research in Automated Inspection," 9-1-85 to 12-31-85, \$14,493.
- [9] Principal Investigator: Purdue Research Foundation, "Integrated Algorithms for Motion Estimation and Object Recovery from Time-Sequentially Sampled Data," 1-1-86 to 12-31-86, \$6,600.
- [10] Co-Principal Investigator with N. C. Gallagher: U.S. Department of the Treasury, TEP-85-68(N), "Diffraction Gratings on Fibers for Counterfeit Deterrence," 1-1-86 to 12-31-87, \$88,941.
- [11] Co-Principal Investigator with E. J. Delp: General Electric Aircraft Engine Business Group, 1136670, "Backprojection Reconstruction of Laser-Drilled Cooling Holes," 1-1-86 to 8-31-86, \$9,380.
- [12] Co-Principal Investigator with C. D. McGillem, J. I. Aunon, and K. Fukunaga: U.S. Navy, N41756-86-C-2816, "Research on Target Tracking," 6-1-86 to 9-30-86, \$74,886.
- [13] Principal Investigator: Mead Imaging, 1173670, "Multilevel Algorithms for Color Image Printing," 8-18-86 to 10-15-87, \$34,244.
- [14] Principal Investigator: Mead Imaging, 1173670 (continuation of previous contract), "Color Printing and Related Problems," 10-16-87 to 10-15-88, \$40,855.
- [15] Principal Investigator: Mead Imaging, 1173670 (continuation of previous contract), "Color Image Processing for Digital Printing," 10-16-88 to 10-31-89, \$36,184.
- [16] Co-Principal Investigator with E. J. Delp and L. H. Jamieson: Eastman Kodak Company Voluntary Support (through Purdue University Development Office), "Research in Color and Motion Imaging" 7-1-91 to 6-30-01, \$200,000.
- [17] Principal Investigator; C. A. Bouman, D. M. Chelberg, and E. J. Delp, Co-Principal Investigators: NSF, CDA-9121854, "CISE Research Instrumentation: A

- Multi-Spectral/Multi-Sensor Systems Laboratory,” 7-1-92 to 6-30-93, \$108,463 (includes \$36,463 provided as cost sharing by Purdue University).
- [18] Co-Principal Investigator with C. A. Bouman: Eastman Kodak Company, 2540670, “Color Imaging Research,” 1-1-92 to 9-30-92, \$43,735 plus \$25,000 license fee.
  - [19] Co-Principal Investigator with C. A. Bouman: Hewlett-Packard Company Voluntary Support, “Research in Digital Halftoning,” 3-3-93, \$30,000 cash plus \$83,999 equipment.
  - [20] Co-Principal Investigator with C. A. Bouman: Hewlett-Packard Company Voluntary Support, “Digital Halftoning for Printing,” 4-26-93, \$63,292 equipment.
  - [21] Co-Principal Investigator with C. A. Bouman: Apple Computer, Inc. Voluntary Support, “Image Processing Investigations,” 5-20-93, \$15,000 cash plus \$17,650 equipment.
  - [22] Co-Principal Investigator with C. A. Bouman: Hewlett-Packard Company Voluntary Support, 9-1-93, “Research in Digital Halftoning,” \$2,783 equipment.
  - [23] Co-Principal Investigator with C. A. Bouman: Hewlett-Packard Company, SRA-U293, “Research in Digital Halftoning,” 10-1-93 to 5-1-94, \$10,000 plus \$5,000 license fee.
  - [24] Co-Principal Investigator with C. A. Bouman: Hewlett-Packard Company Voluntary Support, 6712150, “Research on Printer Characterization and Development of New Digital Halftoning Algorithms for Printing Applications,” 10-21-93, \$56,865.
  - [25] Co-Principal Investigator with C. A. Bouman: Hewlett-Packard Company Voluntary Support, “Research on Printer Characterization and Development of New Digital Halftoning Algorithms for Printing Applications,” 11-16-93, \$66,610 equipment.
  - [26] Co-Principal Investigator with C. A. Bouman: Hewlett-Packard Company Voluntary Support, “Research on Printer Characterization and Development of New Digital Halftoning Algorithms for Printing Applications,” 12-31-93, \$2,924 equipment.
  - [27] Co-Principal Investigator with C. A. Bouman: Hewlett-Packard Company Voluntary Support, “Research in Digital Halftoning” 2-15-94, \$11,190 equipment.
  - [28] Co-Principal Investigator with C. A. Bouman: Apple Computer, Inc. Voluntary Support, 3-23-94, “Image Processing Investigations (2),” \$25,622 cash plus \$5,301 equipment (not including monitor or additional memory).
  - [29] Co-Principal Investigator with C. A. Bouman: Hewlett-Packard Company Voluntary Support, “Research on Printer Characterization and Development of New Digital Halftoning Algorithms for Printing Applications,” 3-14-94, \$20,000 cash plus \$385,702 equipment.
  - [30] Co-Principal Investigator with C. A. Bouman: Color Savvy Systems Incorporated Voluntary Support, “Research on Color Measurement,” 4-10-94, \$5,000.

- [31] Co-Principal Investigator with C. A. Bouman: Hewlett-Packard Company, 2853670NTP, "Multiscale Feature Characterization for High Resolution Image Rendering," 5/15/94 - 5/14/95, \$86,972 plus \$40,000 license fee.
- [32] Co-Principal Investigator with C. A. Bouman: Hewlett-Packard Company Voluntary Support, 6712163, "Image Segmentation Research," 10-22-94, \$5,000.
- [33] Co-Principal Investigator with C. A. Bouman: Xerox Corporation Voluntary Support, Award No. 6712425, "Research on Document Segmentation," 1/03/95, \$15,000.
- [34] Co-Principal Investigator with C. A. Bouman: Hewlett-Packard Company Voluntary Support, Gift No. 26706.1 "Research on Printer Characterization and Print Quality Assessment," 1-20-95, \$60,000 cash plus \$72,478.00 equipment.
- [35] Co-Principal Investigator with C. A. Bouman: Hewlett-Packard Company Voluntary Support, "Digital Halftoning for Printing," 2-9-95, \$629 equipment.
- [36] Co-Principal Investigator with C. A. Bouman: LG Electronics Co., Ltd. Voluntary Support, "Electronic Imaging Systems Laboratory," 5-15-95, \$11,000.
- [37] Co-Principal Investigator with C. A. Bouman: Hewlett-Packard Company, Research Agreement No. Y344, "High Resolution Image Rendering," 5/15/95 - 5/14/96, \$85,500 plus \$40,000 license fee.
- [38] Co-Principal Investigator with C. A. Bouman: Apple Computer, Inc. Voluntary Support, "Research on Color Imaging," 5-23-95, \$26,000 cash plus \$16,263 equipment and software.
- [39] Co-Principal Investigator with C. A. Bouman: Hewlett-Packard Company Voluntary Support, "Research on Digital Halftoning" 6-29-95, \$10,000 cash plus \$52,729 equipment.
- [40] Co-Principal Investigator with C. A. Bouman and Z. Pizlo: Hewlett-Packard Company Voluntary Support, "Research on Printer Characterization and Print Quality Assessment" 6-28-95, \$30,000 cash plus \$223,017 equipment.
- [41] Principal Investigator, Co-Principal Investigators: C. A. Bouman, E. J. Coyle, E. J. Delp, A. A. Maciejewski, N. B. Shroff, and Z. Pizlo: Hewlett-Packard Company Voluntary Support, Gift No. 30009, "Infrastructure for a New Curriculum in Video and Image Systems Engineering," 1-25-96, \$319,845.70 equipment.
- [42] Principal Investigator: Purdue Research Foundation International Travel Grant to co-chair Ninth IEEE/IS&T IMDSP Workshop in Belize City, Belize, 2-28-96, \$624.
- [43] Principal Investigator, Co-Principal Investigators: C. A. Bouman, E. J. Coyle, E. J. Delp, A. A. Maciejewski, N. B. Shroff, and Z. Pizlo: Hewlett-Packard Company Voluntary Support, Gift No. 30009.1 "Infrastructure for a New Curriculum in Video and Image Systems Engineering," 3-1-96, \$29,170.00 equipment.
- [44] Co-Principal Investigator with C. A. Bouman: Hewlett-Packard Company, Award No. 3401670, "High Resolution Image Interpolation from Degraded Image Sources," 5-15-96 - 5-14-97 \$91,355 plus \$35,000 license fee.



- [45] Principal Investigator: Hewlett-Packard Company Voluntary Support, Gift No. 31812.1/2 "Printer Characterization and Print Quality Assessment" 6-26-96, \$30,000 cash plus \$284,334.70 equipment.
- [46] Principal Investigator: Hewlett-Packard Company Voluntary Support, Gift No. 31810.1/2, "Digital Halftoning" 6-26-96, \$10,000 cash plus \$1,730.35 equipment.
- [47] Principal Investigator: Hewlett-Packard Company Voluntary Support, Gift No. 31859.1/2, "Bi-Level Image Quality" 7-10-96, \$10,000 cash plus \$101,835.00 equipment.
- [48] Co-Principal Investigator with Z. Pizlo and C. A. Bouman: Hewlett-Packard Company Voluntary Support, Gift No. 31854.1, "Image Quality Metrics" 7-10-96, \$35,000 cash plus \$112,676.00 equipment.
- [49] Co-Principal Investigator with C. A. Bouman: Hewlett-Packard Company Voluntary Support, Invoice No. AU09, "Travel on 12-15-95" 08-27-96, \$2,969.59.
- [50] Principal Investigator, Co-Principal Investigators: C. A. Bouman, E. J. Coyle, E. J. Delp, A. A. Maciejewski, N. B. Shroff, and Z. Pizlo: Hewlett-Packard Company Voluntary Support, Gift No. 30009.2 "Infrastructure for a New Curriculum in Video and Image Systems Engineering," 8-22-96, \$6,000.
- [51] Principal Investigator, Co-Principal Investigators: C. A. Bouman, E. J. Coyle, E. J. Delp, A. A. Maciejewski, N. B. Shroff, and Z. Pizlo: Hewlett-Packard Company Voluntary Support, Gift No. 32322 "Infrastructure for a New Curriculum in Video and Image Systems Engineering," 9-6-96, \$479,609 equipment.
- [52] Co-Principal Investigator with C. A. Bouman, Apple Computer, Inc. Voluntary Support, "Image Similarity Metrics," 10-10-96, \$26,000 cash plus \$22,101 equipment.
- [53] Principal Investigator, Co-Principal Investigators: C. A. Bouman, E. J. Coyle, E. J. Delp, A. A. Maciejewski, N. B. Shroff, and Z. Pizlo: Hewlett-Packard Company Voluntary Support, Gift No. 30009.3 "Infrastructure for a New Curriculum in Video and Image Systems Engineering," 12-17-96, \$201,000 equipment.
- [54] Co-Principal Investigator with E.J. Coyle, C. A. Bouman, E. J. Delp, M. P. Harper, L. H. Jamieson, N. B. Shroff (E. J. Coyle, Principal Investigator), "CISE Research Instrumentation: Storage and I/O Devices for the Support of Research in Imaging Systems, Networks, and Video and Speech Processing," NSF, CDA 96-17388, 1-1-97 to 12-31-98, \$236,627.
- [55] Principal Investigator, "Using a Digital Camera for Accurate Color Measurement," Purdue Research Foundation David Ross Grant, Account No. 690-1285-2763, 6-1-97-5-31-99, \$23,332.
- [56] Co-Principal Investigator with M.R. Bell, C.A. Bouman, E.K.P. Chong, E.J. Coyle, E.J. Delp, P.C. Doerschuk, Saul B. Gelfand, J.V. Krogmeier, M.P. Harper, L.H. Jamieson, N.B. Shroff, and M.D. Zoltowski, "Intel Equipment for Processing and Communication Intensive Tasks that Enable New Networked Video, Image,

