Kim L. Boyer, Ph.D

Dean, College of Engineering and Applied Sciences
Professor of Electrical and Computer Engineering
University at Albany
Albany, NY 12222

Curriculum Vita

28 February 2018

Academic Appointments

1986 (Mar)	Assistant Professor	(The Ohio State University)
1991 (Sep)	Associate Professor	(The Ohio State University)
1996 (Sep)	Professor	(The Ohio State University)
2008 (Jan)	Professor and Department Head	(Rensselaer)
2015 (Jan)	Professor	(Rensselaer)
2015 (Jul)	Professor and Chair	(University at Albany)
2015 (Jul)	Professor and Dean of Engineering	(University at Albany)

Educational Preparation

B.S.E.E.	Purdue University, 1976	With Distinction, Honors Program
M.S.E.E.	Purdue University, 1977	
Ph.D.	Purdue University, 1986	

Selected Recognitions

Fellow of the IEEE

Fellow of the International Association for Pattern Recognition

National Academies Jefferson Science Fellow at the US Department of State

President, International Association for Pattern Recognition (2012-2014)

IEEE Computer Society Distinguished Visitor (2001-2003)

1. BIOGRAPHICAL SKETCH

Dr. Kim Boyer received the BSEE (with distinction), MSEE, and PhD. Degrees, all in electrical engineering, from Purdue University in 1976, 1977, and 1986, respectively. From January 2008 through December 2014 he was Head of the Department of Electrical, Computer, and Systems Engineering at Rensselaer Polytechnic Institute, Troy, NY. In July 2015 he was appointed as the founding Dean of the new College of Engineering and Applied Sciences, University at Albany, State University of New York.

From 1977 through 1981 he was with Bell Laboratories, Holmdel, NJ; from 1981 through 1983 he was with Comsat Laboratories, Clarksburg, MD. From 1986-2007 he was on the faculty of the Department of Electrical and Computer Engineering, The Ohio State University. He is a Fellow of the IEEE, a Fellow of IAPR, and a former IEEE Computer Society Distinguished Visitor (distinguished speaker).

Dr. Boyer is also a National Academies Jefferson Science Fellow at the US Department of State, spending 2006-07 in Washington as Senior Science Advisor to the Bureau of Western Hemisphere Affairs. While at State he studied the impact of technological innovation on economic development in scientifically lagging and scientifically developing countries. The correlation between the number of scientists and engineers and the gross domestic product (and other indicators of economic capacity) is compelling. These investigations led to a number of policy recommendations designed to assist these countries in coupling innovation into their economies. Dr. Boyer also developed policy recommendations for the use of science and engineering as instruments of diplomacy and capacity building in the scientific innovation arena.

As Founding Dean, Dr. Boyer is leading the building of a new college of engineering essentially from scratch. Beginning with a legacy computer science program, he has laid out a vision to build a fully-featured, research intensive college encompassing most major aspects of engineering with a full set of degree programs from bachelors through doctorate. The electrical and computer engineering department launched in 2015 (first majors fall 2016) and the environmental and sustainable engineering department will launch fall 2018. Additional programs in bioengineering, mechanical engineering, and industrial and systems engineering are to follow. Since July 2015 the College has recruited 22 new faculty members and eight new staff members, with faculty and staff searches currently ongoing as of the date of this CV.

Dr. Boyer's research interests include all aspects of computer vision and medical image analysis, including perceptual organization, structural analysis, graph theoretical methods, stereopsis in weakly constrained environments, optimal feature extraction, large model bases, and robust methods. His current research activities include mapping the surface of the dynamic pre-lens tear film from interferometric video, visual analysis for modeling the dynamics of mitosis in live cell imaging, and most recently, estimation of occupancy distributions in smart spaces by the extraction and analysis of the plenoptic light field with color-controllable LED fixtures and distributed low-cost color sensors.

As an educator, Dr. Boyer is particularly interested in the interaction between the engineering sciences and public policy. Today's scientists and engineers, particularly those with advanced degrees, will be called upon to articulate for science in the formation of public policy. It is imperative that we prepare our students to accept this role, by providing them with the communications skills they will need, together with a worldview. We must prepare and encourage them to act as spokespersons for science and engineering in the public discourse; we can afford to do no less.

Dr. Boyer served as President of the International Association for Pattern Recognition 2012-2014 and will remain on the Executive Committee as Past President until December 2016. He has been a US delegate to the IAPR Governing Board since 2004. He also served two terms as IAPR Treasurer and one as First Vice President. He is a former Associate Editor of *IEEE Transactions on Pattern Analysis and Machine Intelligence,* Area Editor of *Computer Vision and Image Understanding,* Associate Editor of *Machine Vision and Applications,* Founder and Chair of the first two *IEEE Computer Society Workshops on Perceptual Organization,* was a charter member of the DARPA IUE technical Advisory Committee, and was a member of the initial ORD RADIUS Technical Oversight Committee. He is also the Series Editor for the CRC Press book series on Computer Vision.

Dr. Boyer won the *Siemens Best Paper Award* at CVPR93 with his then-student Kuntal Sengupta. In 1995, a student team co-directed by Professor Boyer won the International Unmanned Ground Vehicle Competition for its vision-guided Autonomous Robotic Transporter. In 2002, he was a program chair for Computer Vision and Robotics at ICPR, Quebec City. He is a former Chair of the IEEE Computer Society Technical Committee on Pattern Analysis and Machine Intelligence, and continues to serve on its Steering Committee. He was the keynote speaker for the 2004 *SIBGRAPI* conference in Curitiba, Brazil and for the 2011 Mexican Conference on Pattern Recognition in Cancun. He was a Program Chair for CVPR08 in Anchorage and Technical Co-Chair for ICPR 2010 in Istanbul and ICPR 2012 in Tsukuba, Japan. He was also the Honorary Chair for the 2012 Mexican Conference on Pattern Recognition in Huatulco, Mexico, and the International Liaison Chair for ICPR 2014 in Stockholm.

Dr. Boyer has published seven books and more than 130 refereed scientific papers and has lectured in nearly 30 countries around the world. His work has been cited nearly 5500 times. His books include *Computing Perceptual Organization in Computer Vision,* World Scientific, 1994 (with Sudeep Sarkar); *Perceptual Organization for Artificial Vision Systems,* Kluwer Academic Publishers, 2000 (with Sudeep Sarkar); *Robust Range Image Registration: Using Genetic Algorithms and the Surface Interpenetration Measure,* 2005 (with Luciano Silva and Olga Bellon); and *Multispectral Satellite Image Understanding: From Land Classification to Building and Road Detection*, Springer, 2011 (with Cem Unsalan).

2. PROFESSIONAL EXPERIENCE

January 1976 – May 1977, Graduate Assistant, Purdue University, Department of Electrical Engineering, West Lafayette, Indiana.

June 1977 - June 1981, Member of the Technical Staff, Bell Laboratories, Holmdel, New Jersey.

June 1981 - August 1983, Member of the Technical Staff, COMSAT Laboratories, Clarksburg, Maryland.

August 1983 - February 1986, Graduate Associate, Purdue University, Department of Electrical and Computer Engineering, West Lafayette, Indiana.

March 1986 - September 1991, Assistant Professor, Department of Electrical Engineering, The Ohio State University, Columbus, Ohio.

October 1991 - September 1996, Associate Professor (with tenure), Department of Electrical Engineering, The Ohio State University, Columbus, Ohio.

June 1994 – December 1994, Gastprofessor (Visiting Professor), Department of Mathematics and Informatics, University of Bern, SWITZERLAND, on sabbatical leave from Ohio State.

October 1996 - December 2007, Professor, Department of Electrical and Computer Engineering, The Ohio State University, Columbus, Ohio. Chair of Graduate Studies, 1995-1997, 2004-2005.

August 2006 - August 2007, National Academies Jefferson Science Fellow at the US Department of State, on leave from Ohio State. Senior Science Advisor, Bureau of Western Hemisphere Affairs. Consultant role continues.

January 2008 – December 2014, Professor and Head, Department of Electrical, Computer, and Systems Engineering, Rensselaer Polytechnic Institute, Troy, New York.

January 2015 – June 2015, Professor, Department of Electrical, Computer, and Systems Engineering, Rensselaer Polytechnic Institute, Troy, New York.

July 2015 -, Founding Dean of Engineering and Applied Sciences and Professor, Department of Electrical and Computer Engineering, University at Albany, Albany, New York.

3. INSTRUCTION

3.1 Undergraduate and Graduate Courses Taught

- Honors Enrichment
- Computer Vision
- Image Processing
- Theory and Design of Digital Computers
- Signals and Systems I
- Electronics I
- Introduction to Circuit Theory
- Introduction to Electrical Engineering I, II (for non-majors)
- Probability and Random Variables
- Stochastic Processes
- Random Processes through Linear Systems
- Digital Circuit Design
- State Machine Design
- Artificial Intelligence Programming
- Introduction to Communication Theory

3.2 Graduate Student Supervision

3.2.1 Current Advising

3.2.2 Doctoral Supervision

1. "Robust Methods in Range Image Understanding," Muhammad J. Mirza, August 1992. *1992 Ohio State University Graduate Research Forum Winner.* [OSU]

2. "On Computing Perceptual Organization in Computer Vision," Sudeep Sarkar, March 1993. *1992-93 Ohio State University Presidential Fellow.* [OSU]

3. "Discontinuity Preserving Visual Surface Reconstruction," Nitin M. Vaidya, February 1996. [OSU]

4. "Object Recognition Using Large Modelbases," Kuntal Sengupta, March 1996. [OSU]

5. "Repeatability Characterization and Computer Vision Based Analysis of Optical Coherence Tomography," Dara Koozekanani, May 2001. [OSU]

6. "Multispectral Satellite Image Understanding," Cem Ünsalan, August 2003. [OSU]

7. "Robust Range Image Registration Using Enhanced Genetic Algorithms and the Surface Interpenetration Measure," Luciano Silva, November 2003. (Degree awarded from the Graduate School in Electrical engineering and Applied Computer Science at Centro Federal de Educacao Tecnologica do Parana, Brazil; coadvisor with Olga R. P. Bellon of Universidade Federal do Parana, Brazil).

8. "Study of Computer Vision and Pattern Recognition in Medical Image Analysis: Digital Microscopy and Optical Coherence Tomography," Jun Kong, November 2008. [OSU]

9. "Interferometric Video Analysis for Prelens Tear Film Surface Reconstruction of the Human Eye," Dijia Wu, May 2010. [RPI]

10. "Exploiting Geometric and Spatial Constraints for Vision and Lighting Applications," Quan Wang, September 2014. *2015 Allen B. DuMont Prize Winner.* [RPI]

11. "Classifying and Detecting Activity Based Patterns using Relational Context and Probabilistic Models in Video," Eran Swears, May 2015. [RPI]

3.2.3 External Doctoral Committees

1. Chakra Chennubhotla, University of Toronto, Department of Computer Science, February 2004. Advisor: Allen Jepson.

2. Fatih Demirci, Drexel University, Department of Computer Science, December 2005. Advisor: Ali Shokoufandeh.

1. Adhish Prasoon, University of Copenhagen, Department of Computer Science, April 2014. Advisor: Mads Nielsen.

2. Luis Castillo, Universidad de Chile, Department of Electrical Engineering, June 2016. Advisor: Claudio Perez.

3.2.4 Masters Supervision

1. "Structural Stereopsis: Matching Laplacian-of-Gaussian Contour Segments," George E. Sotak, Jr., April 1988.

2. "Hierarchical Classification and Grouping of Map Spot Symbols Characterized by Fourier Descriptors," John A. Schnurrenberger, June 1988.

3. "Robust Techniques in Stereopsis: Contour Partitioning and Point Correspondence," Daniel M. Wuescher, August 1989.

4. "Scene Decomposition Using Domain Knowledge: Coaxially Viewed Weld Scene Analysis," Wayne A. Penix, September 1989.