- and Speech Applications,” Intel Corporation, 7-1-97 to 6-30-00, \$598,000 equipment.
- [57] Principal Investigator, C. Bajaj, E. Sacks, Co-Principal Investigators, “Center for Image Analysis and Data Visualization: A Proposal for an Image Analysis Laboratory,” Purdue University 1997-1998 Reinvestment Program, 7-9-97 to 7-8-00, \$150,000.
- [58] Co-Principal Investigator with C. A. Bouman, Principal Investigator, “Image Similarity Metrics,” Apple Computer, Inc. Voluntary Support, Award No. 6712786, 8/12/97, \$26,000.
- [59] Co-Principal Investigator with C. A. Bouman, Principal Investigator, “Improvement of Document Segmentation Techniques,” Xerox Foundation Voluntary Support, Award No. 6712944, 8-12-97, \$15,000.
- [60] Principal Investigator, Co-Principal Investigators: C. A. Bouman, G. Chiu, Z. Pizlo, “Improving Image Quality: Metrics, Models, and Scaling,” Hewlett-Packard Company, Award No. ERPS-97040.1, 8-18-97 to 8-17-98, \$248,399 plus \$142,000 equipment.
- [61] Principal Investigator, “Improving Bilevel Image Quality,” Hewlett-Packard Company, Award No. EPRS-97041.1, 8-18-97 to 8-17-98, \$10,000 plus \$107,765 equipment.
- [62] Principal Investigator, “Halftoning for Mixed Resolution/Multiple Dye Load/Multiple Colorant Inkjet Printers,” Hewlett-Packard Company, Award No. ERPS-97042.1, 8-18-97 to 8-17-98, \$10,000 plus \$79,303 equipment.
- [63] Co-Principal Investigator with C. A. Bouman, “Polaroid Polaview 220-DLP Projector for the Video and Image Systems Engineering Laboratory,” Polaroid Corporation, equipment donation, 8-22-97, \$9,495.
- [64] Co-Principal Investigator with C. A. Bouman, Principal Investigator, “Document Segmentation for High Speed Imaging Applications” Xerox Corporation DPS No. 0BA76, 8-22-97 - 12-31-97, \$25,000.
- [65] Principal Investigator, “Research on Color Imaging Systems,” Color Savvy Systems Incorporated, Voluntary Support Award No. 6712240, 10-24-97, \$11,078.
- [66] Principal Investigator, Co-Principal Investigators: C. A. Bouman, E. J. Coyle, E. J. Delp, A. A. Maciejewski, N. B. Shroff, and Z. Pizlo: Hewlett-Packard Company Voluntary Support, Gift No. 30009.4 “Infrastructure for a New Curriculum in Video and Image Systems Engineering,” 6-2-98, \$344,288 equipment.
- [67] Principal Investigator, Co-Principal Investigators: C. A. Bouman, G. Chiu, Z. Pizlo, “Research on Artifact Reduction in Digital Printing,” Hewlett-Packard Company, Award No. 4024670, 2-1-98 to 1-31-99, \$388,372 plus \$131,428.40 equipment.
- [68] Co-Principal Investigator with C. A. Bouman, Principal Investigator, “Improvement of Document Segmentation Techniques,” Xerox Foundation Voluntary Support, Award No. 6712944, 7-20-98, \$15,000.

- [69] Principal Investigator, Co-Principal Investigators: C. A. Bouman, G. Chiu, "Research on Artifact Reduction in Digital Printing," Hewlett-Packard Company, Award No. 4024670, 2-1-99 to 1-31-00, \$543,076.
- [70] Principal Investigator, Co-Principal Investigators: M. Lehto and Y. Yih, "Remote Print Defect Diagnosis," Hewlett-Packard Company, Award No. ETP-99035, 10-1-99 to 9-30-00, \$200,000.
- [71] Principal Investigator, Co-Principal Investigators: G. Chiu, M. Lehto, and Y. Yih, "Remote Print Defect Diagnosis," Hewlett-Packard Company, Voluntary Support, Award No. ERP-20004, 1-24-00, \$15,612.
- [72] Principal Investigator, Co-Principal Investigators: C. Bouman, G. Chiu, and Z. Pizlo, "Print Quality Improvement," Hewlett-Packard Company, Voluntary Support, Award No. ERP-20005, 1-24-00, \$5,881.
- [73] Principal Investigator, Co-Principal Investigators: C. Bouman, G. Chiu, and Z. Pizlo, "Print Quality Improvement," Hewlett-Packard Company, Award No. ERP-20005-1, 2-1-00 to 1-31-01, \$292,579.
- [74] Principal Investigator, "Halftoning for InkJet Systems," Hewlett-Packard Award No. ERP-20017, 2-1-00 – 1-31-01, \$109,458.
- [75] Principal Investigator, Co-Principal Investigators: C. Bouman and M. Johnson, "A New Laboratory/Lecture Facility for the Video and Image Systems Engineering (VISE) Program," Hewlett-Packard Company Voluntary Support, Gift No. 82396.1, 3-20-00, \$223,042 equipment.
- [76] Principal Investigator, Co-Principal Investigators: G. Chiu and Z. Pizlo, "Summer and Sabbatical Program," Hewlett-Packard Award No. ERP-20013, 5-16-00 – 5-15-01, \$121,361.
- [77] Co-Principal Investigator, Principal Investigator G. Chiu, Co-Principal Investigator C. Bouman, "DSP-Based Inkjet Printing System," Texas Instruments Incorporated Voluntary Support, 4-26-00, \$30,798.25.
- [78] Principal Investigator, Co-Principal Investigator: G. Chiu, "Remote Print Defect Diagnosis – Phase 1b Exploiting Sensor Data," Hewlett-Packard Company, Award No. ERP-20025, 5-15-00 – 9-30-00, \$28,061.
- [79] Co-Investigator with Z. Pizlo (subcontract from Indiana University, G. Stookey, Principal Investigator), "Advanced Imaging Technology for Disease Detection and Control," Indiana Development Finance Authority (21st Century Research and Development Fund), 6-1-00 – 6-1-02, \$84,323.
- [80] Principal Investigator, Co-Principal Investigators: C. Bouman, G. Chiu, M. Lehto, Z. Pizlo, and Y. Yih, "Print Quality Improvement and Remote Print Defect Diagnostics," Hewlett-Packard Company, Voluntary Support, Award No. ERP-20023, 6-2-00, \$18,446.
- [81] Principal Investigator, Co-Principal Investigators: G. Chiu, M. Lehto, and Y. Yih, "Remote Print Defect Diagnosis," Hewlett-Packard Company, Award No. ERP-20040, 10-1-00 to 5-31-01, \$240,000.

- [82] Co-Principal Investigator, Principal Investigator G. Chiu, Co-Principal Investigator C. Bouman, "DSP-Based Inkjet Printing System," Texas Instruments Incorporated Voluntary Support, 10-4-00, \$30,798.25.
- [83] Co-Principal Investigator (electronic imaging systems): Ford Foundation gift to Purdue University to fund a "Perception-Based Engineering Laboratory." Co-PIs from ME, ECE, AUS and Psychological Sciences at Purdue collaborated with Dan Hirleman (Head, ME), Bob Bernhard (Director, Herrick), Shari Rodriguez (ME Development), and Patricia Davies (ME, lead co-PI) on the proposal. The funds will be used to construct a new facility and purchase state-of-the art research equipment. The facility, which will form part of the Ray W. Herrick Laboratories, will be shared by this interdisciplinary team of PIs for both teaching and research, 1-24-01 to 1-23-05, \$3,500,000.
- [84] Co-Principal Investigator, Principal Investigator G. Chiu, Co-Principal Investigator C. Bouman, "DSP-Based Inkjet Printing System," Texas Instruments Incorporated Voluntary Support, 1-03-01, \$30,798.25.
- [85] Principal Investigator, Co-Principal Investigators: C. Bouman, G. Chiu, and Z. Pizlo, "Print Quality Improvement," Hewlett-Packard Company, Award No. ERP-2001-002, 2-1-01 to 1-31-02, \$323,355.
- [86] Principal Investigator, "InkJet Imaging Pipeline," Hewlett-Packard Award No. ERP-2001-05, 2-1-01 – 1-31-02, \$135,549.
- [87] Principal Investigator, Co-Principal Investigators: G. Chiu and Z. Pizlo, "Summer 2001 Visit to HP Boise Site," Hewlett-Packard Award No. HPLPA-2001-11, 5-15-01 – 8-15-01, \$29,960.
- [88] Co-Principal Investigator, Co-Principal Investigator: J. Fortes, "A Proposal for Development of a University Relations Database," Hewlett-Packard Award No. HPLPA-2001, 5-15-01 – 5-14-02, \$44,560.
- [89] Principal Investigator, Co-Principal Investigators: M. Atallah, C. Bouman, G. Chiu, E. Coyle, E. Delp, A. Elmagarmid, J. Krogmeier, C. Rosenberg, "A Proposal to Establish a Program in Mobile, E-Services Printing at Purdue University," Hewlett-Packard, Voluntary Support, Gift No. 86350.1, 6-27-01, \$143,983 equipment.
- [90] Principal Investigator, Co-Principal Investigators: M. Atallah, C. Bouman, G. Chiu, E. Coyle, E. Delp, A. Elmagarmid, J. Krogmeier, C. Rosenberg, "A Proposal to Establish a Program in Mobile, E-Services Printing at Purdue University," Hewlett-Packard, Voluntary Support, Gift No. 86350.2, 7-11-01, \$63,354 cash.
- [91] Principal Investigator, Co-Principal Investigators: M. Atallah, C. Bouman, G. Chiu, E. Coyle, E. Delp, A. Elmagarmid, J. Krogmeier, C. Rosenberg, "A Proposal to Establish a Program in Mobile, E-Services Printing at Purdue University," Hewlett-Packard, Voluntary Support, Gift No. 86350.3, 8-29-01, \$3,790 equipment.
- [92] Principal Investigator, Co-Principal Investigators: G. Chiu, M. Lehto, and Y. Yih, "Remote Print Defect Diagnosis," Hewlett-Packard Company, Award No. PA-2002-04, 1-1-02 to 1-31-03, \$159,047.

- [93] Principal Investigator, Co-Principal Investigators: C. Bouman, G. Chiu, and Z. Pizlo, "Print Quality Improvement Program," Hewlett-Packard Company, Purdue Acct. No. 670-1285-4024, 2-1-02 to 1-31-03, \$473,642.
- [94] Principal Investigator, "Participation in International Congress on Imaging Science," Purdue Research Foundation Travel Grant, 2-14-02, \$1,012.
- [95] Principal Investigator, Co-Principal Investigators: M. Atallah, C. Bouman, G. Chiu, E. Coyle, E. Delp, L. Jamieson, J. Krogmeier, C. Rosenberg, "A Proposal to Establish a Curriculum in Mobile Communications Projects at Purdue University," Hewlett-Packard, Voluntary Support, Gift No. 87881.1, 3-14-02, \$88,044 equipment.
- [96] Principal Investigator, "A New Multispectral Digital Camera with Applications to Color Measurement and Color Appearance Modeling," Purdue Research Foundation, 6-1-02 to 5-30-03, \$13,140.
- [97] Principal Investigator, "InkJet Imaging Pipeline," Hewlett-Packard Company, Acct. No. 670-1285-5511, 2-1-02 – 1-31-03, \$130,592.
- [98] Principal Investigator, Co-Principal Investigators: M. Atallah, C. Bouman, G. Chiu, E. Coyle, E. Delp, L. Jamieson, J. Krogmeier, C. Rosenberg, "A Proposal to Establish a Curriculum in Mobile Communications Projects at Purdue University," Hewlett-Packard, Voluntary Support, Gift No. 87881.2, 5-23-02, \$31,816 cash.
- [99] Principal Investigator, "EE 495M Mobile Communications Project Curriculum Development Grant," P&G Fund, Voluntary Support, Acct. No. 671-1285-4075, 4-25-02, \$150,000 cash.
- [100] Principal Investigator, Co-Principal Investigators: G. Chiu, and E. Delp, "ITR: Printer Characterization and Signature-Embedding for Security and Forensic Applications," NSF, Grant No. CCR-0219893, 8-15-02 to 8-14-05, \$410,000.
- [101] Principal Investigator, "Improved Pen Alignment for Bi-Directional Printing," Hewlett-Packard Company, Award #FD87, 1-1-03 to 12-31-03, \$76,131.
- [102] Principal Investigator, Co-Principal Investigators: C. Bouman, G. Chiu, and Z. Pizlo, "Print Quality Improvement Program," Hewlett-Packard Company, Purdue Acct. No. 670-1285-4024, 2-1-03 to 1-31-04, \$499,999.
- [103] Principal Investigator, Co-Principal Investigators: G. Chiu, M. Lehto, and Y. Yih, "Remote Print Defect Diagnosis," Hewlett-Packard Company, Acct No. 670-1285-5361, 2-1-03 to 1-31-04, \$279,413.
- [104] Principal Investigator, "Digital Video Capture Image Analysis," Hewlett-Packard Company, Acct. No. 670-1285-6459, 2-1-03 to 1-31-04, \$72,084.
- [105] Principal Investigator, Co-Principal Investigator: C. Bouman, "InkJet Imaging Pipeline," Hewlett-Packard Company, Acct. No. 670-1285-5511, 2-1-03 to 1-31-04, \$139,456.
- [106] Principal Investigator, Co-Principal Investigators: G. Chiu, E. Delp, J. Krogmeier, C. Rosenberg, L. Slivovsky, "Mobile Communications Projects," Hewlett-Packard, Voluntary Support, Gift No. 89606.1, 3-17-03, \$61,207 equipment.