5. "Optimal, Efficient Detection and Low Level Perceptual Organization of Image Edge Features," Sudeep Sarkar, February 1990. *1990 Graduate Research Forum Winner.*

6. "Image Feature Extraction: Line Detection and Organization," Sin-Guan Tan, November 1990.

7. "Stereopsis from Extended Edge Features in the Absence of Imaging Geometry Information," Nitin M. Vaidya, October 1991.

8. "Rule Based System for the Automatic Segmentation of Coronary Arteries," Paul W. Truitt, June 1992.

9. "Building Structural Descriptions from Coronal Magnetic Resonance Images," Subha V. Raman, July 1992.

10. "Organizing Large Structural Modelbases," Kuntal Sengupta, December 1992.

12. "Registration of Digital Elevation Models with Remotely Sensed Images," Ann Gartz, June 1993.

12. "Hierarchical Structural Stereo Matching with Simultaneous Autonomous Camera Calibration," Xanthippos Magnisalis, June 1994.

13. "Optical Flow Based Motion Analysis with an Application to Automated Highway Systems," Zhibin Cheng, June 1996.

14. "Hardware Development for Realtime Hough Transform: Applications to Autonomous Vehicles," Murale Kanapathipillai, July 1996.

15. "A Computer Vision System for Arc Weld Inspection," Wei Hong, August 1996.

16. "A Computer Vision System for Mapping and Detecting Corrosion in Gas Pipelines," Tolga Ozguner, July 1997.

17. "Measurement of Retinal Neural Fiber Layer Thickness from Optical Coherence Tomography," Dara Koozekanani, March 2000 (Biomedical Engineering, via Candidacy Exam).

18 "Multi-Scale Surface Segmentation and Description for Free Form Object Recognition," Ravi Srikantiah, July 2000.

19. "Vehicle Recognition in Cluttered Environments," Gerald Dalley, June 2002.

20. "Building Detection and Reconstruction from Digital Surface Models," Prabhu Krishnamoorthy, July 2002.

21. "Head Pose Estimation using View Based Eigenspaces," Sujith Srinivasan, December 2002.

22. "Detection, Shape, Recovery and View Planning for Obscured Objects in Range Profile Data," Kanu Julka, May 2003.

23. "Image Analysis of Optical Coherence Tomography: Recovering Optic Nerve Head Geometry," Artemas Herzog, December 2004

24. "Three-Dimensional Modeling of the Prelens Tear Film from Interferometric Measurements," Kenny Chen, May 2006.

25. "Determining the Gestational Age of Newborns Using a Graph Representation of the Plantar Surface," Adam Swejk, August 2006.

26. "A Study of Ventricular Motion Using a Deformable Model with an Open Contour Fourier Shape Descriptor," Toshihiro Okada, December 2007.

27. "Computer Vision Tracking to Reduce Photodamage in Live-Cell Microscopy," Zachary Schilling, December 2011.

28. "Tracing, Extracting Features, and Classifying Microglia from Volumetric Images of Brain Tissue," Zachary Galbreath, December 2011.

29. "Exploration of Tear Film Flow from Interferometric Imaging of the Human Eye," Chandroutie Sankar, December 2011.

3.2.5 Senior Honors Supervision

1. "Tissue Boundary Refinement in Magnetic Resonance Images Using Contour-Based Scale Space Matching," Subha V. Raman, March 1990. *1990 ΣΞ Undergraduate Research Award winner.*

2. "Multiple Baseline Coaxial Stereo for Obstacle Detection," Mrinal Jain, June 1997.

3. "Production-Oriented Development of a Microprocessor Systems Instructional Aid," Mark Spaeth, June 1997.

4. "A Study of Ventricular Motion in Cardiac MRI Using Deformable Models," Toshihiro Okada, March 2007.

3.3 Curriculum Development

- RPI: Developed the new course, ECSE Enrichment, in 2010.

- OSU: Developed the new course ECE863: Computer Vision, in 1987.

- OSU: Developed the new course ECE707: Image Processing, in 1992.

- OSU: Participated in the development of the special ECE881 graduate seminar. Developed presentation and handout materials on "Effective Technical Writing".

- OSU: Developed, while leading the Graduate Studies Committee, ECE888 "Open graduate seminar."

4. STUDENT SERVICES

4.1 Advisor to Student Groups and Organizations

Activity at Ohio State

- Advised (with Professor U. Ozguner) the ART (Autonomous Robotic Transporter) student design team in the International Autonomous Ground Robotics Competition sponsored by the Society of Automotive Engineers and the Autonomous Unmanned Vehicle Society, 1995. This team, in its first year, placed *second* among 17 teams from 15 universities, most of whom were competing for their third time.

- Advised (with Professor U. Ozguner) the ART (Autonomous Robotic Transporter) student design team in the International Autonomous Ground Robotics Competition sponsored by the Society of Automotive Engineers and the Autonomous Unmanned Vehicle Society, 1996. This team, in its second year, placed *first* among 17 teams from 15 universities, most of whom were competing for their fourth time.

- Advised the ART (Autonomous Robotic Transporter) student design team in the International Autonomous Ground Robotics Competition sponsored by the Society of Automotive Engineers and the Autonomous Unmanned Vehicle Society, 1997. Component failure (the video image digitizer) precluded the team from qualifying.

Activity at Rensselaer

- Tau Beta Pi Engineering Honorary Society, Advisor, 2014-15.

4.2 Student Affairs Committee, Task Forces, Other

OSU: University Graduate Recruitment Committee

During 1992-1994, Professor Boyer was appointed to the University Graduate Recruitment Committee by Graduate School Dean Koenigsknecht. He also served on its Demographics Subcommittee.

OSU: Graduate Quality of the University Experience Committee

During 1997-1998, Professor Boyer was appointed to the Graduate Quality of the University Experience (G-QUE) committee by Dean Susan Huntington of the Graduate School. He also co-chaired the Student Services subcommittee of the G-QUE committee and was a member of the Steering Committee.

5. RESEARCH, CREATIVE, AND OTHER SCHOLARLY ACTIVITIES

5.1 Publications

According to Google Scholar, 28 February 2018:

Citations: 5353
h-index: 37
i10-index: 77

5.1.1. Authored Books

1. C. Unsalan and K. L. Boyer, "Multispectral Satellite Image Understanding: From Land Classification to Building and Road Detection," Springer-Verlag, 2011.

2. L. Silva, O. R. P. Bellon, and K. L. Boyer, "Robust Range Image Registration Using Enhanced Genetic Algorithms and the Surface Interpenetration Measure," World Scientific Series on Machine Perception and Artificial Intelligence, Singapore, World Scientific, 2005.

3. S. Sarkar and K. L. Boyer, "Computing Perceptual Organization in Computer Vision," World Scientific Series on Machine Perception and Artificial Intelligence, Singapore: World Scientific, 1994.

5.1.2. Edited Books

1. J. A. Carrasco-Ochoa, J. F. Martinez-Trinidad, J. A. Olvera Lopez, K. L. Boyer (eds), *Proceedings of the 4th Mexican Conference on Pattern Recognition*, Lecture Notes in Computer Science, LNCS 7329, Springer-Verlag, 2012.

2. K. L. Boyer and S. Sarkar, (eds), "Perceptual Organization for Artificial Vision Systems," Boston, Kluwer Academic Publishers, 2000.

3. K. L. Boyer, L. Stark, and H. Bunke, (eds), "Applications of AI, Machine Vision and Robotics," World Scientific Series on Machine Perception and Artificial Intelligence, Singapore: World Scientific, 1994.

4. K. L. Boyer and L. Stark, (eds), "Applications of Artificial Intelligence '93: Machine Vision and Robotics", *Proc, SPIE,* v. 1964, Bellingham, WA: SPIE Press, 1993.

5.1.3. Book Chapters

1. K. L. Boyer and S. Sarkar, "Perceptual Organization: Assessing the state of the community and charting new research directions," in *Perceptual Organization for Artificial Vision Systems*, K. L. Boyer and S. Sarkar, Editors, Boston: Kluwer Academic Publishers, 2000, pp. 1-13.

2. K. L. Boyer, *et al*., "Spatiotemporal Grouping," in *Perceptual Organization for Artificial Vision Systems,* K. L. Boyer and S. Sarkar, Editors, Boston: Kluwer Academic Publishers, 2000, pp. 33-38.

3. K. L. Boyer and K. Sengupta, "Learning Organization Hierarchies of Large Modelbases for Fast Recognition," in *Symbolic Visual Learning*, K. Ikeuchi and M. Veloso, Editors: Oxford University press, 1997, pp. 113-140.

4. K. L. Boyer, S. V. Raman, and S. Sarkar, "Generating Structure Hypotheses in Cerebral Magnetic Resonance Images Using Segment-Based Focusing and Graph-theoretic Cycle Enumeration," in *Advances in Image Analysis*, Y. Mahdavieh and R. C. Gonzalez, Editors, SPIE Optical Engineering Press, 1992, pp. 429-453.

5. R. E. Goddard, K. L. Boyer, and H. H. Hemami, "Collision Strategies for Robotic Retreat and Resistance," in *Microprocessors in Robotic and Manufacturing Systems,* S. G. Tzafestas, Editor, Kluwer Academic Publishers, 1991, pp. 177-215.

6. A. C. Kak, K. L. Boyer, R. J. Safranek, and H. S. Yang, "Knowledge-Based Stereo and Structured Light for 3-D Robot Vision," in *Techniques for 3-D Machine Perception*, A. Rosenfeld, Editor: Elsevier Science Publishers (North-Holland), 1986, pp. 185-218.

5.1.4 Refereed Journal Articles

1. Quan Wang, Xinchi Zhang, and Kim Boyer, "3D Scene Estimation for Smart Light Delivery with Perturbation-Modulated Light Sensing," *Journal of Solid State Lighting*, DOI: 10.1186/s40539-014-0017-2, October 2014.

2. Kim Boyer, Horst Bunke, Alberto Del Bimbo, Katsushi Ikeuchi, Ken-ichi Maeda, "Editorial: Special Issue on ICPR 2012 Awarded Papers," *Pattern Recognition Letters*, Vol. 43, pp. 1-2, July 2014.

3. Kim L. Boyer, Jose F. Martinez-Trinidad, and Jesus A. Carrasco-Ochoa, "Introduction to the Special Issue on Supervised and Unsupervised Classification Techniques and their Applications," *Pattern Recognition Letters*, Vol. 41, pp. 1-2, May 2014.

4. Quan Wang and Kim L. Boyer, "The Active Geometric Shape Model: A New Robust Deformable Shape Model and its Applications," *Computer Vision and Image Understanding*, Vol. 116, No. 12, December 2012, pp. 1178-1194.

5. K. Boyer, M. Cetin, A. Jain, and S-W. Lee, "Editorial: Special Issue on Awards from ICPR 2010," *Pattern Recognition Letters*, Vol. 33, No. 7, July 2012.

6. Z. Schilling, E. Frank, V. Magidson, J. Wason, J. Loncarek, K. Boyer, J. Wen, and A. Khodjakov, "Predictive-Focus Illumination for Reducing Photodamage in Live-Cell Microscopy," *Journal of Microscopy*, Vol. 246, No. 2, May 2012, pp. 160-167. (Published online, 21 March 2012)

7. D. Wu and Kim L. Boyer, "Markov Random Field Based Phase Demodulation of Interferometric Images," *Computer Vision and Image Understanding*, Vol. 115, No. 6, June 2011, pp. 759-770.

8. D. Wu, J. Nichols, E. King-Smith, and K. Boyer, "Texture Based Prelens Tear Film Segmentation in Interferometry Images," *Machine Vision and Applications*, Vol. 21, No. 3, pp. 253-259, April 2010.

9. K. Boyer, M. Shah, and T. Syeda-Mahmood, "Guest Editors' Introduction to the Special Section on Award Winning Papers from the IEEE CS Conference on Computer Vision and Pattern Recognition (CVPR)," *IEEE Transactions on Pattern Analysis and Machine Intelligence*, Vol. 31, No. 12, December 2009, pp. 2113-2114.