- [107] Principal Investigator, Co-Principal Investigators: G. Chiu, E. Delp, J. Krogmeier, C. Rosenberg, L. Slivovsky, "Mobile Communications Projects," Hewlett-Packard, Voluntary Support, Gift No. 89606.2, 3-17-03, \$10,500 cash.
- [108] Principal Investigator, Co-Principal Investigators: G. Chiu, M. Lehto, and Y. Yih, "Remote Print Defect Diagnosis," Hewlett-Packard Company, Acct No. 670-1285-5361, 2-1-04 to 1-31-05, \$420,216.
- [109] Principal Investigator, Co-Principal Investigators: C. Bouman, G. Chiu, and Z. Pizlo, "Print Quality Improvement Program," Hewlett-Packard Company, Purdue Acct. No. 670-1285-4024, 2-1-04 to 1-31-05, \$542,160.
- [110] Co-Principal Investigator with G. Chiu, "Ink Jet Mechanism Improvement," Hewlett-Packard Company, Purdue Acct. No. 670-1285-6847, 1-1-04 to 12-31-04, \$117,854.
- [111] Principal Investigator, Co-Principal Investigators: S. Midkiff, D. Moffett, and 5 faculty members from University of Puerto Rico Mayaguez (UPRM) "Digital Publishing," Hewlett-Packard Company, subcontract from UPRM, Purdue Acct. No. 670-1285-6875, 3-1-04 to 2-28-05, \$442,467 (Purdue's share is \$200,001).
- [112] Principal Investigator, "Stray Light Reduction in Electronic Imaging Systems," E.I. du Pont de Nemours and Company, Purdue Acct. No. 671-1285-4552, 4-1-04 to 3-31-06, voluntary support \$164,016 (\$50,000 for Purdue's Office of Technology Commercialization to develop and market the intellectual property). This grant accompanied the donation by E.I. du Pont de Nemours and Company of two patents (U.S. Patent Nos. 5,153,926 and 6,829,393) to Purdue valued at several million dollars.
- [113] Principal Investigator, Co-Principal Investigators: S. Midkiff and D. Moffett, Gelato Federation Equipment Grant, HP Gift No. PR1096879, 5-11-04, \$52,674.
- [114] Co-Principal Investigator with G. Chiu, "Reduction of Banding Artifacts in Electrophotographic Process Printers," Samsung Electric Company, Purdue Acct. No. 670-1285-6980, 6-1-04 to 5-31-04, \$142,180.
- [115] Co-Principal Investigator, C. Bouman, Principal Investigator, I. Pollak and M. Harper, Co-Principal Investigators, "A Structural Approach to Document Browsing and Management," Xerox Corporation, voluntary support, 8-17-04, \$20,000.
- [116] Co-Principal Investigator with C. Bouman, "InkJet Imaging Pipeline," Hewlett-Packard Company, P.O. No. SBY161377, 2-1-04 to 1-31-05, voluntary support \$91,937.
- [117] Principal Investigator, Co-Principal Investigators: G. Chiu, M. Lehto, and Y. Yih, "Remote Print Defect Diagnosis," Hewlett-Packard Company, Purdue Acct. No. 670-1285-5361, 2-1-05 to 1-31-06, \$432,071.
- [118] Principal Investigator, Co-Principal Investigators: C. Bouman, G. Chiu, and Z. Pizlo, "Print Quality Improvement Program," Hewlett-Packard Company, Purdue Acct. No. 670-1285-4024, 2-1-05 to 1-31-06, \$506,739.
- [119] Principal Investigator, "Digital Publishing," Hewlett-Packard Company, Purdue Account No. 670-1285-6934, 6-1-05 to 5-31-06, \$100,000.

- [120] Principal Investigator, "Commercial Printing," Hewlett-Packard Company, Purdue Account No. 671-1285-4783, 6-13-05, voluntary support \$25,000.
- [121] Principal Investigator, Co-Principal Investigators: E. Coyle, D. Blakesley, J. Campbell, D. Felluga, L. Jamieson, J. Krueger, and C. Sigurdson, "Integration of Digital Publishing in Teaching and Learning," Hewlett-Packard Company, Purdue Account No. 671-1285-4804, 7-18-05, voluntary support \$40,000, plus over \$50,000 equipment.
- [122] Principal Investigator, Co-Principal Investigators: G. Chiu, and E. Delp, "CT-ISG: Printer and Sensor Forensics," NSF, Grant No. 0524540-CNS, 8-01-05 to 7-31-08, \$400,000.
- [123] Co-Principal Investigator with C. Bouman, "InkJet Imaging Pipeline," Hewlett-Packard Company, SPS Award No. 1120054678, 2-1-05 to 1-31-06, voluntary support \$95,000.
- [124] Principal Investigator, Co-Principal Investigators: C. Bouman, G. Chiu, Z. Pizlo, I. Pollak, and Y. Yih, "Print Quality Improvement Program," Hewlett-Packard Company, Purdue Acct. No. 670-1285-4024, 2-1-06 to 1-31-07, \$825,000.
- [125] Principal Investigator, Co-Principal Investigator: M. Lehto, "Remote Print Defect Diagnosis," Hewlett-Packard Company, P.O. No. SBY277458, 2-1-06 to 1-31-07, voluntary support \$187,586.
- [126] Co-Principal Investigator with C. Bouman, "InkJet Imaging Pipeline," Hewlett-Packard Company, P.O. No. SBY282457, 2-1-06 to 1-31-07, voluntary support \$122,258.
- [127] Principal Investigator, "Artifact Reduction," Hewlett-Packard Company, P.O. No. SBY291300, 2-1-06 to 1-31-07, \$75,000.
- [128] Principal Investigator, "UNESCO Digital Publishing Project," Hewlett-Packard Company, P.O. No. SBY294262, 2-1-06 to 1-31-07, \$50,000.
- [129] Principal Investigator, "HP Technology in Digital Publishing," Hewlett-Packard Company, 2-28-06, \$4,809 equipment.
- [130] Principal Investigator, Co-Principal Investigator: E. Delp, "Low Complexity Video Still Image Reconstruction and Resolution Enhancement Project," Samsung Advanced Institute of Technology, 3-01-06 – 10-31-06, \$90,000.
- [131] Principal Investigator, "Development of Banding Analysis Tool and Banding Investigation for Color Laser Business Printer," Samsung Electronics Company, Ltd, 5-01-06 – 2-28-07, \$81,985.
- [132] Co-Principal Investigator, Principal Investigator: C. Bouman, Co-Principal Investigator: G. Chiu, "Next Generation Image Capture to Improve Copy Quality – A Two Phase Approach," Samsung Electronics Company, Ltd, 5-22-06 – 9-21-07, \$313,662.
- [133] Principal Investigator, "Support of New Members of Digital Publishing Federation," Hewlett-Packard Company, 5-30-06, voluntary support, \$50,000.
- [134] Principal Investigator, "UNESCO World Heritage Commission Printing Project," Hewlett-Packard Company, 10-26-06, voluntary support, \$25,000.

- [135] Principal Investigator, "Autonomous Document Assessment Expert," (joint project with University of Puerto Rico at Mayaguez and Pontifical Catholic University of Rio du Sol (PUCRS), Hewlett-Packard Company, 10-30-06, HP Gift No. 1610664, voluntary support, \$64,000 (Purdue portion: \$32,000).
- [136] Principal Investigator, Co-Principal Investigators: C. Bouman, M. Boutin, G. Chiu, Z. Pizlo, I. Pollak, and Y. Yih, "Print Quality Improvement Program," Hewlett-Packard Company, Purdue Acct. No. 670-1285-4024, 2-1-07 to 1-31-08, \$825,000.
- [137] Co-Principal Investigator with C. Bouman, "Text-Based Personalization of Images," Xerox Corporation, 01-01-07 – 4-30-08, \$100,000.
- [138] Principal Investigator, "Training-based halftoning algorithms for better halftone image quality for the HP Digital Press," Hewlett-Packard Company, Purdue Account No. 8000016522, 02-15-07 – 02-14-08, \$55,000.
- [139] Principal Investigator, Co-Principal Investigator: M. Lehto, "Remote Print Defect Diagnosis," Hewlett-Packard Company, P.O. No. SBY405527, 2-1-07 to 1-31-08, voluntary support \$155,501.
- [140] Principal Investigator, "Stray Light Reduction in Electronic Imaging Systems," E.I. du Pont de Nemours and Company, Purdue Acct. No. 671-1285-4552, 5-15-07 to 5-14-08, voluntary support \$125,000.
- [141] Principal Investigator, Co-Principal Investigators: G. Chiu, Y. Yih, "HP Boise Site Extended Visits," Hewlett-Packard Company, P.O. No. SBY418486, 6-11-07 to 12-01-07, voluntary support \$30,902.
- [142] Co-Principal Investigator with C. Bouman, M. Boutin, "InkJet Imaging Pipeline," Hewlett-Packard Company, P.O. No. SBY423521, 2-1-07 to 1-31-08, voluntary support \$122,384.
- [143] Principal Investigator, Co-Principal Investigators: G. Chiu, Y. Yih, "HP Boise Site Extended Visits," Hewlett-Packard Company, P.O. No. SBY492168, 1-14-08 to 6-27-08, voluntary support \$30,902.
- [144] Principal Investigator, Co-Principal Investigators: C. Bouman, M. Boutin, G. Chiu, I. Pollak, and Y. Yih, "Print Quality Improvement Program," Hewlett-Packard Company, P.O. No. SBY505783, Purdue Acct. No. 670-1285-4024, 2-1-08 to 1-31-09, \$629,810.
- [145] Principal Investigator, Co-Principal Investigators: M. Lehto and Z. Pizlo, "Hewlett-Packard 2008 PQI VS," Hewlett-Packard Company, P.O. No. SBY505724, Purdue Account Nos. 8000024205 and 8000024206, 2-1-08 to 1-31-09, voluntary support \$45,432.
- [146] Co-Principal Investigator, Principal Investigator: G. Chiu, "Post Cylinder Dynamic Mirror Actuator (DMA) for the Indigo Digital Press," Hewlett-Packard Company, P.O. No. SBY506811, 2-1-08 to 10-31-08, \$55,000.
- [147] Co-Principal Investigator, Principal Investigator: E. Delp, "Color Management System," Indiana 21<sup>st</sup> Century Fund, Purdue Acct. No. 8000023136/42010000, 3-1-08 to 2-28-10, \$268,642.



- [148] Principal Investigator, “Sponsorship support to Purdue University to work on UNESCO World Heritage Commission Map Project,” Hewlett-Packard Company, P.O. No. SBY522700, 5-26-08, voluntary support \$32,500.
- [149] Co-Principal Investigator with C. Bouman, M. Boutin, “InkJet Imaging Pipeline,” Hewlett-Packard Company, P.O. No. SBY528421, 2-1-08 to 1-31-09, voluntary support \$124,549.
- [150] Principal Investigator, “Training-based halftoning algorithms for better halftone image quality for the HP Digital Press – Phase 2,” Hewlett-Packard Company, Purdue Account No. 8000016522, 06-01-08 – 10-31-08, \$27,500.
- [151] Principal Investigator, “Training-based halftoning algorithms for better halftone image quality for the HP Digital Press – Phase 3,” Hewlett-Packard Company, Purdue Account No. 8000016522, 01-01-09 – 06-30-09, \$37,500.
- [152] Co-Principal Investigator with C. Bouman, “Text-Based Personalization of Images – Phase 2,” Xerox Corporation, 01-01-09 – 05-31-10, \$100,000.
- [153] Co-Principal Investigator; Principal Investigator: J. Krogmeier; other Purdue University Co-Principal Investigator: S. Bagchi; Georgia Institute of Technology Co-Principal Investigators: E. Coyle, R. Abler, and J. Melkers, Collaborative Research: The VIP Program – Integrating Undergraduate Design Projects and Graduate Research,” Grant No. pending, 03-xx-09 – 02-xx-11, \$87,732.
- [154] Principal Investigator, “Training-based halftoning algorithms for better halftone image quality for the HP Digital Press – Phase 4,” Hewlett-Packard Company, Purdue Account No. 8000016522, 07-01-09 – 12-31-09, \$37,500.

### **Professional Society Activities**

- Society: Institute of Electrical and Electronics Engineers  
Signal Processing Society
- Activity: Member  
1972 to present
- Activity: Member, Image and Multidimensional Signal Processing Technical  
Committee of the Signal Processing Society of IEEE  
1986 to 1995
- Activity: Chairman, Image and Multidimensional Signal Processing Technical  
Committee of the Signal Processing Society of IEEE  
1990 to 1991
- Activity: Associate Editor, *IEEE Transactions on Acoustics, Speech, and Signal  
Processing*  
1988 to 1990
- Activity: Secretary, IEEE Signal Processing Society

1992 to 1995

Activity: Technical Program Co-Chair (with K. Buckley), 1993 International Conference on Acoustics, Speech and Signal Processing, Minneapolis, MN, April 27-30, 1993.

Activity: Member, IEEE Signal Processing Society Board of Governors  
1996 to 1998.

Activity: General Co-Chair (with J. Kovacevic), IEEE SP Society/IS&T Ninth Image and Multidimensional Signal Processing Workshop, Belize City, Belize, March 3-6, 1996.

Activity: Associate Editor (one of 5) for the *IEEE Transactions on Image Processing* special issue on color, July 1997.

Activity: Associate Editor, *IEEE Transactions on Image Processing*  
1997-1999.

Activity: Guest Editor with T. N. Pappas, *IEEE Signal Processing Magazine* Special Issue on Digital Halftoning, July 2003.

Activity: Member, Information Forensics and Security Technical Committee of the Signal Processing Society of IEEE  
2008 to present

Society: Society for Imaging Science and Technology

Activity: Member  
1991 to present

Activity: Member, Editorial Advisory Board, *Journal of Electronic Imaging*  
1992 to 1994

Activity: Member, Board of Directors (Chapters Vice President)  
1992 to 1996

Activity: Chair, Nominations Committee  
1996 to 1997

Activity: Member, Nominations Committee  
1997 to 1998

Activity: General co-chair (with R. Ellson) IS&T/SPIE's 11<sup>th</sup> International Symposium on Electronic Imaging: Science and Technology (EI-99), San Jose, CA January 24-29, 1999.

- Activity: Guest Editor with B. E. Rogowitz and T. N. Pappas, "Special Section on Human Vision and Electronic Imaging," *Journal of Electronic Imaging*, Vol. 10, pp. 8-193, January 2001.
- Activity: Editor, *Journal of Electronic Imaging*  
2001 to present
- Activity: Member, Awards Committee  
2001 to 2002
- Activity: Chair, Awards Committee  
2002 to 2003
- Activity: Member, Awards Committee  
2003 to 2004
- Activity: Member, Nominations Committee  
2006 to 2007
- Activity: Member, Awards Committee  
2008 to 2009
- Activity: General co-chair (with N. Sampat) IS&T/SPIE's 21<sup>st</sup> Annual Symposium on Electronic Imaging: Science and Technology (EI-09), San Jose, CA January 18-22, 2009.
- Society: SPIE The International Society for Optical Engineering
- Activity: Member  
2001 to present
- Activity: Editor, *Journal of Electronic Imaging*  
2001 to present
- Activity: Member, Publications Committee  
2001 to present
- Society: Optical Society of America
- Activity: Member  
1974 to 2000

**Ph.D. Thesis Supervision Completed**

**University of Delaware:**

<i>Name</i>	<i>Date</i>	<i>Thesis Title</i>
[1] J. B. Koskol	Dec. 1984	“The Performance Evaluation of Line Versus Dot-Interlaced Scanning of Time-Varying Imagery with an Application in Motion Estimation”

**Purdue University:**

<i>Name</i>	<i>Date</i>	<i>Thesis Title</i>
[2] P. K. Murphy	May 1984	“Digital Signal Processing Techniques Applied to Optical Propagation Problems,” (jointly supervised with Prof. N.C. Gallagher)
[3] E. Viscito	August 1988	“Multirate Filters and Filter Banks”
[4] R. S. Gentile	August 1989	“Color Image Processing for High Quality Reproduction Based on Uniform Color Spaces”
[5] B. K. Jennison	August 1990	“Wavefront Synthesis and Reconstruction: Direct Binary Search Holograms and Synthetic Aperture Radar”
[6] S. J. Bever	August 1990	“Synthesis of Diffractive Optical Bar Codes”
[7] M. A. Rahgozar	May 1991	“Tracking and Motion Estimation Based on Time-Sequentially Sampled Imagery and a General Theory of Time-Sequential Sampling”
[8] R. Balasubramanian	December 1992	“Color Image Quantization for Display Applications,” (jointly supervised with Prof. C. A. Bouman)
[9] M. Analoui	December 1992	“Problems in Halftone Imaging: Synthesis and Reconstruction”
[10] M. Wolski	December 1994	“Applications of Vector Space Methods to the Colorimetric Problems of Scanning”

- Filter Selection and Gamut Mismatch Compensation,” (jointly supervised with Prof. C. A. Bouman)
- [11] J. Z. Chang      May 1995      “Sequential Structures for Vector Quantization and Functional Approximation,” (jointly supervised with Prof. C. A. Bouman)
- [12] C. B. Atkins      December 1998      “Classification-Based Methods in Optimal Image Interpolation,” (jointly supervised with Prof. C. A. Bouman)
- [13] C. C. Taylor      December 1998      “Image Quality Assessment Based on a Human Visual System Model,” (jointly supervised with Prof. Z. Pizlo)
- [14] D. J. Lieberman      May 1999      “The Analysis and Efficient Implementations of Direct Binary Search and Related Halftoning and Image Enhancement Applications”
- [15] A. U. Agar      May 1999      “Color Imaging: Efficient Transformations and Model Based Halftoning”
- [16] D. Kacker      August 2000      “Color Transforms, Halftoning, and Watermarking”
- [17] F. A. Baqai      August 2000      “Halftoning Algorithms for Robust Digital Printing”
- [18] W. Wu      December 2000      “Two Problems in Digital Color Imaging: Colorimetry and Image Fidelity Assessor” (jointly supervised with Prof. Z. Pizlo)
- [19] P. Li      December 2000      “Efficient, High Quality Halftoning Algorithms”
- [20] J. Lee      May 2002      “Advanced Halftoning Algorithms: Printer Models, Color, and Compression”
- [21] G. Lin      May 2003      “Electronic Imaging System Improvements via Novel Hardware Architecture and Halftoning Algorithms”
- [22] S. Kim      August 2003      “High Quality/Low Complexity Halftoning and Color Image Enhancement”

- [23] T. Chang August 2004 “Memory Efficient Error Diffusion and Halftone Texture Characterization”
- [24] W-Y. Jang December 2004 “Print Quality: Assessment and Enhancement”
- [25] D-Y. Ng May 2005 “Imaging Colorimetry Using a Digital Camera with Dental Applications and Digital Video Capture Image Analysis”
- [26] Y. Bang December 2005 “Hardcopy Banding Measurement and Assessment,” (jointly supervised with Prof. Z. Pizlo)
- [27] B-S. Lee May 2006 “Characterization of Opponent Channels, Automated Detection of PQ Defects, and Green Noise Mask Design by Dual Metric,” (jointly supervised with Prof. Z. Pizlo)
- [28] E. Bernal December 2006 “Improved Rendition of Text and Lines in Inkjet and Electrophotographic Printers,” (jointly supervised with Prof. Z. Pizlo)
- [29] O. Arslan December 2006 “Development of a Softcopy Environment for Banding Visibility Assessment Experiments and Identification of Inkjet Printers for Forensic Applications,” (jointly supervised with Prof. Z. Pizlo)
- [30] Y. Han December 2006 “Sub-pixel Registration and Image Analysis with Application to Image Compression”
- [31] B. Zhang May 2007 “Three Problems in Digital Photography: Image Sharpness, Image Interpolation, and Image Restoration,” (jointly supervised with Prof. Z. Pizlo)
- [32] G. Ali May 2007 “Image Quality Analysis of Electrophotographic Printers for Banding Measurement and Forensic Applications”
- [33] X. Feng December 2007 “Ringing Artifact Assessment/Reduction and Low Quality Image Interpolation”
- [34] M. Qiao August 2008 “Digital Press Characterization and Artifact Prediction and Reduction”

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|------|-----------|---------------|---|
| [35] | C. H. Lee | December 2008 | “Hybrid Screen Design and Automatic Portrait Image Enhancement” (jointly supervised with Prof. M. Boutin) |
| [36] | S. W. Han | May 2009      | “Training Based Error Diffusion and Halftone Quality Quantification”                                      |
| [37] | H. Wang   | May 2009      | “Four Low-Complexity Color Trapping Algorithms” (jointly supervised with Prof. M. Boutin)                 |

### **M. S. Thesis Supervision Completed**

#### **University of Delaware:**

	<i>Name</i>	<i>Date</i>	<i>Thesis Title</i>
[1]	A. H. Stadlin	June 1978	“Coding Techniques for Dithered Binary Images”
[2]	D. F. Hoerl	June 1979	“Design of Test Signals for Digital Filters”
[3]	R. A. Blake	June 1980	“Digital Analysis of Ultrasonic Waves in Composites”
[4]	D. G. Ehrenberg	June 1981	“Prediction Coding for Dithered Binary Images”
[5]	R. H. Squires	December 1982	“Representational Errors in Digital Holograms: An Experimental Study”
[6]	R. M. Cramblitt	June 1983	“Problems in Time-Sequential Sampling of Spatiotemporal Images”
[7]	B. A. Hoerl	December 1983	“Reduction of Aliasing Using Jittered Sampling”

#### **Purdue University:**

	<i>Name</i>	<i>Date</i>	<i>Thesis Title</i>
[8]	D. S. Chen	August 1984	“On Reconstruction of Time Varying Imagery and Performance of Sampling Patterns”

- [9] K. D. Sauer August 1985 “Iterative Reconstruction of Bandlimited Signals from Nonuniformly Spaced Samples”
- [10] M. A. Seldowitz May 1987 “Synthesis of Digital Holograms by Direct Binary Search”
- [11] S. P. Kell May 1992 “Methods to Increase the Computational Efficiency of Direct Binary Search Computer-Generated Holograms”
- [12] C. B. Atkins May 1994 “Digital Halftoning for the Printing and Display of Images,” (jointly supervised with Prof. C. A. Bouman)
- [13] J. Grice May 1998 “The Virtual Microdensitometer: An Integrated Print-Quality Assessment Tool”
- [14] M. Groszek May 2005 “Haze Removal for Image Enhancement”
- [15] A. Suwendi May 2006 “Nearest-neighbor and Bilinear Resampling Factor Estimation to Detect Blockiness or Blurriness of an Image”
- [16] E. Cox August 2007 “A Graphical User Interface and Database Framework for Image Comparison in the Context of Printer Firmware Qualification”
- [17] V. Shah May 2008 “Embedding and Detecting Machine Readable Data in Images Printed by Electrophotographic Printer”
- [18] S. Gindi August 2008 “Color Characterization and Modeling of Scanners,”

**M. S. Thesis or Research Project and Ph.D. Thesis Students  
Currently Being Supervised**

B. Bitlis	Ph.D.
P. Chiang	Ph.D. (co-advisor with G. Chiu)
H. Ding	Ph.D. (co-advisor with C. Bouman)
J. Gong	Ph.D.
P. Goyal	Ph.D.
M. Gupta	Ph.D.
X. Jing	Ph.D.
D. Kim	Ph.D.



J. Kim	Ph.D.
M. Ortiz	Ph.D.
H. Park	Ph.D. (co-advisor with Z. Pizlo)
S. Park	Ph.D.
H. Santos	Ph.D. (co-advisor with M. Boutin)
S. Suh	Ph.D.
H. Thanh	Ph.D.
J. Wei	Ph.D. (co-advisor with C. Bouman and I. Pollak)

## **Courses Developed**

### **University of Delaware:**

EE 310	Random Signals and Noise (1977)
EE 667	Image Processing (1977)
EE 170	Introduction to Discrete Systems (1979)

### **Purdue University:**

EE 641	Principles of Digital and Analog Imaging Systems (1984)
EE 438	Digital Signal Processing with Applications (1989)
EE 638	Principles of Digital Color Imaging Systems (2002)
EE 495M	Mobile Communications Project (2001)

## **School Committee Activities**

### **University of Delaware:**

Committee:	Department Faculty
Activity:	Secretary Sept. 1976 to May 1980

Committee:	Graduate Committee
Activity:	Member Sept. 1976 to May 1977

### **Purdue University:**

Committee:	Communication Sciences Area
Activity:	Member Jan. 1983 to present Chairman June 1985 to May 1987

Committee:	Ad Hoc Committee on Graduate Admissions and Recruiting
Activity:	Chairman October 1987 to January 1988
Committee:	PDE Committee
Activity:	Chairman January 1989 to December 1989
Committee:	Graduate Committee
Activity:	Chairman January 1990 to May 1994
	Graduate Coordinator Aug. 1994 to May 1998
Committee:	ECE Head Search Committee
Activity:	Member June 1995 to May 1996
Committee:	Image Analysis Laboratory
Activity:	Director June 1997 to June 2000
Committee:	Feddersen Chair Search Committee (Mechanical Engineering)
Activity:	Member August 1998 to December 2001
Committee:	ECE Awards Committee
Activity:	Chair September 1999 to August 2003
Committee:	ECE Head Faculty Review Committee
Activity:	Chair January 2000 to November 2000
Committee:	ECE Head Search Committee
Activity:	Member October 2001 to May 2002
Committee:	ECE Head's Advisory Committee
Activity:	Member August 2002 to present
Committee:	ECE Named Professors Committee
Activity:	Member August 2005 to present

Committee: ECE Internal Evaluation Committee  
Activity: Chair  
April 2005 to April 2006

Committee: ECE Strategic Planning Committee  
Activity: Chair  
August 2007 to present