10. J. Kong, O. Sertel, H. Shimada, K. L. Boyer, J. H. Saltz, and M. N. Gurcan, "Computer-aided Evaluation of Neuroblastoma on Whole-Slide Histology Images: Classifying Grade of Neuroblastic Differentiation," *Pattern Recognition,* Vol. 42, No. 6, pp. 1080-1092, June 2009.

11. J. Kong, O. Sertel, H. Shimada, K. L. Boyer, J. H. Saltz, and M. N. Gurcan, "Computer-assisted Grading of Neuroblastic Differentiation," *Archives of Pathology and Laboratory Medicine,* Vol. 132, No. 6, pp. 903-904, June 2008.

12. L. Silva, O. R. P. Bellon, and K. L. Boyer, "Robust Multiview Range Image Registration," *Image and Vision Computing,* Vol. 25, No. 1, pp 114-125, Jan. 2007. **Invited.**

13. K. L. Boyer, A. Herzog, and C. Roberts, "Automatic Recovery of the Optic Nerve head Geometry in Optical Coherence Tomography," *IEEE Transactions on Medical Imaging,* Vol. 25, No 5, pp. 553-570, May 2006.

14. C. Ünsalan and K. L. Boyer, "A System to Detect Houses and Residential Street Networks in Multispectral Satellite Images," *Computer Vision and Image Understanding*, Vol. 98, No. 3, pp. 423-461, June 2005.

15. O. R. P. Bellon, M. N. L. Cat, L. Silva, and K. L. Boyer, "Using Computer Vision to Help the Determination of the Gestational Age of Newborns," *Academic Radiology*, Vol 12, No. 5, pp. 544-553, May 2005.

16. L. Silva, O. R. P. Bellon, and K. L. Boyer, "Precision Range Image Registration Using a Robust Surface Interpenetration Measure and Enhanced Genetic Algorithms," *IEEE Transactions on Pattern Analysis and Machine Intelligence,* Vol. 27, No. 5, pp. 762-776, May 2005.

17. C. Ünsalan and K. L. Boyer, "A Theoretical and Experimental Investigation of Graph Theoretical Measures for Land Development in Satellite Imagery," *IEEE Transactions on Pattern Analysis and Machine Intelligence,* Vol. 27, No. 4, pp. 575-589, April 2005.

18. P. F. U. Gotardo, L. Silva, O. R. P. Bellon, and K. L. Boyer, "Range Image Segmentation into Planar and Quadric Surfaces Using an Improved Robust Estimator and Genetic Algorithm," *IEEE Transactions on Systems Man, and Cybernetics B,* Vol. 34, No. 6, pp. 2303-2316, December 2004.

19. C. Ünsalan and K. L. Boyer, "Classifying Land Development in High Resolution Satellite Imagery Using Hybrid Structural-Multispectral Features," *IEEE Transactions on Geoscience and Remote Sensing,* Vol 42, No. 12, pp. 2840-2850, December 2004.

20. L. Silva, O. R. P. Bellon, and K. L. Boyer, "Computer Vision and Graphics for Heritage Preservation and Digital Archaeology," *Revista de Informatica Teorica e Aplicada,* (Journal of Theoretical and Applied Computer Science, Brazil), Vol. 11, No. 1, pp. 9-31, September 2004. Special Issue on Computer Graphics and Image Processing.

21. C. Ünsalan and K. L. Boyer, "Linearized Vegetation Indices Based on a Formal Statistical Framework," *IEEE Transaction on Geoscience and Remote Sensing,* Vol. 42, No. 7, pp. 1575-1585, July 2004.

22. C. Ünsalan and K. L. Boyer, "Classifying Land Development in High-Resolution Panchromatic Satellite Images Using Straight-Line Statistics," *IEEE Transactions on Geoscience and Remote Sensing,* Vol. 42, No. 4, pp. 907-919, April 2004.

23. D. Koozekanani, K. L. Boyer, and C. Roberts, "Tracking the Optic Nerve Head in OCT Video Using Dual Eigenspaces and an Adaptive Vascular Distribution Model," *IEEE Transaction on Medical Imaging,* Vol. 22, pp. 1519-1536, December 2003.

24. S. V. Raman, C. Hofmeister, K. L. Boyer, J. M. Jagadeesh, and S. D. Nelson, "Wavelet Analysis of High-Resolution Signal-Averaged Electrocardiograms in Post infraction Patients with Bundle Branch Block," *Cardiovascular Engineering*, Vol. 2, No. 1, pp. 33-35, March 2002.

25. K. L. Boyer, R. Srikanitah, and P. J. Flynn, "Saliency Sequential Surface Organization for Free Form Object Recognition," *Computer Vision and Image Understanding*, Vol. 88, No. 3, pp. 152-188, December 2002.

26. D. Koozekanani, K. L. Boyer, and C. Roberts, "Retinal Thickness Measurements from Optical Coherence Tomography Using a Markov Boundary Model," *IEEE Transactions on Medical Imaging,* Vol. 20, No. 9, pp. 900-916, September 2001.

27. K. L. Boyer and T. Ozguner, "Robust Online Detection of Pipeline Corrosion from Range Data," *Machine Vision and Applications,* Vol. 12, No. 6, pp. 291-304, 2001.

28. B. Csatho, K. L. Boyer, and S. Filin, "Segmentation of Laser Surfaces," *International Archives of Photogrammetry and Remote Sensing,* Vol. 32, Part 3 W14, pp. 73-80, 2000.

29. S. V. Raman, C. Hofmeister, J. M. Jagadeesh, K. L. Boyer, and S. D. Nelson, "Wavelet Analysis of High Resolution Signal Averaged Electrocardiograms in Post infarction Patients with Bundle Branch Block," *Journal of Investigative Medicine,* (abstract), October 2000.

30. K. L. Boyer and S. Sarkar, "Perceptual Organization in Computer Vision: Status, Challenges, and Potential," *Computer Vision and Image Understanding*, Special Issue on Perceptual Organization in Computer Vision, Vol. 76, No. 1, pp. 1-5, October 2000.

31. N. Vaidya and K. L. Boyer, "Discontinuity Preserving Surface Reconstruction using Stochastic Differential Equations," *Computer Vision and Image Understanding*, Vol 72, No. 3, pp. 257-270, December 1998.

32. S. Sarkar and K. L. Boyer, " Quantitative Measures of Change Based on Feature Organization: Eigenvalues and Eigenvectors," *Computer Vision and Image Understanding,* Vol. 71, No. 1, pp. 110-136, July 1998.

33. K. Sengupta and K. L. Boyer, "Modelbase Partitioning Using Property Matrix Spectra," *Computer Vision and Image Understanding,* Vol. 70, No. 2, pp. 177-196, May 1998.

34. M. J. Mirza and K. L. Boyer, "A Fast Sequential Approach to Robust Surface Parameter Estimation," *The Arabian Journal of Science and Engineering*, Vol. 21, No. 1, pp. 99-117, January 1996.

35. S. Sarkar and K. L. Boyer, "Using Perceptual Inference Networks to Manage Vision Processes," *CVGIP: Image Understanding,* Vol. 62, No. 1, pp. 27-46, July 1995.

36. K. Sengupta and K. L. Boyer, "Organizing Large Structural Modelbases," *IEEE Transactions on Pattern Analysis and Machine Intelligence,* Vol. 17, No. 4, pp. 321-332, April 1995.

37. K. L. Boyer, L. Stark, and H. Bunke, "Editorial: Computer Vision from Signals to Symbols," *International Journal of Pattern Recognition and Artificial Intelligence,* Vol. 8, No. 6, pp. 1-3, December 1994.

38. K. L. Boyer, M. J. Mirza, and G. Ganguly, "The Robust Sequential Estimator: A General Approach and its Application to Surface Organization in Range Data," *IEEE Transactions on Pattern Analysis and Machine Intelligence,* Vol. 16, No. 10, pp. 987-1001, October 1994.

39. S. Sarkar and K. L. Boyer, "A Computational Structure for Pre-attentive Perceptual Organization: Graphical Enumeration and Voting Methods," *IEEE Transactions on Systems, Man, and Cybernetics,* Vol. 24, No. 2, pp. 246-267, February 1994.

40. K. L. Boyer and S. Sarkar, "Comments on 'On the Localization Performance Measure and Optimal Edge Detection," *IEEE Transactions on Pattern Analysis and Machine Intelligence,* Vol. 16, No. 1, pp. 106-108, January 1994.

41. S. Sarkar and K. L. Boyer, "Perceptual Organization in Computer Vision: A Review and a Proposal for a Classificatory Structure," *IEEE Transactions on Systems, Man, and Cybernetics,* Vol. 23, No. 2, pp. 382-399, March 1993.

42. S. Sarkar and K. L. Boyer, "Integration, Inference, and Management of Spatial Information Using Bayesian Networks: Perceptual Organization," *IEEE Transactions on Pattern Analysis and Machine Intelligence,* Special Issue on Probabilistic Reasoning, Vol. 15, No. 3, pp 256-274, March 1993.

43. R. M. Taylor, B. Kawarizadeh, H. Hemami, and K. L. Boyer, "A Preliminary Experiment in Dual Channel Tactile Information Flow," *Journal of Robotic Systems*, Vol. 10, No. 2, pp. 187-198, 1993.

44. M. J. Mirza and K. L. Boyer, "Performance Evaluation of a Class of M-Estimators for Surface Parameter Estimation in Noisy Range Data," *IEEE Transactions on Robotics and Automation,* Vol. 9, No. 1, pp. 75-85, February 1993.

45. S. V. Raman, S. Sarkar, and K. L. Boyer, "Hypothesizing Structures in Edge Focused Cerebral Magnetic Resonance Images Using Graph-Theoretic Cycle Enumeration," *CVGIP: Image Understanding,* Vol. 57, No. 1, pp. 81-98, January 1993.

46. K. L. Boyer and W. A. Penix, "An Image Analysis System for Coaxially Viewed Weld Scenes," *Machine Vision and Applications,* Vol. 5, No. 4, pp. 277-293, October 1992.

47. S. Sarkar and K. L. Boyer, "On Optimal Infinite Impulse Response Edge Detection Filters," *IEEE Transactions on Pattern Analysis and Machine Intelligence,* Vol. 13, No. 11, pp. 1154-1171, November 1991.

48. S. Sarkar and K. L. Boyer, "Optimal Infinite Impulse Response Zero Crossing Based Edge Detectors," *CVGIP: Image Understanding,* Vol. 54, No. 2, pp. 224-243, September 1991.

49. S. V. Raman, S. Sarkar and K. L. Boyer, "Tissue Boundary Refinement in Magnetic Resonance Images Using Contour-Based Scale Space Matching," *IEEE Transactions on Medical Imaging*, Vol. 11, No. 2, pp 109-121, June 1991.

50. K. L. Boyer, G. E. Sotak, Jr., and A. F. Schenk, "Structural Stereopsis: Potential for Automatic Stereo Camera Calibration," *Optical Engineering,* Vol. 30, No. 3, pp. 288-299, March 1991.

51. D. M. Wuescher and K. L. Boyer, "Robust Contour Decomposition Using a Constant Curvature Criterion," *IEEE Transactions on Pattern Analysis and Machine Intelligence,* Vol. 13, No. 1, pp. 41-51, January 1991.

52. K. L. Boyer, D. M Wuescher, and S. Sarkar, "Dynamic Edge Warping: Recovering Disparity Maps in Weakly Constrained Systems," *IEEE Transactions on Systems, Man, and Cybernetics,* Vol. 21, No. 1, pp. 143-158, January/February 1991.

53. G. E. Sotak, Jr. and K. L. Boyer, "Comments on 'Fast Convolution with Laplacian-of-Gaussian Masks," *IEEE Transactions on Pattern Analysis and Machine Intelligence,* Vol. 11, No. 12, pp. 1329-1332, December 1989.

54. G. E. Sotak, Jr. and K. L. Boyer, "The Laplacian-of-Gaussian Kernel: A Formal Analysis and Design Procedure for Fast, Accurate Convolution and Full-Frame Output," *Computer Vision, Graphics, and Image Processing,* Vol. 48, pp. 147-189, November 1989.

55. K. L. Boyer and A. C. Kak, "Structural Stereo for 3-D Vision," *IEEE Transactions on Pattern Analysis and Machine Intelligence,* Vol. PAMI-10, No. 2, pp. 144-166, March 1988.

56. K. L. Boyer and A. C. Kak, "Color-Encoded Structured Light for Rapid Active Ranging," *IEEE Transactions on Pattern Analysis and Machine Intelligence,* Vol. PAMI-9, No. 1, pp. 14-28, January 1987.

    Reprinted in *Computer Vision: Advances and Applications,* R. Kasturi and R. Jain, Editors, Los Alamitos, CA: IEEE Computer Society Press, 1991, pp. 25-39. Only those papers among the most often cited in the computer vision area over the 1985-1991 time period were included in this volume.

57. K. L. Boyer, A. J. Vayda, and A. C. Kak, "Robotic Manipulation Experiments Using Structural Stereopsis for 3-D Vision," *IEEE Expert*, Vol 1, No. 3, pp. 73-94, Fall 1986.

58. A. C. Kak, K. L. Boyer, C. H. Chen, R. J. Safranek, and H. S. Yang, "A Knowledge-Based Robotic Assembly Cell," *IEEE Expert,* Vol. 1, No. 1, pp. 63-83, Spring 1986.

5.1.5 Refereed Conference Papers

1. Quan Wang, Meng Wang, and Kim Boyer, "Learning Room Occupancy Patterns from Sparsely Recovered Light Transport Models," *International Conference on Pattern Recognition*, Stockholm, SWEDEN, August 2014. DOI: 10.1109/ICPR.2014.347

2. Quan Wang, Xin Shen, Meng Wang, and Kim Boyer, "Label Consistent Fisher Vectors." *International Conference on Pattern Recognition*, Stockholm, SWEDEN, August 2014.

3. Quan Wang and Kim Boyer, "The Active Geometric Shape Model: A New Robust Deformable Shape Model and its Applications," *IAPR Joint International Workshops on Structural Techniques in Pattern Recognition and Syntactic Pattern Recognition*, Joensuu, FINLAND, August 2014. (Journal Track)

4. Eran Swears, Qiang Ji, Kim Boyer, and Anthony Hoogs, "Complex Activity Recognition using Granger Constrained DBN (GCDBN) in Sports and Surveillance Video," *IEEE Conference on Computer Vision and Pattern Recognition*, Columbus, OH, June 2014.

5. Quan Wang, Xinchi Zhang, and Kim Boyer, "3D Scene Estimation with Perturbation-Modulated Light and Distributed Sensors," *IEEE Workshop on Perception Beyond the Visible Spectrum*, Columbus, OH, June 2014. DOI:10.1109/CVPRW.2014.46

6. Quan Wang, Dijia Wu, Meizhu Liu, Le Lu, Kim Boyer, and Shaohua Zhou, "Semantic Context Feature Boosting for Learning Based Knee Cartilage Segmentation in 3D MR Images," *International Conference on Medical Image Computing and Computer Assisted Intervention*, Workshop on Medical Computer Vision, Nagoya, JAPAN, September 2013.

7. Eran Swears, Anthony Hoogs, and Kim L. Boyer, "Pyramid Coding for Functional Scene Element Recognition in Video Scenes," *International Conference on Computer Vision*, Sydney, AUSTRALIA, December 2013.

8. Quan Wang and Kim L. Boyer, "Feature Learning by Multidimensional Scaling and its Applications in Object Recognition," *Conference on Graphics, Pattern, and Images (SIBGRAPI)*, Arequipa, PERU, August 2013.

9. Quan Wang, Yan Ou, Agung Julius, Kim Boyer, and Min Jun Kim, "Tracking *Tetrahymena Pyriformis* Cells using Decision Trees," *International Conference on Pattern Recognition*, Tsukuba, JAPAN, November 2012.

10. Kim L. Boyer and D. Wu, "Resilient Subclass Discriminant Analysis with Application to Prelens Tear Film Interferometry," *Mexican Conference on Pattern Recognition*, *Lecture Notes in Computer Science*, Vol. 6718, pp. 1-11, Cancun, MEXICO, June 2011. **Invited, Keynote Address**

11. Dijia Wu and Kim L. Boyer, "Sign Ambiguity Resolution for Phase Demodulation in Interferometry with Application to Prelens Tear Film Analysis," *IEEE Conference on Computer Vision and Pattern Recognition*, San Francisco, CA, June 2010.

12. D. Wu, J. Bi, Y. Shinagawa, K. Boyer, A. Krishnan, and M. Salganicoff, "Stratified Learning of Local Anatomical Context for Lung Nodules in CT Images," *IEEE Conference on Computer Vision and Pattern Recognition*, San Francisco, CA, June 2010.

13. D. Wu and K. L. Boyer, "Resilient Subclass Discriminant Analysis," *IEEE International Conference on Computer Vision*, Kyoto, JAPAN, October 2009, pp. 389-396.

14. J. Kong, K. L. Boyer, J. H. Saltz, and K. Huang, "A New Model-Based Estimation of Ellipses for Object Representation," *International Conference of the IEEE Engineering in Medicine and Biology Society*, Minneapolis, MN, September 2009.

15. D. Wu, Jinbo Bi, and K. L. Boyer, "A Min-Max Framework of Cascaded Classifiers with Multiple Instance Learning for Computer Aided Diagnosis," *IEEE Conference on Computer Vision and Pattern Recognition*, Miami, FL, June 2009.

16. D. Wu and K. L. Boyer, "A New Gaussian Clustering Method for High Dimensional Classification Problems," *International Conference on Pattern Recognition and Information Processing*, Minsk, BELARUS, May 2009. **Invited, Keynote Address**

17. A. Ruiz, J. Kong, M. Ujaldon, K. Boyer, J. Saltz, M. Gurcan, "Pathological Image Segmentation for Neuroblastoma using the GPU," *IEEE International Symposium on Biomedical Imaging: From Nano to Macro*, May 2008.

18. J. Kong, O. Sertel, A. Gewirtz, A. Shana'a, F. Racke, J. Zhao, K. Boyer, U. Catalyurek, M. Gurcan, G. Lozanski, "Development of Computer Based System to aid Pathologists in Histological Grading of Follicular Lymphomas," *BLOOD* (*Amer. Soc. Hematology*), pp. 974A, Nov. 2007.

19. Jun Kong, Olcay Sertel, Hiroyuki Shimada, Kim Boyer, Joel Saltz, and Metin Gurcan, "Computer-Aided Grading of Neuroblastic Differentiation: Multi-Resolution and Multi-Classifier Approach," *2007 IEEE International Conference on Image Processing,* San Antonio, Texas, September 2007.

20. Jun Kong, Hiroyuki Shimada, Kim Boyer, Joel Saltz, and Metin Gurcan, "Image Analysis for Automated Assessment of Neuroblastic Grade of Differentiation," *2007 IEEE International Symposium on Biomedical Imaging,* Washington, DC, April 2007.

21. P. Gotardo, K. L. Boyer, J. Saltz and S. Raman, "A New Deformable Model for Boundary Tracing in Cardiac MRI and its Application to the Detection of Intra-Ventricular Dyssychrony," *IEEE Conference on Computer Vision and Pattern Recognition,* New York, NY, June 2006.

22. Kim Boyer, Paulo Gotardo, Joel Saltz, and Subha Raman, "On the Detection of Intra-Ventricular Dyssynchrony in the Left Ventricle from Routine Cardiac MRI," *2006 IEEE International Symposium on Biomedical Imaging,* Washington, DC, April 2006.

23. A. Herzog, K. L. Boyer and C. Roberts, "Extracting the Optic Disk End-Points in Optical Coherence Tomography Data," *Seventh Workshop on Applications of Computer Vision,* Breckinridge, CO, January 2005

24. C. Unsalan and K. L. Boyer, "A Theoretical and Experimental Investigation of Graph Theoretical Measures for Land Development in Satellite Imagery," *International Conference on pattern Recognition,* Cambridge, UK, August 2004.

25. K. Julka and K. L. Boyer, "Perceptual Organization in Range Data: Robust Detection of Low Order Surfaces in Heavy Clutter," *International Conference on Pattern Recognition,* Cambridge, UK, August 2004.

26. C. Unsalan and K. L. Boyer, "A System to Detect Houses and Residential Street Networks in Multispectral Satellite Images," *International Conference on Pattern Recognition,* Cambridge, UK, August 2004.

27. P. Gotardo, K. L. Boyer, O. R. P. Bellon and L. Silva, "Efficient Robust Extraction of Planar and Quadric Surfaces from Range Images," *International Conference on Pattern Recognition,* Cambridge, UK, August 2004.

28. A. Herzog, K. L. Boyer and C. Roberts, "Robust Extraction of the Optic Nerve Head in Optical Coherence Tomography," *Workshop on Computer Vision Applications in Medical Image Analysis - Mathematical Methods in Biomedical Image Analysis, Lectures Notes in Computer Science,* Vol. 3117, pp. 395-407, Prague, CZECH REPUBLIC, May 2004.

29. L. Silva, O. R. P. Bellon and K. L. Boyer, "Robust Multi View Range Image Registration," 16th Brazilian Symposium on Computer Graphics and Image Processing (SIBGRAPI), Sao Carlos, BRAZIL, 2003.

30. L. Silva, O. R. P. Bellon and K. L. Boyer, "Enhanced Genetic Algorithms for Multi view Range Image Registration," *Workshop on Three Dimensional Imaging and Modeling,* Banff, AB, CANADA, October 2003.

31. L. Silva, O. R. P. Bellon and K. Boyer, "An Enhanced Point to Tangent Plane Model for Range Image Registration," *Workshop on Three Dimensional Imaging and Modeling,* Banff, AB, CANADA, October 2003.

32. O. R. P. Bellon, M. Severich, L. Silva, M. Cat and K. Boyer, "Image Analysis of Newborn Plantar Surface for Newborn Gestational Age Determination," *Conference on Medical Image Computing and Computer-Assisted Intervention,* 2003, Montreal, PQ, CANADA, Lecture Notes in Computer Science, Vol. 2879, Springer-Verlag, November 2003.

33. L. Silva, O. R. P. Bellon and K. L. Boyer, "Low-Overlap Range Image Registration for Archaeological Applications," *Workshop on Applications of Computer Vision in Archaeology*, Madison, WI, June 2003.

34. L. Silva, O. R. P. Bellon and K. L. Boyer, "Range Image Registration Using Enhanced Genetic Algorithms," *International Conference on Image Processing,* Barcelona, SPAIN, September 2003.

35. Cem Ünsalan and K. Boyer, "Linearized Vegetation indices Using a Formal Statistical Framework," *IEEE International Geoscience and Remote Sensing Symposium,* Toulouse, FRANCE, July 2003.

36. Kim L. Boyer, Ravi Srikantiah and Patrick J. Flynn, "Multiscale Surface Organization and Description for Free Form Object Recognition," *International Conference on Pattern Recognition,* Quebec City, PQ, CANADA, August 2002, Vol. 3, pp. 569-572.

37. Cem Ünsalan and Kim Boyer, "Classifying Land Development in High Resolution Satellite Images using Straight Line Statistics," *International Conference on Pattern Recognition*, Quebec City, PQ, CANADA, August 2002, Vol. 1, pp. 127-130.

38. Prabhu Krishnamoorthy, Patrick J. Flynn and Kim L. Boyer, "Robust Detection of Buildings in Digital Surface Models," *International Conference on Patter Recognition,* Quebec City, PQ, CANADA, August 2002, Vol. 1, pp. 159-163.

39. Sujith Srinivasan and Kim L. Boyer, "Head Pose Estimation Using View Based Eigenspaces," *international Conference on Pattern Recognition,* Quebec City, PQ, CANADA, August 2002, Vol. 4, pp. 302-305.