### **Engineering-wide Committee Activities**

#### **University of Delaware:**

Committee: Engineering College Faculty  
Activity: Secretary  
September 1978 to May 1979

Committee: Engineering College Faculty  
Activity: Alternate Secretary  
September 1979 to May 1981

Committee: Elections Committee  
Activity: Member  
September 1979 to December 1982

Committee: Computer Committee  
Activity: Member  
September 1979 to May 1981

#### **Purdue University :**

Committee: Continuing Engineering Education  
Activity: Member  
August 1994 to May 1999

Committee: College Research Committee (CRC)  
Activity: Member  
January 2004 to May 2007

Committee: College of Engineering Finance Committee  
Activity: Member  
August 2007 to May 2008

Committee: College of Engineering Finance Committee  
Activity: Chair

August 2008 to present

### University Committee Activities

#### Purdue University:

- Committee: Faculty Senate  
Activity: Member  
August 1990 to May 1992, August 1997 to May 2000
- Committee: Graduate Council  
Activity: Member  
August 1992 to May 1995, August 1997 to May 2000, August 2001 to May 2003
- Committee: Ad Hoc Committee to Revise Thesis Manual  
Activity: Member  
August 1992 to May 1994
- Committee: Thesis and Publications  
Activity: Member  
August 1992 to May 1994
- Committee: Intercampus Relations  
Activity: Member  
March 1996 to May 1998
- Committee: Faculty Affairs  
Activity: Member  
August 1997 to May 2000
- Committee: Ad Hoc Committee on Nontraditional Vehicles in Graduate Education  
Activity: Chair  
October 1998 to May 2001

#### Serial Journal Regular Articles (names of students are indicated by an asterisk):

- [1] J. P. Allebach and B. Liu, "Minimax Spectrum Shaping with a Bandwidth Constraint," *Appl. Opt.*, Vol. 14, pp. 3062-3072, December 1975.
- [2] J. P. Allebach, N. C. Gallagher, Jr., and B. Liu, "Aliasing Error in Digital Holography," *Appl. Opt.*, Vol. 15, pp. 2183-2188, September 1976.
- [3] J. P. Allebach and B. Liu, "Random Quasiperiodic Halftone Process," *J. Opt. Soc. Am.*, Vol. 66, pp. 909-917, September 1976.

- [4] J. P. Allebach and B. Liu, "Analysis of Halftone Dot Profile and Aliasing in the Discrete Binary Representation of Images," *J. Opt. Soc. Am.*, Vol. 67, pp. 1147-1154, September 1977.
- [5] J. P. Allebach, "Random Nucleated Halftone Screen," *Photogr. Sci. Engrg.*, Vol. 22, pp. 89-91, March-April 1978.
- [6] J. P. Allebach, "Aliasing and Quantization in the Efficient Display of Images," *J. Opt. Soc. Am.*, Vol. 69, pp. 869-877, June 1979.
- [7] J. P. Allebach and R. N. Stradling, "Computer-Aided Design of Dither Signals for Binary Display of Images," *Appl. Opt.*, Vol. 18, pp. 2708-2713, August 1, 1979.
- [8] J. P. Allebach, "Binary Display of Images when Spot Size Exceeds Step Size," *Appl. Opt.*, Vol. 19, pp. 2513-2519, 1 August 1980.
- [9] R. A. Blake and J. P. Allebach, "Digital Ultrasonic Image Construction Using Electronic Ordered Dither Techniques," *J. Nondestruct. Eval.*, Vol. 2, No. 1, pp. 75-84, 1981.
- [10] J. P. Allebach, "Analysis of Sampling Pattern Dependence in Time-Sequential Sampling of Spatiotemporal Signals," *J. Opt. Soc. Am.*, Vol. 71, pp. 99-105, January 1981.
- [11] J. P. Allebach, "Representation - Related Errors in Binary Digital Holograms: A Unified Analysis," *Appl. Opt.*, Vol. 20, pp. 290-299, 15 January 1981.
- [12] J. P. Allebach, "Effect of Sample Displacement in Time-Sequential Sampling of Spatiotemporal Signals," *J. Opt. Soc. Am.*, Vol. 73, pp. 466-472, April 1983.
- [13] R. M. Cramblitt and J. P. Allebach, "Analysis of Time-Sequential Sampling with a Spatially Hexagonal Lattice," *J. Opt. Soc. Am.*, Vol. 73, pp. 1510-1517, November 1983.
- [14] J. P. Allebach, "Design of Antialiasing Patterns for Time-Sequential Sampling of Spatiotemporal Signals," *IEEE Trans. Acoust., Speech, Signal Processing*, Vol. ASSP-32, pp. 137-144, February 1984.
- [15] P. K. Murphy, J. P. Allebach, and N. C. Gallagher, "The Effect of Optical Aberrations on Laser Speckle," *J. Opt. Soc. Am. A*, Vol. 3, pp. 215-222, February 1986.
- [16] J. B. Koskol and J. P. Allebach, "Estimating the Motion of a Maneuvering Target with Time-Sequentially Sampled Imagery," *J. Opt. Soc. Am. A*, Vol. 3, pp. 1504-1511, September 1986.
- [17] E. Ochoa, J. P. Allebach, and D. W. Sweeney, "Optical Median Filtering Using Threshold Decomposition," *Appl. Opt.*, Vol. 26, pp. 252-260, 15 January 1987.
- [18] D. S. Chen and J. P. Allebach, "Analysis of Error in Reconstruction of 2-D Signals from Irregularly Spaced Samples," *IEEE Trans. Acoust., Speech, Signal Processing*, Vol. ASSP-35, pp. 173-180, February 1987.
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- [20] K. D. Sauer and J. P. Allebach, "Iterative Reconstruction of Bandlimited Images from Nonuniformly Spaced Samples," *IEEE Trans. Circuits Syst.*, Vol. CAS-34, pp. 1497-1506, December 1987.
- [21] E. Viscito and J. P. Allebach, "On Determining Optimum Multirate Structures for Narrow-Band Filters," *IEEE Trans. Acoust., Speech, Signal Processing*, Vol. ASSP-36, pp. 1255-1271, August 1988.
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- [23] B. K. Jennison, J. P. Allebach, and D. W. Sweeney, "Iterative Approaches to Computer-Generated Holography," (**invited paper**) *Opt. Eng.*, Vol. 28, pp. 629-637, June 1989.
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- [25] R. S. Gentile, E. Walowit, and J. P. Allebach, "Quantization and Multilevel Halftoning of Color Images for Near Original Image Quality" *J. Opt. Soc. Am. A.*, Vol. 7, pp. 1019-1026, June 1990.
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- [28] T. S. Rao, G. R. Arce, and J. P. Allebach, "Analysis of Ordered Dither for Arbitrary Sampling Lattices and Screen Periodicities," *IEEE Trans. Acoust., Speech, Signal Processing*, Vol. ASSP-38, pp. 1981-2000, November 1990.
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- [33] S. J. Bever and J. P. Allebach, "Multiple Scattering by a Planar Array of Parallel Dielectric Cylinders," *Appl. Opt.*, Vol. 31, pp. 3524-3532, 20 June 1992.
- [34] M. A. Rahgozar and J. P. Allebach, "A General Theory of Time-Sequential Sampling," (**invited paper**) *Signal Processing*, Vol. 28, pp. 253-270, September 1992.

- [35] J. P. Allebach, "Processing Digital Images: From Capture to Display," (**invited paper**) *Physics Today*, Special Issue: The Physics of Digital Color, pp. 32-39, December 1992.
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- [37] R. Balasubramanian, J. P. Allebach, and C. A. Bouman, "Color Image Quantization Using a Fast Binary Splitting Technique," *J. Opt. Soc. Am. A.*, Vol. 11, pp. 2777-2786, November 1994.
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- [75] D. Y. Ng and J. P. Allebach, "A Subspace Matching Color Filter Design Methodology for a Multi-spectral Imaging System," *IEEE Trans. on Image Processing*, Vol. 15, pp. 2631-2643, Sep. 2006.
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- [84] B. Zhang and J. P. Allebach, "Adaptive Bilateral Filter for Sharpness Enhancement and Noise Removal," *IEEE Trans. on Image Processing*, Vol. 17, pp. 664-678, May 2008.
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### **Publications Pending:**

- [1] D.-Y. Ng and J. P. Allebach, "An Automated Prescreening Tool for a Printer Qualification Process," *Journal of Imaging Science and Technology*, submitted.
- [2] C. Lee and J. P. Allebach, "The Hybrid Screen – Improving the Breed," *IEEE Trans. on Image Processing*, submitted.
- [3] H. Santos, H. J. Park, R. Kumontoy, K. Low, M. Ortiz, C. W. Kim, P. Choe, S. Leman, K. Oldenburger, M. Lehto, X. Lehto, and J. P. Allebach, "A web-based self-diagnosis tool to solve print quality issues," *Journal of Imaging Science and Technology*, submitted.
- [4] H. J. Park and J. P. Allebach, "A Psychophysical Investigation of the Effect of Coring on Perceived Toner Scatter," *Journal of Electronic Imaging*, submitted.

### **Research Book Contributions and Books Published:**

- [1] J. P. Allebach, "Aliasing and Quantization in the Efficient Display of Continuous Tone Imagery," (reprinted from *J. Opt. Soc. Am.*, Vol. 69, June 1979) Section 6.4 of Chapter 6, *Graphical and Binary Image Processing and Applications*, J. C. Stoffel, editor, Artech House, Dedham, MA, 1982, pp. 331-340.
- [2] J. P. Allebach, "Random Nucleated Halftone Screening," (reprinted from *Photogr. Sci. Engrg.*, Vol. 22, March-April 1978) Section 6.6 of Chapter 6, *Graphical and Binary Image Processing and Applications*, J. C. Stoffel, editor, Artech House, Dedham, MA, 1982, pp. 347-350.
- [3] J. P. Allebach, "Design of Antialiasing Patterns for Time-Sequential Sampling of Spatiotemporal Signals," (reprinted from *IEEE Trans. Acoust., Speech, Signal Processing*, Vol. ASSP-32, February 1984), *Selected Papers in Multidimensional Digital Signal Processing*, edited by the Multidimensional Signal Processing Technical Committee of the IEEE Acoustics, Speech, and Signal Processing Society, IEEE Press, New York, NY, 1986, pp. 128-135.
- [4] M. A. Seldowitz, J. P. Allebach, and D. W. Sweeney, "Synthesis of Digital Holograms by Direct Binary Search," (reprinted from *Appl. Opt.*, Vol. 26, 15 July 1987), *Selected Papers on Computer-Generated Holograms and Diffractive Optics*, S. H. Lee, editor, SPIE Milestone Series Vol. MS 33, Bellingham, WA, 1992, pp. 71-81.
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- [6] E. J. Delp, J. P. Allebach, and C. A. Bouman, "Digital Image Processing," *The Electrical Engineering Handbook*, R. C. Dorf, editor, CRC Press, Boca Raton, FL, pp. 329-345, 1993.

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- [203] E. J. Coyle, J. P. Allebach, and J. Garton Krueger, "The Vertically-Integrated Projects (VIP) Program in ECE at Purdue: Fully Integrating Undergraduate Education and Graduate Research," *Proceedings of the 2006 ASEE Annual Conference and Exposition*," Chicago, IL, June 18-21, 2006.
- [204] B. Zhang, J. P. Allebach, J. Gondek, and M. Schramm, "Improved Resolution Synthesis Algorithm for Image Interpolation," ,” *Proceedings of NIP22 22nd International Conference on Digital Printing Technologies*, Denver, CO, 17-22 September 2006.
- [205] P.-J. Chiang, A. K. Mikkilineni, S. Suh, G. T. C. Chiu, E. J. Delp, and J. P. Allebach, "Extrinsic Signatures Embedding and Detection in Electrophotographic Halftone Images through Laser Intensity Modulation," *Proceedings of NIP22 22nd International Conference on Digital Printing Technologies*, Denver, CO, 17-22 September 2006.
- [206] S. Suh, J. P. Allebach, G. T. C. Chiu, and E. J. Delp, and, "Printer Mechanism-Level Data Hiding for Halftone Documents," *Proceedings of NIP22 22nd International Conference on Digital Printing Technologies*, Denver, CO, 17-22 September 2006.
- [207] A. K. Mikkilineni, P.-J. Chiang, S. Suh, G. T. C. Chiu, J. P. Allebach, and E. J. Delp, "Data Hiding Capacity and Embedding Techniques for Printed Text Documents," *Proceedings of NIP22 22nd International Conference on Digital Printing Technologies*, Denver, CO, 17-22 September 2006.
- [208] H. J. Park, H. Santos, C. Kim, P. Choe, R. Kumontoy, K. Low, K. Oldenberger, M. Ortiz, X. Lehto, M. Lehto, and J. P. Allebach, "A Web-Based Self-Diagnosis Tool to Solve Print Quality Issues," (**Focal paper**) *Proceedings of NIP22 22nd International Conference on Digital Printing Technologies*, Denver, CO, 17-22 September 2006.
- [209] C. H. Lee and J P. Allebach, "The Hybrid Screen: Improving the Breed," in *Color Imaging XII: Processing, Hardcopy, and Applications*, SPIE Vol. 6493, R. Eschbach and G. Marcu, Eds., 30 January – 1 February 2007.
- [210] S. W. Han, M. Jain, R. Kumontoy, C. A. Bouman, P. Majewicz, and J P. Allebach, "AMFM Halftoning: Improved Cost Function and Training Framework," in *Color Imaging XII: Processing, Hardcopy, and Applications*, SPIE Vol. 6493, R. Eschbach and G. Marcu, Eds., 30 January – 1 February 2007.
- [211] B. Bitlis, P. A. Jansson, and J P. Allebach, "Parametric point spread function modeling and reduction of stray light effects in digital still cameras," in *Computational Imaging V*, SPIE Vol. 6498, C. Bouman, E. Miller, and I. Pollak, Eds., 29-31 January 2007.
- [212] N. Khanna, A. K. Mikkilineni, G. T. C. Chiu, J. P. Allebach, E. J. Delp III, "Forensic classification of imaging sensor types," in *Security, Steganography, and Watermarking of Multimedia Contents IX*, SPIE Vol. 6505, E. Delp and P. Wong, Eds., January 2007.
- [213] P. Choe, M. R. Lehto, and J. Allebach, "Self-Help Troubleshooting by Q-KE-CLD Based on Fuzzy Bayesian Model," in *HCI International 2007, Lecture Notes in Computer Science (LNCS)*, 22-27 July 2007, Beijing, P.R. China.