40. Dara Koozekanani, Kim L. Boyer, Cynthia Roberts and Steven Katz, "Tracking the Optic Nerve Head in OCT Video Using Dual Eigenspaces and an Adaptive Vascular Distribution Model," *IEEE CVPR*, Kauai, HI, December 2001, pp. I-934 - I-941.

41. Dara Koozekanani, Kim L. Boyer and Cynthia Roberts, "Retinal Thickness Measurements and Optic Nerve Head Tracking in Optical Coherence tomography," *2nd International Workshop on Computer Assisted Fundus Image Analysis,* Copenhagen, DENMARK, October 2001.

42. D. Koozekanani, K. L. Boyer, C. Roberts and S. Katz, "A System to Automatically Determine the OCT Scan Path in Cases of Ocular Motion," *Third International Symposium on Optical Coherence Tomography,* April 2001, Longboat Key, FL.

43. D. Koozekanani, C. Roberts and K. L. Boyer, "A New Automatic Retinal Thickness Measurement Algorithm for OCT Images," *Second International Symposium on Optical Coherence Tomography,* Longboat Key, FL, April 2000.

44. D. Koozekanani, C. Roberts and K. L. Boyer, "Application of Iterative Deconvolution to Retinal and Corneal OCT Images Obtained with the Humphrey 2000 OCT System," *Second International Symposium on Optical Coherence Tomography,* Longboat Key, FL, April 2000.

45. D. Koozekanani, K. L. Boyer and C. Roberts, "Retinal Thickness Measurements in Optical Coherence Tomography Using a Markov Boundary Model," *IEEE International Conference on Computer Vision and Pattern Recognition,* Hilton Head, SC, June 2000, pp. II-363-370.

46. K. L. Boyer, "Generalized Graph Spectra for Large Model base Organization," *International Symposium on Computer and Information Sciences*, Izmir, TURKEY, October 1999, **Invited Speaker** (This item also appears under National and International Programs).

47. K. L. Boyer and K. Sengupta, "Object Recognition Using Large Structural Modelbases," *3rd International Workshop on Visual Form,* Isle of Capri, ITALY, May 1997. Published in *Advances in Visual Form Analysis,* Singapore: World Scientific, 1997, pp. 53-70. **Invited Speaker** (This item also appears under "National and International Program.").

48. K. Sengupta and K. L. Boyer, "Using Spectral Features for Model base Partitioning," *1996 International Conference on Pattern Recognition,* Vienna, AUSTRIA, August 1996, pp. 65-69.

49. S. Sarkar and K. L. Boyer, "Quantitative Measures of Change Based on Feature Organization: Eigenvalues and Eigenvectors," *1996 IEEE International Conference on Computer Vision and Pattern Recognition,* San Francisco, CA., June 1996, pp. 478-483.

50. N. Vaidya, K. Sengupta, B. Went and K. L. Boyer, "Experiments in Semi-autonomous Registration of Disparate Spatial Data: Two New Techniques and a Model for Comparison," *1995 IEEE International Symposium on Computer Vision,* Coral Gables, FL, November 1995, pp. 407-412.

51. K. Sengupta and K. L. Boyer, "Using Geometric Hashing with Information Theoretic Clustering for Fast Recognition from a Large CAD Model base," *1995 IEEE International Symposium on Computer Vision,* Coral Gables, FL, November 1995, pp. 151-156.

52. N. Vaidya and K. L. Boyer, "Discontinuity Preserving Surface Reconstruction Through Global Optimization," *1995 IEEE International Symposium on Computer Vision,* Coral Gables, FL, November 1995, pp. 115-120.

53. K. L. Boyer, "The Role of Perceptual Organization in Automated Scene Analysis," *ISPRS Workshop on The Role of Models in Automated Scene Analysis,* Photogrammetric Reports No. 68, ISSN 0071-8068, Stockholm, SWEDEN, August 1995. **Invited Speaker** (This item also appears under "National and International Programs.")

54. K. L. Boyer and K. Sengupta, "Large Model base Organization: Information Theoretic Clustering, Learning and Geometric Hashing," *Workshop on Computer Vision,* Islamabad, PAKISTAN, January 1995, pp. 139-158. **Invited Speaker** (This item is also listed under "National and International Programs.")

55. S. Sarkar and K. L. Boyer, "Using Perceptual Inference Networks to Manage Vision Processes," *12th International Conference on Pattern Recognition,* Jerusalem, ISRAEL, October 1994, pp. A-808-810.

56. X. Magnisalis and K. L. Boyer, "Hierarchical Structural Stereo Matching with Simultaneous Autonomous Camera Calibration," *12th International Conference on Pattern Recognition,* Jerusalem, ISRAEL, October 1994, pp. A711-713.

57. S. Sarkar and K. L. Boyer, "Automated Design of Bayesian Perceptual Inference Networks," *1994 IEEE Computer Society Conference on Computer Vision and Pattern Recognition,* Seattle, WA, June 1994, pp. 98-103.

58. K. Sengupta and K. L Boyer, "Computing Random Structural Descriptions of CAD Models and Presorting Large Structural Modelbases," *2nd IEEE CAD-Based Vision Workshop*, Champion, PA, February 1994, pp. 38-45.

59. K. Sengupta and K. L. Boyer, "Information Theoretic Clustering of Large Structural Modelbases," *1993 IEEE Computer Society Conference on Computer Vision & Pattern Recognition,* New York, NY, June 1993, pp. 174-179. *This paper won the "Siemens Best Paper Award," at the 1993 CVPR, sponsored by Siemens USA, for papers with a student as first author.*

60. R. W. Richardson, W. A. Penix and K. L. Boyer, "Interpretation of Arc Weld Images by Vision Analysis," *Japan-USA Symposium on Flexible Automation,* JAPAN, 1992, Pt. 1, pp. 309-312.

61. K. Sengupta and K. L. Boyer, "Organizing Large Structural Modelbases: Information Theoretic Clustering and Node Pointer Lists," *IAPR International Workshop on Structural and Syntactic Pattern Recognition,* Bern, Switzerland, August 1992, in *Advances in Structural and Syntactic Patter Recognition,* H. Bunk (ed.), Singapore: World Scientific, pp. 461.470.

62. S. Sarkar and K. L. Boyer, "Computing Perceptual Organization Using Voting Methods and Graphical Enumeration," *11th International Conference on Pattern Recognition*, The Hague, NETHERLANDS, August 1992, pp. A:263-267.

63. K. L. Boyer, "Hierarchical Perceptual Organization," *1992 Canadian Conference on Electrical and Computer Engineering,* **Invited Speaker,** Toronto, Ontario, CANADA, September 1992.

64. M. J. Mirza and K. L. Boyer, "A Robust Sequential Procedure for Surface Parameter Estimation and Curvature Computation," *1992 IEEE/Robotics Society of Japan International Conference on Intelligent Robots and Systems,* Raleigh, NC, July 1992, pp. 2017-2026.

65. S. Sarkar and K. L. Boyer, "Perceptual Organization Using Bayesian Networks," *1992 IEEE Computer Society Conference on Computer Vision and Pattern Recognition,* Champaign, IL, June 1992, pp. 251-256.

66. M. J. Mirza and K. L. Boyer, "An Information Theoretic Robust Sequential Procedure for Surface Model Order Selection in Noisy Range Data," *1992 IEEE Computer Society Conference on Computer Vision and Pattern Recognition,* Champaign, IL, June 1992, pp. 366-371.

67. N. M. Vaidya and K. L. Boyer, "Stereopsis and Image Registration from Extended Edge Features in the Absence of Camera Pose Information," *1991 IEEE Computer Society Conference on Computer Vision and Pattern Recognition,* Lahaina, HI, June 1991, pp. 76-82.

68. K. L. Boyer, D. M. Wuescher and S. Sarkar, "Dynamic Edge Warping: Experiments in Disparity Estimation Under Weak Constraints," *1990 International Conference on Computer Vision,* Osaka, JAPAN, December 1990, pp. 471-475.

69. S. Sarkar and K. L. Boyer, "Optimal, Efficient, Recursive Edge Detection Filters," *10th International Conference on Pattern Recognition,* Atlantic City, NJ, June 1990, pp. 931-936.

70. K. L. Boyer and G. E. Sotak, Jr., "Depth Perception for Robots: Structural Stereo from Extended Laplacian-of-Gaussian Features," *Proceedings of the 4th International Conference on Advanced Robotics,* Columbus, OH, June 1989, Berlin: Springer-Verlag, pp. 349-359.

71. K. L. Boyer and A. C. Kak, "Symbolic Stereo from Structural Descriptions," *Proceedings of the 2nd IEEE Conference on Artificial Intelligence Applications,* Miami Beach, FL, December 1985, pp. 82-87.

72. K. L. Boyer, R. J. Safranek and A. C. Kak, "A Knowledge-Based Robotic Vision System," *Proceedings of the 1st IEEE Conference on Artificial Intelligence Appl.,* Denver, CO, December 1984, pp. 45-50.

73. H. S. Yang, K. L. Boyer and A. C. Kak, "Range Data Extraction and Interpretation by Structured Light," *Proceedings of the 1st IEEE Conference on Artificial Intelligence Appl.,* Denver, CO, December 1984, pp. 199-205.

5.1.6 Other Conference Papers, Abstracts

1. Xinchi Zhang, Quan Wang, and Kim L. Boyer, "Illumination Adaptation with Rapid-Response Color Sensors," *SPIE Optical Engineering and Applications*, San Diego, CA, August 2014. DOI: 10.1117/12.2062105

2. J. Kong, O. Sertel, H. Shimada, K. L. Boyer, J. H. Saltz and M. N. Gurcan, "A Multi-resolution Image Analysis System for Computer-assisted Grading of Neuroblastoma Differentiation," *Proceedings, SPIE Medical Imaging,* Vol. 6915, Vol. 1, p. 6915T, San Diego, CA, February 2008.

3. Kim L. Boyer, Dara Koozekanani, Cynthia Roberts and Steven Katz, "A New Retinal Thickness Measurement Algorithm for OCT Images," *Association for Research in Vision and Ophthalmology,* Fort Lauderdale, FL, May 2001. Also in *Investigative Ophthalmology and Visual Science Suppl.,* 2001; 42:3773.

4. Dara Koozekanani, Kim L. Boyer, Cynthia Roberts and Steven Katz, "Detection and Measurement of Eye Movement During OCT Circle (RNFL) Scan Acquisition to Determine the True Scan Path," *Association for Research in Vision and Ophthalmology,* Fort Lauderdale, FL, May 2001. Also in *Investigative Ophthalmology and Visual Science Suppl.,* 2001; 42:98.

5. K. L. Boyer, "Computer Vision as Repeated Perceptual Organization," *ISPRS International Workshop on the Analysis of Aerial Scenes,* Columbus, OH, November 1993. **Invited Speaker.**

6. K. Sengupta and K. L. Boyer, "Incremental Model base Updating: Learning New Model Sites," *AAAI Workshop on Learning in Machine Vision: What, Why and How?,* Technical Report AAAI-FS-93-04, Raleigh, NC, October 1993, pp. 1-3.

7. M. J. Mirza and K. L. Boyer, "Robust Surface Perception in Range Data," *SPIE Symposium: Robust Methods in Sensor Fusion,* Boston, MA, September 1993.

8. S. V. Raman and K. L. Boyer, "Building Structural Descriptions of Coronal Magnetic Resonance Images," *SPIE/IS&T Symposium on Electronic Imaging: Science and Technology,* San Jose, CA, February 1993.

9. K. L Boyer and S. Sarkar, "Assessing the State of the Art in Edge Detection: 1992," *SPIE conference on Applications of Artificial Intelligence X: Machine Vision and Robotics,* Orlando, FL, April 1992, pp. 353-362. **Invited** survey paper for special session on Modern Edge Detector Theory.

10. M. J. Mirza and K. L. Boyer, "Performance Evaluation of a Class of M-Estimators for Surface Parameter Estimation in Noisy Range Data," *SPIE Conference on Applications of Artificial Intelligence X: Machine Vision and Robotics,* Orlando, FL, April 1992, pp. 198-209.

11. S. V. Raman, S. Sarkar and K. L. Boyer, "Tissue Boundary Refinement in Magnetic Resonance Images Using Contour-Based Scale Space Matching," *1990 Symposium for Computer Assisted Radiology,* Anaheim, CA, June 1990, Carlsbad, CA: Symposia Foundation, pp. 618-624.

12. G. E. Sotak, Jr., and K. L. Boyer, "Structural Matching of Laplacian-of-Gaussian Contour Segments for 3D Perception," *Proceedings of the SPIE Conference: Optics, Illumination and Image Sensing for Machine Vision III*, Cambridge, MA, November 1988, pp. 219-226.

13. K. L. Boyer, "Transform-Based Image Coder," *Proc. 6th Intl. Conference on Digital Satellite Comm.*, Phoenix, AZ, September 1983, pp. VII-A 31-36.

5.1.7 Abstracts

1. K. L. Boyer and A. C. Kak, "Color-Encoded Structured Light for Rapid Active Ranging," in *Cambridge Scientific Abstracts, Computer and Information Sciences,* Vol. 35, No. 5.

2. K. L. Boyer and A. C. Kak, "Structural Stereopsis for 3-D Vision," in *Cambridge Scientific Abstracts, Computer and Information Sciences,* Vol. 36, No. 3.

5.1.8 Other Creative or Scholarly Works

Invited Presentations

1. "Sensing Room Occupancy Distributions for Smart Lighting Applications," University at Albany – State University of New York, Computer Science Lecture Series, Feb. 2015.

2. "Sensing Room Occupancy Distributions for Smart Lighting Applications," 10th IEEE Latin American Summer School on Computational Intelligence, University of Chile, Santiago, CHILE, December 2014. Plenary lecture, expenses paid by Chilean National Science Foundation (FONDECYT).

3. "Engineering and Public Policy – with Connections to Computer Vision," Kansas State University, Jefferson Science Fellow Distinguished Lecture, Manhattan, KS, October 2014. (One of the first two invitees to deliver a lecture in this series.)

4. "Engineering and Public Policy – with some Computer Vision Thrown In," Rensselaer Polytechnic Institute, Douglas Mercer Distinguished Lecture, Troy, NY, October 2014.

5. "Interferometric Image Analysis for Prelens Tear Film Surface Reconstruction," Boston University, Electrical and Computer Engineering Distinguished Lecture Series, Boston, MA, March 2013.

6. "Interferometric Image Analysis for Prelens Tear Film Surface Reconstruction," Mexican Conference on Pattern Recognition, Invited Keynote Address, Cancun, MEXICO, June 2011.

7. "Perceptual Organization in the Design of Computer Vision Systems," Mexican Conference on Pattern Recognition, Invited Tutorial, Cancun, MEXICO, June 2011.

8. "Staring into Your (Dry) Eyes: Monitoring the Prelens Tear Film from Narrowband Interferometry, *or* Interferometric Image Analysis for Prelens Tear Film Surface Reconstruction," University of Chile, IEEE Latin American Summer School on Computational Intelligence, Santiago, CHILE, December 2009. Plenary lecture, expenses paid by Chilean National Science Foundation (FONDECYT).

9. "A New Gaussian Clustering Method for High Dimensional Classification Problems," Keynote Address, International Conference on Pattern Recognition and Information Processing, Minsk, BELARUS, May 2009.

10. "Overview of Research in Computer Vision, and the Extraction of Retinal and Nervehead Geometry in Ophthalmic Optical Coherence Tomography," IEEE Signal Processing Society, Rochester Section, University of Rochester, Rochester, NY, November 2008.

11. "Overview of Research in Computer Vision, and the Extraction of Retinal and Nervehead Geometry in Ophthalmic Optical Coherence Tomography," Department of Computer Science Seminar Series, Rochester Institute of Technology, Rochester, NY, November 2008.

12. "Multiscale Surface Segmentation and Description for Free Form Object Recognition," University of Chile, IEEE Summer School on Computational Intelligence, Santiago, CHILE, December 2007. Plenary lecture, expenses paid by Chilean National Science Foundation (FONDECYT).

13. "Computer Vision: Survey and Analysis of Ophthalmic Optical Coherence Tomography," University of Chile, IEEE Summer School on Computational Intelligence, Santiago, CHILE, December 2007. Plenary lecture, expenses paid by Chilean National Science Foundation (FONDECYT).

14. "Research in Computer Vision at the Signal Analysis and Machine Perception Laboratory," Rensselaer Polytechnic Institute, Department of Electrical and Computer systems Engineering, Troy, NY, April 2007.

15. "Automatic Measurement of Retinal Thickness and Optic Nervehead Geometry in Optical Coherence Tomography," OSU College of Optometry Seminar Series in Vision Sciences, Columbus, OH, November 2004.

16. "Automatic Measurement of Retinal Thickness and Optic Nervehead Geometry in Optical Coherence Tomography," Distinguished Lecture Series, Department of Computer Science and Engineering, University of South Carolina, Columbia, SC, November 2004.

17. "Perspectives on Computer Vision: Obstacles and Opportunities," Keynote Address, SIBGRAPI 2004, October 2004, Curitiba, BRAZIL.

18. "Research in the Signal Analysis and Machine Perception Laboratory and Retinal Thickness Measurements and Optic Nervehead Tracking in Optical Coherence Tomography," University of Toronto Department of Computer Science, Toronto, Ontario, CANADA, February 2004.

19. "Research in the Signal Analysis and Machine Perception Laboratory," Seminar em Informatica, Universidade Federal do Parana, Curitiba, BRAZIL, February 2004.

20. "Retinal Thickness Measurements and Optic Nervehead Tracking in Optical Coherence Tomography," Computer Engineering Department Seminar, Rochester Institute of Technology, April 2003.

21. "Retinal Thickness Measurements and Optic Nervehead Tracking in Optical Coherence Tomography," IEEE Rochester, NY, Section, *IEEE Distinguished Visitor*, April 2003.

22. "Multiscale Surface Segmentation and Description for Free Form Object Recognition," School of Electrical and Computer Engineering Seminar Series, Purdue University, West Lafayette, IN, April 2001.

23. "Profile of a *More* Successful Department: Selecting Strategic Research Targets is Not Enough," CSE Department, The Pennsylvania State University, University Park, PA, April 2001.

24. "Profile of a *More* Successful Department: Selecting Strategic Research Targets is Not Enough," CSE Department, Michigan State University, March 2001.

25. "Multiscale Surface Segmentation and Description for Free Form Object Recognition," Computer Science and Engineering Department Seminar Series, Michigan State University, East Lansing, MI, March 2001.

26. "Generalized Graph Spectra for Large Model base Organization," International Symposium on Computer and Information Sciences, Izmir, TURKEY, October 1999.

27. "Graph Theoretical Methods in Computer Vision: Issues in Inexact Matching and the Use of Generalized Spectra," DIMACS/NSF Workshop on Graph Theoretic Methods in Computer Vision, Rutgers, The State University of New Jersey, Piscataway, NJ, May 1999.

28. "Quantitative Measures of Change Based on Feature Organization: Eigenvalues and Eigenvectors," OSU Center for Mapping Interdisciplinary Seminar Series on Spatial Information Science, Columbus, OH, October 1998.

29. "Object Recognition Using Large Structural Modelbases," OSU College of Optometry Seminar Series in Vision Sciences, Columbus, OH, October 1997.

30. "Object Recognition Using Large Structural Modelbases," 3rd International Workshop on Visual Form, Capri, ITALY, May 1997.

31. A Gentle Introduction to the Role and Implementation of Perceptual Organization in Computer Vision," OSU College of Optometry Seminar Series in Vision Sciences, Columbus, OH, July 1995.

32. "Learning in Computer Vision: Large Model base Organization," University of Geneva, Computer Science Colloquium Series, Geneva, SWITZERLAND, November 1994.

33. "Computer Vision and Perceptual Organization: A Gentle Introduction," University of Berne, Informatik-Kolloquim Serie, Bern, SWITZERLAND, November 1994.

34. "Perceptual Organization in Computer Vision," Lund University Cognitive Science Colloquium Series, Lund, SWEDEN, November 1994.

35. "Organizing Large Structural Modelbases and Learning New Model Sites," Lund University Cognitive Science Colloquium Series, Lund, SWEDEN, November 1994.

36. "Computer Vision: A Gentle Introduction for the Non-Specialist," Department of Photography, ETH- Swiss Federal Institute of Technology, Zürich, SWITZERLAND, November 1994.

37. "Organizing and Expanding Large Structural Modelbases," Department of Electrical Engineering, Communications Technology: Zürich, SWITZERLAND, November 1994.

38. "Bayesian Networks for Perceptual Organization in Computer Vision," Institut Imag, Institut National Polytechnique de Grenoble, Grenoble, FRANCE, September 1994.

39. "Perceptual Organization in Computer Vision: Inference Networks and Voting Methods," Department of Informatics, University of Oslo, Oslo, NORWAY, August 1994.

40. "Organizing and Incrementally Expanding Large Structural Modelbases," Department of Electrical Engineering, University of Linköping, Linköping, SWEDEN, August 1994.

41. "Computing Perceptual Organization in Vision: Perceptual Inference Networks," Centrum fir bildanalys, Uppsala University, Uppsala, SWEDEN, August 1994.

42. "Organizing and Incrementally Expanding Large Structural Modelbases," Department of Computer Science, University of Copenhagen, DENMARK, August 1994.

43. "Computing Perceptual Organization: Perceptual Inference Networks and Voting Methods," Laboratory of Image Analysis, University of Aalborg, DENMARK, August 1994.

44. "Computing Perceptual Organization in Computer Vision (To see anything, you have to look)," IEEE Laser and Electro-Optics Society & Electron Device Society Colloquium Series, Columbus, OH, April 1994.

45. "Visual Collision Avoidance in Intelligent Vehicles," OSU Department of Civil Engineering, Seminar Series on Intelligent Vehicle Highway Systems, Columbus, OH, April 1994.

46. "On Computing Perceptual Organization in Vision," University of Illinois, Department of Electrical and Computer Engineering Colloquium Series, Urbana-Champaign, IL, January 1994.

47. "Perceptual Organization in Computer Vision," Illinois Institute of Technology, Department of Electrical Engineering Seminar Series, Chicago, IL, September 1993.

48. "Computing Perceptual Organization in Vision," OSU Center for Mapping Seminar Series, Columbus, OH, May 1993.

49. "On Organizing Large Structural Modelbases," University of Central Florida, Department of Computer Science Colloquium Series, Orlando, FL, April 1993.

50. "Organizing Large Structural Modelbases," University of South Florida, Department of Computer Science and Engineering Seminar Series, Tampa, FL, April 1993.

51. "On Computing Perceptual Organization," OSU College of Optometry Seminar Series in Vision Sciences, Columbus, OH, February 1993.

52. "Generating Structure Hypotheses in Cerebral Magnetic Resonance Imaging," OSU Biomedical Engineering Seminar Series, Columbus, OH, May 1991.

53. "Structural Stereopsis and Dynamic Edge Warping for Camera Orientation and Depth Recovery Under Weak Constraints," OSU Department of Geodetic Science & Surveying Seminar Series, Columbus, OH, November 1990.

54. "Two Topics in Computer Vision: A Contour Based Approach to Scale Space Boundary Refinement and Autonomous Recovery of Surface Shape from Shading," OSU College of Optometry Seminar Series in Vision Sciences, Columbus, OH, February 1990.

55. "Structural Stereo from Extended LoG Contour Segments," Kodak Research Distinguished Scientist Seminar Program, Eastman Kodak Company, Rochester, NY, March 1989.

56. "Structural Stereo from Extended Edge Features," Clarkson University, Department of Electrical and Computer Engineering Seminar Series on Systems Science, Potsdam, NY, January 1989.

57. "Structural Stereo Matching of Extended Laplacian-of-Gaussian Features," OSU College of Optometry Seminar Series in Vision Sciences, Columbus, OH, October 1988.