- [214] P. Choe, C. Kim, M. R. Lehto, and J. Allebach, "Experimental comparison of adaptive vs. static thumbnail displays," in *HCI International 2007, Lecture Notes in Computer Science (LNCS)*, 22-27 July 2007, Beijing, P.R. China.
- [215] B. Zhang and J. P. Allebach, "Adaptive Bilateral Filter for Sharpness Enhancement and Noise Removal," *Proceedings of the IEEE International Conference on Image Processing*, San Antonio, TX, 16-19 September 2007.
- [216] S. Suh, J. P. Allebach, G.-T. Chiu, and E. J. Delp, "Printer Mechanism-Level Embedding and Extraction for Halftone Documents: New Results," *Proceedings of NIP23: The 23<sup>rd</sup> International Conference on Digital Printing Technologies*, Anchorage, AK, 16 – 21 September 2007.
- [217] P.-J. Chiang, A. K. Mikkilineni, S. J. Suh, G.-T. Chiu, E. J. Delp, and J. P. Allebach, "Development of an Electrophotographic Laser Intensity Modulation Model for Extrinsic Signature Embedding," *Proceedings of NIP23: The 23<sup>rd</sup> International Conference on Digital Printing Technologies*, Anchorage, AK, 16 – 21 September 2007.
- [218] A. K. Mikkilineni, P.-J. Chiang, G.-T. Chiu, J. P. Allebach, and E. J. Delp, "Channel Coding and Pulse Shaping for Data Hiding in Text," *Proceedings of NIP23: The 23<sup>rd</sup> International Conference on Digital Printing Technologies*, Anchorage, AK, 16 – 21 September 2007.
- [219] H. Wang, M. Boutin, J. Trask, and J. P. Allebach, "An Efficient Method for Color Trapping," in *Color Imaging XIII: Processing, Hardcopy, and Applications*, SPIE Vol. 6807, R. Eschbach, G. Marcu, S. Tominaga, Eds., 29-31 January 2008.
- [220] B. Min, Z. Pizlo, and J. P. Allebach, "Development of softcopy environment for primary color banding visibility," in *Image Quality and System Performance V*, SPIE Vol. 6808, S. P. Farnand and F. Gaykema, Eds., 28-30 January 2008.
- [221] J. Wei, B. Bitlis, A. Bernstein, A. de Silva, P. Jansson, and J. P. Allebach, "Stray Light and Shading Reduction in Digital Photography: A New Model and Algorithm," in *Digital Photography IV*, SPIE Vol. 6817, J. M. DiCarlo and B. G. Rodricks, Eds., 28-29 January 2008.
- [222] N. Khanna, G. T. Chiu, J. P. Allebach, and E. J. Delp, "Scanner Identification with Extension to Forgery Detection," in *Security, Forensics, Steganography, and Watermarking of Multimedia Contents X*, SPIE Vol. 6819, E. J. Delp, P. W. Wong, J. Dittmann, and N. D. Memon, Eds., 28-30 January 2008.
- [223] M. Qiao and J. P. Allebach, "Moire Artifact Prediction in a Variable Data Printing Environment," *Proceedings of the 2008 IEEE International Conference on Acoustics, Speech, and Signal Processing*, Las Vegas, NV, 30 March – 4 April 2008.
- [224] N. Khanna, G. T.-C. Chiu, J. P. Allebach, and E. J. Delp, "Forensic Techniques for Classifying Scanner, Computer Generated and Digital Camera Images," *Proceedings of the 2008 IEEE International Conference on Acoustics, Speech, and Signal Processing*, Las Vegas, NV, 30 March – 4 April 2008.
- [225] E. Bernal, J. P. Allebach, and J. Trask, "Model-Based Memory Efficient Algorithm for Compensation of Toner Overdevelopment in Electrophotographic

- Printers,” NIP24: 24th International Conference on Digital Printing Technologies,” Pittsburgh, PA, 7 – 12 September 2008.
- [226] T. Ha, J. P. Allebach, and D. Cha, “Measurement and Analysis of Banding Artifacts in Color Electrophotographic Printers,” NIP24: IS&T’s 24th International Conference on Digital Printing Technologies, Pittsburgh, PA, 7 – 12 September 2008.
- [227] D. Y. Ng and J. P. Allebach, “An Automated Prescreening Tool for a Printer Qualification Process,” NIP24: IS&T’s 24th International Conference on Digital Printing Technologies, Pittsburgh, PA, 7 – 12 September 2008.
- [228] P. J. Chiang, G. T. C. Chiu, E. J. Delp, and J. P. Allebach, “Optimal Encoding and Decoding of Extrinsic Signatures for Electrophotographic Halftone Images,” NIP24: IS&T’s 24th International Conference on Digital Printing Technologies, Pittsburgh, PA, 7 – 12 September 2008.
- [229] X. Feng and J. P. Allebach, “Segmented Edge Interpolation Using Edge Direction and Texture Synthesis,” *Proceedings of the IEEE International Conference on Image Processing*, San Diego, CA, 12-17 October 2008.
- [230] H. Santos-Villalobos, V. Loewen, J. P. Allebach, and M. Lehto, “Houston, we have a color issue,” in *Color Imaging XIV: Displaying, Hardcopy, Processing, and Applications*, SPIE Vol. 7241, R. Eschbach, G. Marcu, S. Tominaga, A. Rizzi, Eds., San Jose, CA, 18-22 January 2009.
- [231] H-J. Park, Z. Pizlo, and J. P. Allebach, “Analysis of optimal coring values from psychophysical experiments,” in *Image Quality and System Performance VI*, SPIE Vol. 7242, S. P. Farnand and F. Gaykema, Eds., San Jose, CA, 18-22 January 2009.
- [232] J. Wei, G. Cao, C. A. Bouman, and J. P. Allebach, “Fast space-varying convolution and its application in stray light reduction,” in *Computational Imaging VII*, SPIE Vol. 7246, C. A. Bouman, E. L. Miller, and I. Pollak, Eds., San Jose, CA, 18-22 January 2009.

### **Invited Lectures:**

- [1] “Problems in the Printing and Display of Images,” Syracuse Section of IEEE Circuits and Systems Society, Syracuse, NY, October 26, 1977.
- [2] “Problems in the Digital Display of Images,” IBM Thomas J. Watson Research Center, Yorktown Heights, NY, April 13, 1979.
- [3] “Digital Image Processing,” College of Marine Studies, University of Delaware, Newark, DE, October 1981.
- [4] “Implicit Sampling Problems in Image Processing: Printing and Display of Images, Sampling of Spatiotemporal Signals,” TEKTRONIX, Inc., Beaverton, OR, February 1982.
- [5] “Digital Printing: Basic Principles,” TEKTRONIX, Inc., Wilsonville, OR, March 18, 1983.



- [6] "Digital Printing: Theory," TEKTRONIX, Inc., Beaverton, OR, March 18, 1983.
- [7] "Digital Printing and Display of Images: Spectral Analysis as a Key to Understanding and Improving Performance," 3M Graphic Research Laboratory, St. Paul, MN, May 25, 1983.
- [8] "Time-Sequential Sampling of Spatiotemporal Signals," Hughes Aircraft Co., El Segundo, CA, August 20, 1983.
- [9] "Digital Printing and Display of Images," IBM San Jose Research Center, San Jose, CA, October 24, 1983.
- [10] "Spectral Analysis as the Key to Understanding Moire in Halftone Printing," Bureau of Printing and Engraving, U.S. Department of the Treasury, Washington, DC, March 8, 1984.
- [11] "Digital Printing and Display of Images," IBM Thomas J. Watson Research Center, Yorktown Heights, NY, March 16, 1984.
- [12] "Unified Analysis and Simulation Study of Methods for Digital Holography," Sandia National Laboratories, Livermore, CA, March 25, 1985.
- [13] "Time-Sequential Approaches to Moving Image Analysis," Coordinated Sciences Laboratory, University of Illinois, Urbana, IL, April 22, 1985.
- [14] "Digital Printing and Display of Images," Mead Imaging, Dayton, OH, April 30, 1985.
- [15] "Iterative Recovery of Bandlimited Signals from Nonuniformly Spaced Samples," Sandia National Laboratories, Livermore, CA, October 1, 1985.
- [16] "Time-Sequential Sampling and Processing of Multidimensional Signals," Department of Electrical Engineering, Princeton University, Princeton, NJ, February 20, 1986.
- [17] "Time-Sequential Sampling and Processing of Time-Varying Images," Department of Electrical and Computer Engineering, University of Cincinnati, Cincinnati, OH, June 6, 1986.
- [18] "Printing and Display of Images," Imagen Corporation, Santa Clara, CA, November 3, 1987.
- [19] "Digital Halftoning," Polaroid Corporation, Cambridge, MA, March 18, 1988.
- [20] "Iterative Approaches to the Synthesis of Digital Diffractive Elements," Department of Electrical and Computer Engineering, Illinois Institute of Technology, Chicago, IL, March 3, 1989.
- [21] "Iterative Approaches to the Synthesis of Digital Diffractive Elements," Department of Electrical and Computer Engineering, State University of New York at Buffalo, Buffalo, NY, April 14, 1989.
- [22] "Motion Estimation from Time-Sequentially Sampled Data," Department of Electrical Engineering, University of Minnesota, Minneapolis, MN, February 7, 1991.
- [23] "Two Problems in Binary Signal Design," Department of Electrical Engineering, University of Minnesota, Minneapolis, MN, February 8, 1991.

- [24] "Current Research in Digital Image Processing at Purdue," Eastman Kodak Company, Rochester, NY, July 16, 1991.
- [25] "Current Research in Digital Image Processing at Purdue," Xerox Webster Research Center, Webster, NY, July 17, 1991.
- [26] "A New Approach to Color Image Palettization," PictureTel Corporation, Peabody, MA, September 25, 1991.
- [27] "Current Research in Printing and Display of Images," presented as 1991-1992 Visiting Lecturer of the Society for Imaging Science and Technology at the following chapter meetings: Boston, September 26, 1991; Atlanta, September 27, 1991; Binghamton, October 9, 1991; New Jersey/New York, October 10, 1991; Twin Cities, November 20, 1991.
- [28] "A Tutorial on Printing and Display of Images," Imaging Chapter Tech Forum, 3M Company, St. Paul, MN, November 21, 1991.
- [29] "Current Research on Digital Halftoning at Purdue," (with C. A. Bouman), Hewlett-Packard Laboratories, Palo Alto, CA, February 14, 1992.
- [30] "Two Problems in Halftone Imaging: Model-Based Halftoning Via Direct Binary Search and Reconstruction of Continuous-Tone from Halftone," Coordinated Sciences Laboratory, University of Illinois, Urbana, IL, April 15, 1992.
- [31] "Recent Progress in Digital Halftoning," Department of Electrical and Computer Engineering, Illinois Institute of Technology, Chicago, IL, November 13, 1992.
- [32] "Problems in Binary Signal Design: Digital Holography, Sparse Correlation Masks, and Digital Halftoning," Hewlett-Packard Laboratories, Palo Alto, CA, February 5, 1993.
- [33] "Digital Halftoning," Department of Psychology, Purdue University, West Lafayette, IN, March 29, 1993.
- [34] "Scalar Sequential Quantization of Color Images," (with C. A. Bouman), PictureTel Corporation, Peabody, MA, May 11, 1993.
- [35] "Digital Halftoning," Stanford Applied Perception Seminar Series, Stanford University, Palo Alto, CA, August 3, 1993.
- [36] "Scalar Sequential Quantization of Color Images," Information Systems Laboratory, Department of Electrical Engineering, Stanford University, Palo Alto, CA, August 9, 1993.
- [37] "Sequential Scalar Quantization: A New Structure for Efficient Implementation of Multivariate Nonlinear Functions," IEEE Fallcon Conference, Cedar Rapids, IA, November 4, 1993.
- [38] "Sequential Data Structures: Optimal Sequential Data Structures for Color Imaging," Department of Electrical Engineering, Indiana University - Purdue University at Indianapolis, April 15, 1994.
- [39] "Data Collection for Better Color," (with C. A. Bouman), 1994 ATG External Research Open House, Apple Computer, Cupertino, CA, May 9, 1994.
- [40] "Current Research on Halftoning and Color Imaging," Imaging Systems Laboratory, Xerox Webster Research Center, Webster, NY, May 19, 1994.