58. "Hierarchical Classification and Grouping of Map Spot Symbols Characterized by Fourier Descriptors," OSU Department of Geography Seminar Series, Columbus, OH, April 1988.

59. "3D Robot Vision: Acquisition and Interpretation," University of Delaware Electrical Engineering Research Colloquium, Newark, DW, October 1985.

60. "Symbolic Processing in Robot Vision," OSU Electrical Engineering Research Colloquium, Columbus, OH, September 1985.

Bell Laboratories Technical Memoranda
Internal reports based on work performed at Bell Labs.

1. K. L. Boyer, C. M. Felix, and W. E. Studdiford, "Transmission Performance of an L5 Switching Section with an Intermediate Power Feed Station Operating at Elevated Temperatures," November 28, 1977.

2. K. L. Boyer and M. S. Gemelos, "Phase Jitter Investigation on Boston-Dranesville L5 Line at Dover Plains, NY Power Feed Station," April 6, 1978.

3. R. D. Tuminaro, K. L. Boyer, and M. S. Gemelos, "Meeting Notes: Data Transmission Task Force," June 1, 1978.

4. K. L. Boyer, "Apparatus to Establish the Extent of Correlation Between Weather Conditions and the Presence of Phase/Amplitude Hits on a Received Signal," July 25, 1978.

5. K. L. Boyer and M. D. Tremblay, "Proposed L5E Measurement Program for the Jackson-New Orleans Installation," August 1, 1978.

6. K. L. Boyer, "Jackson-New Orleans L5E Line Acceptance: Comments on Line Design using Old Vintage Cable," October 26, 1978.

7. K. L. Boyer, "L5/L5E Noise Loading Investigations on Florida Field Trial Route," January 22, 1979.

8. K. L. Boyer, "Some Thoughts on the Deployment of Multidestinational TASI-D (Time-Assigned Speech Interpolation - Digital) in a Digital POTS Satellite Network," May 11, 1979.

9. K. L. Boyer, "Impact of a Proposed TASI-D Terminal on Nonvoice Signals," November 14, 1979.

10. K. L. Boyer and E. M. Butler, "A Trunk Compression Terminal for Digital Facilities - Preliminary Proposal," November 14, 1979.

11. K. L. Boyer and E. M. Butler, “A Digital Trunk Compression Terminal - Preliminary Thoughts on a Design,” November 14, 1979.

12. K. L. Boyer, “Scale of Projected TASI-D Deployment,” November 16, 1979.

13. K. L. Boyer, “TASI-D/Nonvoice Signal Interaction,” November 28, 1979.

14. K. L. Boyer, “1.2Kb/s Carriers for Satellite Network Control,” December 31, 1979.

15. K. L. Boyer, “Response to 2A Echo Canceler Terminal Systems Questions,” March 20, 1980.

16. K. L. Boyer, “Extended Delay Echo Cancelers,” May 1980. (Later served as the basis for US Patent 4,554,417: “Tandem Adaptice Echo Canceler Arrangement,” November 19, 1985, K. L. Boyer, Inventor.

17. K. L. Boyer, “ISSUE 1: 2A Digital Echo Canceler Terminal,” April 11, 1980.

18. D. A. Alsberg and K. L. Boyer, “Maintenance-Related Interfaces for the 2A Echo Canceler Terminal,” April 14, 1980.

19. K. L. Boyer, S. Byars, C. Y. Kao, and A. Maione, “2A Echo Canceler Frame - A System Prospectus,” January 26, 1981.

COMSAT Laboratories Technical Reports and Presentations
Internal reports and presentations based on work performed at COMSAT Labs.

1. K. L. Boyer, R. Garlow, Y. Kao, and J. Poklemba, “N-MAC (NTSC-Based Multiplexed Analog Components) Signal Description,” November 22, 1982.

2. K. L. Boyer, “Transform Based Image Coder,” June 1983.

3. K. L. Boyer and S. C. Wu, “Cosine Transform Coding Strategies for Composite Video,” August 1983.

4. K. L. Boyer, “Development of a Transform-Based Coder-Decoder for Video Teleconferencing Applications,” presentation to the COMSAT Laboratories Technical Advisory Board, July 1983.

Patents and Disclosures

1. K. L. Boyer, "Tandem Adaptive Echo Canceler Arrangement," US Patent 4,554,417, November 19, 1985.

2. Paulo F. U. Gotardo, Kim L. Boyer and Subha V. Raman, "Method and Apparatus for Detecting Intraventricular Dyssynchrony," US Patent 8,280,136, October 2, 2012.

3. Quan Wang, Xinchi Zhang, and Kim Boyer, "Occupancy Sensing with Perturbation-Modulated Light and Distributed Non-imaging Color Sensors," US Patent 9,907,138, February 27, 2018. Patent has also been published in the EU, China, and Japan.

4. J. Wason, Z. Schilling, E. Frank, V. Magidson, J. Loncarek, J. Wen, K. Boyer, and A. Khodjakov, "Active Lighting Control for Live Cell Imaging," Invention Disclosure to Rensselaer Office of Technology Commercialization, July 2010.

5.2 Research and Funding Activity

5.2.1 Proposals Funded

External Funding

1. "Feature Extraction from Aerial Imagery and Interpreting Raster Scanned Map Data," The NASA Center for the Commercial Development of Space, $55,000, November 1, 1986 - August 1, 1987; OSURF #719035; PIs: A. F. Schenk, Geodetic Science (60%), K. L. Boyer (40%).

2. "Feature Extraction from Aerial Imagery and Interpreting Raster Scanned Map Data," the NASA Center for the Commercial Development of Space, $61,000, September 1, 1987 - August 31, 1987; OSURF #720141; PIs: K. L. Boyer (75%) A. F. Schenk, Geodetic Science (25%).

3. "Primitive Extraction and Feature Identification from Aerial and Satellite Images," The NASA Center for the commercial Development of Space, one year, $94,000, September 1, 1988 - September 30, 1989; OSURF #721484; PIs: A. F. Schenk, Geodetic Science (60%), K. L. Boyer (40%).

   This project included a corporate partnership with Digital Equipment Corporation, who provided funding and software to the project.

4. "Feature Extraction from Aerial and Satellite Imagery," The NASA Center for the Commercial Development of Space, one year, $84,000, September 1, 1988 - September 30, 1989; OSURF #721485; PIs: K. L. Boyer (60%), A. F. Schenk, Geodetic Science (40%).

   This project included a corporate partnership with Digital Equipment Corporation, who provided funding and software to the project.

5. "Feature Extraction from Aerial and Satellite Images," NASA Center for the Commercial Development of Space, one year, $145,000, September 1, 1989 - August 30, 1990; OSURF #722912; PI: K. L. Boyer.

6. "An Integrated Symbolic and Signal Processing Workstation for Research in Signal analysis, Machine Perception, and Computer Architecture," National Science Foundation Grant No. CDA-8811237, $91,015, OSURF #721252, equipment grant, June 1988; PIs: K. L. Boyer (100%), S. C. Ahalt, A. K. Krishnamurthy, R. L. Moses and F. D. Garber.

   Professor Boyer, PI, had 100% expenditure responsibility, he initiated, directed, and coordinated the proposal-writing effort, and was the sole negotiator with NSF for the necessary cost-sharing agreement.

7. "Digital Data Acquisition and Archiving System," Ohio Department of Transportation, $199,727, March 1, 1988 - February 28, 1990; EES #529752; PIs: A.F. Schenk, Geodetic Science (80%), K. L. Boyer (20%).

8. "Construction, Refinement, and Rule-Based Segmentation of the Object Space," NASA, $310,344, January 1, 1989 - December 31, 1990; OSURF $721641; PIs: K. L. Boyer (50%), A. F. Schenk, Geodetic Science (50%).

   This was a joint venture with the Intergraph Corporation of Huntsville, AL. In exchange for a favorable transfer of technology scenario, they provided equipment, software, and labor with a commercial value of $581,500 as leverage for the funds provided by NASA. Thus, the project represented $891,344 input to the University. The hardware and software products (in particular, two Unix high-performance engineering graphics workstations) remained the property of Ohio State at the conclusion of the project.

9. "Feature Extraction and Stereopsis from Satellite Imagery," NASA, $72,000, October 1, 1990 - September 30, 1991; OSURF #724050; PI: K. L. Boyer.

10. "Computer Vision Research," Texas Instruments, Dallas, TX. One year, $20,000 (gift directed to support Professor Boyer's research - otherwise unrestricted), December 1990 - December 1991.

11. "Digital Elevation Models from Uncalibrated Image Pairs," NASA Center for the commercial Development of Space, one year, $100,000, September 1, 1991 - August 31, 1992; OSURF #725406; PI: K. L. Boyer.

12. "Automatic Registration of Digital Elevation Data with Remotely Sensed Image Data Using Geomorphic Models," NASA Center for the Commercial Development of Space, One year, $46,000, September 1, 1991 - August 31, 1992; OSURF #725407; PI: K. L. Boyer.

13. "Digital Elevation Models from Uncalibrated Image Pairs," NASA Center for the Commercial Development of Space, one year, $104,880, November 1, 1992 - October 31, 1993; OSURF #726894; PI: K. L. Boyer.

14. "Digital Elevation Models from Uncalibrated Image Pairs," NASA Center for the Commercial Development of Space, one year, $107, 339, November 1, 1993 - October 31, 1994; OSURF #728466; PI: K. L. Boyer.

15. "Automated Registration of Imagery and Digital Feature Analysis Data to Digital Elevation Data," US DOD SBIR, subcontract from BWTechnology, six months, $17,567, July 1, 1994 - December 3, 1994, OSURF #729713; PI: K. L. Boyer.

16. "Digital elevation Models from Uncalibrated Image Pairs and Organizing Large Feature Modelbases," NASA Center for the Commercial Development of Space, one year, $43,800, November 1, 1994 - October 31, 1995; OSURF #730092; PI: K. L. Boyer.

17. "Perceptual Inference Networks for Change Detection," APRI-ORD RADIUS Seed contract, $20,000; OSURF #731261; PI: K. L. Boyer.

18. "Support for Autonomous Robotic Transporter," $750, gift from IBM by Professor Boyer to support student project.

19. "Research Collaboration in Autonomous Robotic Transporters," $1000, AT&T Bell Laboratories, obtained by Professor Boyer for support of student project.

20. "Generation and Detection of 3D Log for Fillet Weld Inspection," Edison Welding Institute, $6000; OSURF #731715, October 1, 1995 - December 31, 1995; PI: K. L. Boyer.

21. "Generation and Detection of 3D Log for Fillet Weld Inspection," Edison Welding Institute, $6000; OSURF #731715 (extension of previous project), January 1, 1996 - March 31, 1996; PI: K. L. Boyer.

22. "Range Data Analysis for Pipe Inspection," Edison Welding Institute, $24,864.20, OSURF #733260, October 11, 1996 - June 30, 1997; PI: K. L. Boyer.

23. "Range Data Analysis for Pipe Inspection," Edison Welding Institute, $12,093.40, OSURF #734140, April 1, 1997 - January 1998; PI: K. L. Boyer.

24. "Intelligent Compression of Digital Echocardiographic Data," Cleveland Clinic Foundation, $108,658, OSURF #735663, January 1, 1998 - April 30, 1999; PI: K. L. Boyer.

25. "A High-Performance Computing and Imaging Facility for Research in Image Understanding and Analysis," National Science Foundation CISE Instrumentation Program, $180,000 (total cost), OSURF#736997, January 1, 1999 - December 31, 2001. PIs: K. L. Boyer, P. J. Flynn and T. M Caelli.

26. "An International Workshop on Perceptual Organization in Computer Vision: Assessing the State of the Community and Charting New Research Directions," National Science Foundation, $29,000, OSURF#738144, September 1, 1999 - August 31, 2001. PI: K. L. Boyer.

27. "Model-Based Object Recognition Using Multiple Sensor Modalities and Invariant Techniques," AFRL/DAGSI, OSURF#739180, $400,000, July 1, 2000 - December 31, 2002. PIs: P. J. Flynn, K. L. Boyer and M. Oxley.