- [41] "Digital Color Imaging: Bringing Color to the Desktop" presented as IEEE Signal Processing Society Distinguished Lecturer on the following occasions: Portland Chapter, Oregon Graduate Center, Portland, OR, October 28, 1994; Franz Tuteur Memorial Lecture, Department of Electrical Engineering, Tel Aviv University, Tel Aviv, Israel, December 12, 1994; Southeast Michigan Chapter, Detroit, MI, April 10, 1995; Opening Plenary Lecture of the Turkish National Workshop on Signal Processing and Applications, Cappadocia, Turkey, April 26, 1995.
- [42] "Digital Color Imaging: Bringing Color to the Desktop," Department of Electrical Engineering, Technion University, Haifa, Israel, December 14, 1995.
- [43] "Problems in the Synthesis of Binary Signals," Department of Electrical Engineering, Bosphorous University, Istanbul, Turkey, April 24, 1995.
- [44] "Recent Results in Image Rendering: Image Scaling and Digital Halftoning," (with C. A. Bouman), Hewlett-Packard Research Labs, Palo Alto, CA, 31 January 1996.
- [45] "Two Problems in Electronic Imaging: Color Sensor Design and Digital Halftoning," Department of Computer Science, University of Waterloo, Waterloo, Canada, 16 February 1996.
- [46] "Transformations for Color Measurement and Imaging," Department of Information and Computer Sciences, Chiba University, Inage-ku, Japan, 11 September 1996.
- [47] "Digital Halftoning Using the Direct Binary Search Algorithm," Department of Electrical Engineering, University of Louisville, Louisville, KY, 14 November 1996.
- [48] "Halftoning via Direct Binary Search - An Update," Hewlett-Packard Research Labs, Palo Alto, CA, 12 February 1997.
- [49] "Image Rendering for the Desktop: Color Transformations and Digital Halftoning," UM Communications and Signal Processing Lab Seminar Series, University of Michigan, Ann Arbor, MI, 22 February 1998.
- [50] "Digital Printing," Guest lecture for EE 580a Processor Architectures for new Paradigms, Department of Electrical and Computer Engineering, Princeton University, Princeton, NJ, 2 March 1999.
- [51] "Digital Imaging on The Desktop: A Signal Processing Perspective," Computer Engineering Seminar Series, Department of Electrical and Computer Engineering, Princeton University, Princeton, NJ, 2 March 1999.
- [52] "Digital Imaging on The Desktop: A Signal Processing Perspective," Department of Electrical and Computer Engineering, University of Delaware, Newark, DE, 3 March 1999.
- [53] "Digital Halftoning via the Direct Binary Search Algorithm," Center for Imaging Science, Rochester Institute of Technology, Rochester, NY, 9 April 1999.
- [54] "Model-Based Imaging: Halftoning, Printers, and the Human Viewer," Xerox Corporation, Rochester, NY, 25 May 1999.

- [55] “Desktop Printing: A Digital Signal Processing Perspective,” Imaging from A to Z, workshop sponsored by IS&T and the University of Delaware, Newark, DE, 2 December 2000.
- [56] “Digital Halftoning via Direct Binary Search,” Digimarc, Tualatin, OR, 13 February 2001.
- [57] “Digital Photography: From Click to Clunk,” Technical Excellence Lecture, Thomson Consumer Electronics, Indianapolis, IN, 21 March 2001.
- [58] “Imaging Colorimetry Using a Digital Camera with Dental Applications,” Imaging Community of Practice Seminar Series, Procter and Gamble Company, Cincinnati, OH, 5 November 2002.
- [59] “Realistic Color Rendering Based on Human Color Perception,” Imaging Community of Practice Seminar Series, Procter and Gamble Company, Cincinnati, OH, 5 November 2002.
- [60] “HP’s Mobility Program: A University Perspective,” HP Higher Education Executive Forum, Cupertino, CA, 28-30 April 2003.
- [61] “Digital Halftoning – Why Am I Still Talking About It?” UIUC Signal Processing Seminar Series, University of Illinois at Urbana-Champaign, Urbana, IL, 7 May 2003.
- [62] “Digital Publishing, High Performance Computing, and the Grid,” Gelato Conference, University of Illinois at Urbana-Champaign, Urbana, IL, 24 May 2004.
- [63] “Digital Printing – An Image Processor’s Perspective,” **Distinguished Lecture Series**, Xerox Imaging and Services Technology Center, Rochester, NY, 9 June 2004.
- [64] “Print Quality and Print Quality Defects – Improving Platform Design, and Service and Support,” Xerox Imaging and Services Technology Center, Rochester, NY, 9 June 2004.
- [65] “Training-Based Methods for Developing Optimal Rendering Algorithms,” IEEE Signal Processing Chapter, Rochester, NY, 9 June 2004.
- [66] “Printer Forensics Research at Purdue,” presented with G. Chiu and E. Delp, U.S. Secret Service, Washington, DC, 17 June 2004.
- [67] “An Overview of Imaging and Printing Research at Purdue University,” presented jointly with G. Chiu, Samsung Advanced Institute of Technology, Suwon, South Korea, 16 September 2004.
- [68] “Training-Based Methods for Developing Optimal Rendering Algorithms,” Department of Electrical and Computer Engineering, Northwestern University, 13 October 2004.
- [69] “Printer Forensics Research at Purdue,” presented with G. Chiu and E. Delp, Bank of Canada, Ottawa, Canada, 2 November 2004.
- [70] “An Overview of Imaging and Printing Research at Purdue University,” Ricoh Innovations, Menlo Park, CA, 15 November 2004.

- [71] “Master Research Frameworks – A Study in Productive Collaborations,” (with Lou Witkin, HP University Relations), Bay Area Strategic Innovation Intellectual Property Consortium, San Francisco, CA, 1 February 2005.
- [72] “An Interdisciplinary Approach to Image Processing Research,” Purdue-Silicon Valley Symposium, Santa Clara, CA, 22 February 2005.
- [73] “An Interdisciplinary Approach to Image Processing Research,” Purdue Indianapolis Area ECE Alumni Luncheon, Indianapolis, IN, 13 May 2005.
- [74] “What Impact on Teaching and Learning Would Look Like,” Spring 2006 Digital Publishing University Community Meeting, University of Nottingham, Nottingham, England, 3-4 April 2006.
- [75] “Artifact Recognition, Dynamic Scheduling, and Dependability Assessment for Automated Digital Publishing Workflows,” presented jointly with W. Rivera, University of Puerto Rico – Mayaguez, HP Technologies Workshop – Emerging Computing Trends: Utility Computing and Digital Publishing, part of the IFIP World Computing Conference, Santiago, Chile, 20-25 August 2006.
- [76] “Future Imaging Technologies,” Samsung Advanced Institute of Technology (SAIT), Yongin, 19 October 2006.
- [77] “Training-Based Approaches in Digital Imaging and Printing – Real Solutions to Real Problems,” Purdue ECE Southern California Alumni Dinner, Laguna Woods, CA, 16 April 2007.
- [78] “Imaging Research Overview,” HP Labs – Israel, Haifa, Israel, 25 June 2007.
- [79] “Research in Imaging and Printing at Purdue – a Model and Training-Based Approach,” HP Labs – Bristol, Bristol, United Kingdom, 20 September 2007.
- [80] “Image Artifact Recognition for Autonomous Document Assessment Expert,” Fifth Chameleon Federation Meeting, Bologna, Italy, 24 September 2007.
- [81] “Printing from the Web,” Fifth Chameleon Federation Meeting, Bologna, Italy, 24 September 2007.
- [82] “Overview of Purdue Digital Imaging Systems Program and Photo Enhancement Projects,” Samsung Electronics Company Digital Printing Division, Suwon City, South Korea, 25 October 2007.
- [83] “Stray Light in Digital Cameras – Why You Should Care and How to Correct It,” Samsung Electronics Company Digital Printing Division, Suwon City, South Korea, 25 October 2007.
- [84] “Training-Based Approaches in Digital Imaging and Printing – Real Solutions to Real Problems,” Purdue ECE Portland Area Alumni Dinner, Portland, OR, 19 March 2008.
- [85] “Training-Based Approaches in Digital Imaging and Printing – Real Solutions to Real Problems,” Purdue ECE Seattle Area Alumni Dinner, Seattle, WA, 20 March 2008.
- [86] “HP-Sponsored Imaging Research at Purdue: What’s New – What’s Old,” HP Labs – Israel, Haifa, Israel, 7 April 2008.

- [87] “Overview of HP-Purdue Imaging Relationship,” Scitex-Image Division of HP, Netanya, Israel, 8 April 2008.
- [88] “Overview of HP-Purdue Imaging Relationship,” HP San Diego Writing Systems Group, San Diego, CA, 1 May 2008.
- [89] “Purdue Imaging Algorithm Research: Xerox Sponsored Activities and Other Highlights” (jointly presented with C. Bouman, H. Ding, J. Wei, and W. Wong), Xerox Digital Imaging Technology Center, Rochester, NY, 17 June 2008.
- [90] “Design Principles for Document Layout – an Engineering Perspective,” Multimedia Image Understanding Laboratory, HP Labs, Palo Alto, CA, 11 May 2009.

### Non-refereed Publications

- [1] J. Z. Chang, J. P. Allebach, and C. A. Bouman, “Sequential Linear Interpolation of Nonlinear Color Transformations,” *SPIE/IS&T International Technical Working Group Newsletter: Electronic Imaging*, (**Special issue on color, invited article**), Vol. 5, No. 2, July 1995, pp. 4-5.
- [2] Q. Lin and J. P. Allebach, “Color FM screen Design using DBS Algorithm,” *IS&T/SPIE’s International Technical Group Newsletter: Electronic Imaging*, (**invited article**), Vol. 9, No. 1, January 1999, p. 9.
- [3] D. Kacker and J. P. Allebach, “Aperiodic Microscreen Design using DBS and Training,” *IS&T/SPIE’s International Technical Group Newsletter: Electronic Imaging*, (**invited article**), Vol. 9, No. 2, May 1999, p. 3.
- [4] T. N. Pappas, J. P. Allebach, D. Neuhoff, “Model-Based Digital Halftoning,” *IEEE Signal Processing Magazine Special Issue on Digital Halftoning*, vol. 20, pp. 14-27, July 2003.
- [5] J. P. Allebach, “Digital Printing – An Image Processor’s Perspective,” (**feature article**), *IS&T Reporter*, Vol. 19, No. 1, pp. 1-8, February 2004.

### Published Reviews:

- [1] *Digital Document Processing*, by H. S. Hou, Wiley, 1983, *Optical Engineering*, Vol. 22, pp. (SR-185)-(SR-186), Nov./Dec. 1983.

### Technical Reports:

- [1] J. P. Allebach, “Distributed Image Processing with the Research Signal Processor,” IBM Research Report, RC 8177, (#35590), March 20, 1980.
- [2] E. Viscito and J. P. Allebach, “The Design of Equal Complexity FIR Perfect Reconstruction Filter Banks Incorporating Symmetries,” School of Electrical Engineering, Purdue University, TR-EE89-27, May 1989.

**Patents:**

- [1] J. P. Allebach, E. Ochoa, and D. W. Sweeney, "Optical Ranked-Order Filtering Using Threshold Decomposition," U.S. Patent No. 4,949,389, August 14, 1990, assignee: United States Government.
- [2] R. Balasubramanian, C. A. Bouman, J. P. Allebach, B. Kolpatzik, "Sequential Scalar Quantization of Digital Color Image Using Mean Squared Error-Minimizing Quantizer Density Function," U.S. Patent No. 5,432,893, July 11, 1995, assignee: Purdue Research Foundation.
- [3] J. P. Allebach and P. W. Wong, "Magnifying Digital Image using Edge Mapping," U.S. Patent No. 5,446,804, August 29, 1995, assignee: Hewlett-Packard Company.
- [4] J. P. Allebach, C. A. Bouman, and R. Balasubramanian, "Sequential Product Code Quantization of Digital Color Image," U.S. Patent No. 5,544,284, August 6, 1996, assignee: Eastman Kodak Company.
- [5] J. P. Allebach and P. W. Wong, "Magnifying Digital Image using Mapping," U.S. Patent No. 5,661,824, August 26, 1997, assignee: Hewlett-Packard Company.
- [6] J. P. Allebach and Q. Lin, "Joint Design of Dither Matrices for a Set of Colorants," U.S. Patent No. 5,812,744, September 22, 1998, assignee: Hewlett-Packard Company.
- [7] C. B. Atkins, C. A. Bouman, J. P. Allebach, J. S. Gondek, M. T. Schramm, and F. W. Silz, "Computerized Method for Improving Data Resolution," U. S. Patent No. 6,058,248, May 2, 2000, assignee: Hewlett-Packard Company.
- [8] C. B. Atkins, C. A. Bouman, J. P. Allebach, J. S. Gondek, M. T. Schramm, and F. W. Silz, "Computerized Method for Improving Data Resolution," U. S. Patent No. 6,075,926, June 13, 2000, assignee: Hewlett-Packard Company.
- [9] C. B. Atkins, C. A. Bouman, and J. P. Allebach, "Apparatus and Method of Building an Electronic Database for Resolution Synthesis," U. S. Patent No. 6,466,702, October 15, 2002, assignee: Hewlett-Packard Company.
- [10] P. Li and J. P. Allebach "Tone-Dependent Error Diffusion," U. S. Patent No. 6,563,957, May 13, 2003, assignee: Hewlett-Packard Company.
- [11] C. B. Atkins, C. A. Bouman, and J. P. Allebach, "Apparatus and Method of Building an Electronic Database for Resolution Synthesis," U. S. Patent No. 6,683,998, January 27, 2004, assignee: Hewlett-Packard Company.
- [12] J. P. Allebach and Q. Lin, "Halftone Printing with Dither Matrices Generated by Using Cluster Filters," U. S. Patent No. 6,791,718, September 14, 2004, assignee: Hewlett-Packard Company.
- [13] J. P. Allebach and Q. Lin, "Method for Designing Sets of Color Matrices that Tile Together," U. S. Patent No. 6,829,063, December 7, 2004, assignee: Hewlett-Packard Company.

- [14] A. L. Frazier and J. P. Allebach, "Image Printing Devices with AM/FM Halftoning with Self-Determination of Dot Size and Method of Implementing Same," U. S. Patent No. 6,982,814, January 3, 2006, assignee: Hewlett-Packard Company.
- [15] Zhen He, Ti-chiun Chang, Charles Bouman, and J. P. Allebach, "Image Data Processing Methods, Hard Imaging Devices, and Articles of Manufacture,," U. S. Patent No. 7,450,270, November 11, 2008, assignee: Hewlett-Packard Development Company.

**Selected Special Projects, Short Courses, Etc. - Contribution:**

NSF Circuits and Signal Processing Program, Washington, DC, January 27, 1989.  
Served on Oversight Committee.

NSF Graduate Research Fellowship Program, Washington, DC, February 7-9, 1989.  
Served on panel to evaluate fellowship applications.

New York State Education Department Doctoral Evaluation Project, Rochester, NY, March 20-21, 1989.  
Served on panel to visit Rochester Institute of Technology and evaluate readiness to offer a Ph.D. in Imaging Science.

Purdue Electrical Engineering Industrial Institute  
Liaison representative for Bell Communications Research (1989 - 1994).

1990 SPIE/SPSE Symposium on Electronic Imaging-Science and Technology, Santa Clara, CA, February 11-16, 1990.  
Co-Organized and co-chaired 3 day Conference (with B.E. Rogowitz): "Human Vision and Electronic Imaging: Models, Methods, and Applications."

Taught 1/2 day short course: "Analysis of Sampling, Scanning, Printing, and Display Subsystems."

National Research Council Resident Research Associates Program, February 22-23, 1990.  
Served on panel to visit Redstone Arsenal U. S. Army Missile Command to evaluate the NRC Resident Research Associates Program in Optics.

1991 SPIE/SPSE Symposium on Electronic Imaging-Science and Technology, San Jose, CA, February 24 - March 1, 1991.  
Co-Organized and co-chaired 3 day Conference (with B. E. Rogowitz and M. H. Brill): "Human Vision, Visual Processing, and Digital Display II".

Taught 1/2 day short course: "Analysis of Sampling, Scanning, Printing, and Display Subsystems."



Xerox Color Conference and Symposium, Webster, NY, October 8, 1991.  
Invited Attendee

NSF Workshop on Signal Processing, Keystone, CO, November 15-17, 1991.  
Invited Participant

1992 SPIE/SPSE Symposium on Electronic Imaging-Science and Technology, San Jose, CA, February 9 - February 14, 1992.  
Co-Organized and co-chaired 3 day Conference (with B. E. Rogowitz and S. A. Klein): "Human Vision, Visual Processing, and Digital Display III."

Taught 1/2 day course: "Analysis of Sampling, Scanning, Printing, and Display Subsystems."

NSF Research Initiation Review Panel - Microelectronic Information Processing Systems Division, Washington, DC, March 16, 1992.  
Served on panel to evaluate research initiation grant proposals.

1993 IS&T/SPIE Symposium on Electronic Imaging: Science and Technology, San Jose, CA, January 31-February 4, 1993.

Co-Organized and co-chaired 3.5 day Conference (with B. E. Rogowitz): "Human Vision, Visual Processing, and Digital Display IV."

Taught 1/2 day course: "Analysis of Sampling, Scanning, Printing, and Display Subsystems."

IS&T's 46th Annual Conference, Boston, MA, May 9-14, 1993.

Taught 1/2 day course (with C. A. Bouman): "Introduction to Digital Halftoning."

Offered "State of the Art Seminar" (with C. A. Bouman): "Advanced Concepts in Digital Halftoning."

1994 IS&T/SPIE Symposium on Electronic Imaging: Science and Technology, San Jose, CA, February 6-10, 1994.

Co-Organized and co-chaired 3 day Conference (with B. E. Rogowitz): "Human Vision, Visual Processing, and Digital Display V."

Taught 1/2 day course (with C. A. Bouman): "Basic and Advanced Concepts in Digital Halftoning."

IS&T's 47th Annual Conference, Rochester, NY, May 15-20, 1994.

Taught 1/2 day course (with C. A. Bouman): "Introduction to Digital Halftoning."

Offered “State of the Art Seminar” (with C. A. Bouman): “Current Trends in Digital Halftoning.”

IS&T’s 10th International Congress on Advances in Non-Impact Printing Technologies, New Orleans, LA, Oct. 30 - Nov. 4, 1994.

Organized and chaired session “Digital Image Processing”

1994 IEEE International Conference on Image Processing, Austin, TX, Nov. 13-16, 1994.

Co-organized and co-chaired Special Session (with C. A. Bouman) “Model-Based Methods in Electronic Imaging: from Content to User”

1995 IS&T/SPIE Symposium on Electronic Imaging: Science and Technology, San Jose, CA, February 6-10, 1995.

Co-Organized and co-chaired 2 1/2 day Conference (with B. E. Rogowitz): “Human Vision, Visual Processing, and Digital Display VI.”

IS&T’s 48th Annual Conference, Washington, DC, May 7-11, 1995.

Organized and chaired Special Invited Session “Image Processing in the Information Age”

1995 IEEE International Conference on Image Processing, Washington, DC, Oct. 22-25, 1995.

Co-organized and co-chaired Special Session (with J. Dalton): “Color and Printing”

IS&T/SID 3rd Color Imaging Conference: Color Science, Systems, and Applications, Scottsdale, AZ, Nov. 7-11, 1995

Member of program committee

1996 IS&T/SPIE Symposium on Electronic Imaging: Science and Technology, San Jose, CA, 28 January - 2 February 1996.

Co-Organized and co-chaired 4 day Conference (with B. E. Rogowitz): “Human Vision and Electronic Imaging”

External Member of Ph.D. Dissertation Examining Committee for Ian Bell, Department of Computer Science, University of Waterloo, Waterloo, Canada, 16 February 1996.

1996 IEEE International Conference on Image Processing, Lausanne, Switzerland, 16-19 Sept. 1996.

Member of program committee

OSA/IS&T Optics and Imaging in the Information Age, Rochester, NY, Oct. 20-24, 1996.

Organized three symposia: "Printing and Image Quality," "Optics and Media for Printing and Display," and "Digital Color Printing"

1997 IEEE International Conference on Image Processing, Santa Barbara, CA, 26-29 October. 1997.

Taught invited tutorial "Digital Halftoning" with Ping Wah Wong.

1997 IS&T's 13th Annual International Conference on Digital Printing Technologies, Seattle, WA, 2-6 November 1997.

Taught short course "Digital Halftoning" with Ping Wah Wong.

1998 IS&T's 13th Annual International Conference on Digital Printing Technologies, Toronto, CN, 19 November 1998.

Taught short course "Digital Halftoning" with Ping Wah Wong.

National Science Foundation Signal Processing Systems CAREER Panel, 21 November 1998.

Served on panel

1999 IS&T's 14th Annual International Conference on Digital Printing Technologies, Orlando, FL, 19 October 1999.

Taught short courses "Introduction to Digital Halftoning" and "Advanced Topics in Digital Halftoning," with Ping Wah Wong.

2000 IS&T's 15th Annual International Conference on Digital Printing Technologies, Vancouver, BC, 16-17 October 2000.

Taught short courses "Introduction to Digital Halftoning" and "Advanced Topics in Digital Halftoning," with Ping Wah Wong.

2001 IS&T's 16th Annual International Conference on Digital Printing Technologies, Ft. Lauderdale, FL, 1-5 October 2001.

Taught short courses "Introduction to Digital Halftoning" and "Advanced Topics in Digital Halftoning," with Ping Wah Wong.

HP Mobile Technology in University Environments Forum, Palo Alto, CA, 23-24 October 2002.

Participant

National Science Foundation Signal Processing Systems CAREER Panel, 30-31 October 2002.

Served on panel

2003 IS&T/SPIE Symposium on Electronic Imaging: Science and Technology, Santa Clara, CA, 20-24 January 2003.

Taught short courses “Introduction to Digital Halftoning” and “Advanced Topics in Digital Halftoning,” with Ping Wah Wong.

2004 IS&T/SID Color Imaging Conference, Scottsdale, AZ, 8-12 November 2004.

Taught short course “Spatio-chromatic Vision Models for Imaging”.

2005 IS&T/SPIE Symposium on Electronic Imaging: Science and Technology, Santa Clara, CA, 17-20 January 2005.

Taught short courses “Introduction to Digital Halftoning” and “Advanced Topics in Digital Halftoning,” with Ping Wah Wong.

2005 IS&T/SID Color Imaging Conference, Scottsdale, AZ, 7-11 November 2005.

Taught short course “Spatio-chromatic Vision Models for Imaging”.

2006 IS&T/SPIE Electronic Imaging Symposium, San Jose, CA, 15-19 January 2006.

Co-chaired and co-organized with Hui Chao of HP Labs, Palo Alto, CA the conference *Digital Publishing*.

2005 IS&T/SID Color Imaging Conference, Scottsdale, AZ, 7-11 November 2005.

Taught short course “Spatio-chromatic Vision Models for Imaging”.

2006 IS&T/SID Color Imaging Conference, Scottsdale, AZ, 6-10 November 2006.

Taught short course “Spatio-chromatic Vision Models for Imaging”.

Taught three-day short course “Advanced Topics in Digital Halftoning” in Rehovot, Israel at the HP Indigo Division site. Each day consisted of morning lectures followed by afternoon laboratory exercises. The course was attended by 16 individuals from HP Labs-Israel and two HP divisions in Israel. 19-21 June 2007.

2007 IS&T/SID Color Imaging Conference, Albuquerque, NM, 5-9 November 2007.

Taught short course “Spatio-chromatic Vision Models for Imaging”.

Served on Audit Committee for the School of Computer and Communication Sciences (I&C), Ecole Polytechnique Federale De Lausanne (EPFL) at the invitation of University President Patrick Aebischer, 26-27 November 2007.

NIP24: IS&T’s 24th International Conference on Digital Printing Technologies, Pittsburgh, PA, 7 – 12 September 2008.

Taught 4-hour tutorial “Advanced Digital Halftoning”.

2008 IS&T/SID Color Imaging Conference, Portland, OR, 10-14 November 2008.

Taught 2-hour tutorial “Spatio-chromatic Vision Models for Imaging”.

Taught three-day short course “Advanced Topics in Digital Halftoning” in San Diego, CA at the HP San Diego site. Each day consisted of morning lectures followed by afternoon laboratory exercises. The course was attended by 16 individuals from HP San Diego divisions. 13-15 January 2009.