28. "Hierarchical Segmentation and Attribution of High Resolution Aerial Images with a View to Change Detection and Analysis," NASA, OSURF#739396, $200,000, May 19, 2000 - May 18, 2001. PIs: K. L. Boyer, P. J. Flynn and S. C. Zhu.

29. "Vehicle Occupant Motion Detection and Analysis," Honda R&D Americas, $60,000, April 1, 2000 - open. PI: K. L. Boyer.

30. "Using Airborne-Based Data in Real-Time Network State Estimation and Traffic Management," National Consortium on Remote Sensing in Transportation - Flows (NCRSTF), $136,923, June 2000 - June 2001. PI: Rabi Mishalani, Co-PIs: K. L. Boyer, U. Ozguner and B. Coifman.

31. "Automatic Target Detection and Identification from Airborne Laser Range Profile Data," Air Force Research Laboratories, $50,000, July 1, 2003 - June 30, 2004. PI: K. L. Boyer.

32. "Automatic 3D Reconstruction of the Optic Nerve Head Topography and Nerve Fiber Layer Thickness Measurement from Optical Coherence Tomography for Improved Diagnosis and Monitoring of Glaucoma," $69,293, January 1, 2003 - December 31, 2004. PIs: C. J. Roberts and K. L. Boyer.

33. "Spatiotemporal Statistical Shape Models for the Analysis of Ventricular Dyssynchrony in Cardiac MRI," subproject to BISTI, NIH, Joel Saltz, PI. $70,000. June 2004 - September 2007.

34. "Automated Measurement of the Precorneal and Prelens Tear Film Thickness," subproject from Optometry, $27,000. November 2005 - May 2006. PI: Jason Nichols.

35. "Spatiotemporal Statistical Shape Models for the Analysis of Ventricular Dyssynchrony in Cardiac MRI," OSURF#744510, Boyer's part $16,607. October - December 2005. Co-PI: Subha Raman.

36. "National Academies Jefferson Science Fellowship at the US Department of State," August 2006 - 2007. $50,000 stipend for living expenses provided by the MacArthur Foundation and the Carnegie Corporation.

37. "VIRAT: Automatic Activity Recognition and Retrieval from Video," $531,535 (Rensselaer portion), August 11, 2008 - March 11, 2010. Primary sponsor: DARPA, RPI subcontract from Kitware. Co-PI. PI: Qiang Ji.

38. "Characterizing Light Transport Changes for Activity-Sensitive Locally-Optimized, Real Time Adaptive Illumination," NSF Smart Lighting ERC, August 2013-15. Graduate student and summer support.

OSU Internal Funding

1. "Structural Stereopsis for Robot Vision Using a Generalized Primitive Set," University Seed Grant, $18,000, April 1, 1987 - March 30, 1988; PI: K. L. Boyer.

2. "Automatic Feature Extraction and Characterization from Magnetic Resonance Images of the Human Brain," $20,000, Department of Psychiatry, October 1, 1988 - September 30, 1989; PI: K. L. Boyer.

3. "High Speed Optic Flow Field Analysis for Intelligent Vehicles," The Center for Automotive Research, Transportation Research Endowment Program, $47,916.90, July 1, 1992-93; EES#5510206; PI: K. L. Boyer.

4. "High Speed Visual Sensing and Sensor Fusion for Intelligent Vehicles," IVHS-OSU Seed Grant Program, one year, $22,800, October 1, 1993 - September 30, 1994; EES#510235; PI: K. L. Boyer.

5. "High Speed Visual Sensing and Sensor Fusion for Intelligent Vehicles Extension," IVHS-OSU Seed Grant Program, one year, $8000, October 1, 1994 - September 30, 1995; EES#510235; PI: K. L. Boyer.

6. "High Speed Visual Sensing and Sensor Fusion for Intelligent Vehicles Extension," CITR Grant Program, one year, $15,000, October 1, 1995 - September 30, 1996; EES#510235; PI: K. L. Boyer.

5.3 Awards for Research, Scholarly or Creative Work

- Jefferson Science Fellow at the US Department of State, 2006-12. Program administered by the National Academies of Science, Engineering, and Medicine and supported by the MacArthur Foundation and the Carnegie Corporation.
- Fellow of the IEEE, elected January 2004.
- Fellow of the IAPR, elected April 2004.
- Best Dissertation Award (Co-Advisor of Luciano Silva with Olga Bellon), XVII Brazilian Symposium on Computer Graphics and Image Processing, Curitiba, BRAZIL, October 2004.
- 1991 Ohio State University College of Engineering Lumley Research Award.
- Siemens Best Paper Award, 1993 IEEE Computer Society Conference on Computer Vision and Pattern Recognition, New York City, NY (with Kuntal Sengupta, student advisee).
- 1995 Ohio State University College of Engineering Lumley Research Award.
- 2000, Star Award, Battelle Memorial Institute.
- 2000, Key Contributor Award, Battelle Memorial Institute.
- 2001-2003, IEEE Computer Society Distinguished Visitor.
- 2001 OSU College of Engineering Annual Research Accomplishment Award.
- 2005 Ohio State University College of Engineering Lumley Research Award.

6. PROFESSIONAL AND PUBLIC SERVICE

6.1 Editorships and Service as a Reviewer

6.1.1 Editorships of Archival Journals and Book Series

- Series Editor, CRC Press book series on *Computer Vision*, 2014 - 2015.
- Area Editor and Member of the Editorial Board, *Computer Vision and Image Understanding*, June 1994 – October 2012. (Promotion from Associate Editor).
- Associate Editor, *Machine Vision and Applications,* 2004 - 2017.
- Member, Editorial Committee, *The Source*, the journal of the Electrical and Computer Engineering Department Heads Association, 2012 - 2015.
- Associate Editor, *Computer Vision and Image Understanding,* October 1993 - June 1994.
- Associate Editor, *IEEE Transactions on Pattern Analysis and Machine Intelligence,* September 1992 - December 1996.
- Associate Editor, *Pattern Recognition*, April 1999 - 2001.

6.1.2 Guest Editorships of Archival Journals

- Co-Guest Editor, *Pattern Recognition Letters*, Special Issue on Awards from ICPR 2012, July 2014.
- Managing Guest Editor, *Pattern Recognition Letters*, Special Issue on Supervised and Unsupervised Classification Techniques and their Applications, May 2014.
- Co-Guest Editor, *Pattern Recognition Letters*, Special Issue on Awards from ICPR 2010, Vol. 33, No. 7, July 2012.
- Co-Guest Editor, *IEEE Transactions on Pattern Analysis and Machine Intelligence,* Special Section on Award Winning Papers from CVPR 2008, Vol. 31, No. 12, December 2009.
- Co-Guest Editor, *Computer Vision and Image Understanding*, Special Issue on Perceptual Organization in Computer Vision, October 1999.

- Co-Guest Editor, *International Journal of Pattern Recognition and Artificial Intelligence,* Special Issue on "Computer Vision from Signals to Symbols," Vol. 8, No. 6, December 1994.

6.1.3 Special Society Committees

- IEEE Computer Society Fellows Committee, 2013.
- IEEE Computer Society Fellows Committee, 2012.
- Pattern Recognition Society Awards Committee, 2000.
- IAPR Governing Board, 2002 – ; IAPR Executive Committee 2006 –

6.1.4 Publication Reviewer

Since 1990

Archival Journals

- Integrated Computer-Aided Engineering
- Photogrammetric Engineering and Remote Sensing
- Journal of Mathematical Imaging and Vision
- IEEE Transactions on Image Processing
- IEEE Computer
- Image and Vision Computing Journal
- IEEE Control Society Magazine
- IEEE Expert
- Computer Vision, Graphics, and Image Processing: Image Understanding
- Computer Vision, Graphics and Image Processing: Graphical Models and Image Processing

- Artificial Intelligence
- IEEE Transactions on Pattern Analysis and Machine Intelligence
- IEEE Transactions on Geoscience and Remote Sensing
- IEEE Transactions on Systems, Man, and Cybernetics
- IEEE Transactions on Acoustics, Speech, and Signal Processing
- Machine Vision and Applications
- IEE Transactions on Education
- Optical Engineering
- The Journal of Supercomputing
- IEEE Transactions on Circuits and Systems
- International Journal of Pattern Recognition and Artificial Intelligence
- IEEE Transactions on Control System Technology
- Intelligent Automation and Soft Computing
- Pattern Recognition
- Pattern Recognition Letters

Conferences

- IEEE International Conference on Image Processing
- International Conference on Pattern Recognition
- International Workshop on Structural and Syntactic Pattern Recognition
- IEEE Conference on Systems, Man, and Cybernetics
- IEEE Computer Society Conference on Computer Vision and Pattern Recognition

- IEEE Workshop on CAD-Based Vision
- IEEE Workshop on Context Based Vision
- IEEE Workshop on Biomedical Image Analysis
- IEEE Workshop on Perceptual Organization in Computer Vision
- IEEE Conference on Artificial Intelligence Applications
- IEEE Computer Society Workshop on Computer Vision
- IEEE International Computer Vision Symposium
- IEEE International Conference on Robotics and Automation
- SPIE Conference on Applications of Artificial Intelligence: Machine Vision and Robotics
- International Conference on Intelligent Robots and Systems
- IEEE International Conference on Control Applications
- International Joint Conference on Artificial Intelligence
- Canadian Vision Interface Conference

6.2 Offices and Selected Activity in Professional Societies

Professor Boyer is a member of the following professional societies:

- Institute of Electrical and Electronics Engineers (IEEE)

  Elected to Senior Member, January 1993
  Elected to Fellow, January 2004

  - Computer Society
  - Signal Processing Society

- American Society for Engineering Education

Professor Boyer holds or has held the following society offices:

- Past President, International Association for Pattern Recognition; Member of Executive Committee, 2014-2016.

- President, International Association for Pattern Recognition; Member of Executive Committee, 2012-2014.

- First Vice President, International Association for Pattern Recognition; Member of Executive Committee, 2010 – 2012.

- Treasurer, International Association for Pattern Recognition (IAPR); Member of Executive Committee, 2006 - 2010.

- Steering Committee, IEEE Computer Society Technical Committee on Pattern Analysis and Machine Intelligence, 2010 - .

- Scientific Secretary, Technical Commission III: Theory and Algorithms, International Society for Photogrammetry and Remote Sensing, 1996 - 2000.

- Co-Chairman of the IEEE Robotics and Automation Society Technical Activities Board, Technical Committee on Computer and Robot Vision, 1992 - 1995.

- International Association for Pattern Recognition (IAPR), US Delegate to Board of Governors, 2002 - .

- IEEE Technical Activities Board (IEEE-TAB), Publications Review Committee, 2000 - 2003.

- Chair, IAPR *Ad Hoc* Committee on Conference Software, 2002 - 2006.

- Chair, IEEE-CS Pattern Analysis and Machine Intelligence Technical Committee, January 2004 - December 2005.

- ICPR 2006 Task Force, August 2004 - August 2006.

6.3 Consultation

- Accu-Sort Systems, Wilmer-Hale, March 2005 - January 2006. Expert witness in machine vision.

- Battelle Columbus Laboratories, May 2000 - January 2001. Development of medical instrument prototype.

- One Vision Corporation, June 2000. Consultation on visual inspection problems.

- One Vision Corporation, July - September 1999. Development of visual inspection system prototype.

- One Vision Corporation, February - April 1998. Development of visual inspection system prototype.

- Battelle Columbus Laboratories, October 1997. Prescreening of OCR researchers, developers and algorithms.

- Battelle Columbus Laboratories, July 1997. Computer vision techniques in medical instrumentation.

- McGraw-Hill, December 1993. Review of text manuscript in Machine Vision.

- JMAC, Inc., November 1993. Design evaluation for a bar code scanner, signal and data processor, and computer device for use in a joint toy-publishing venture.

- Prentice-Hall, May 1992. Recommendations on contracting a manuscript for a text in Signals and Systems.

- BW Technology, April 1992. Consultation on data structures and representations in heterogeneous spatial data analysis and registration

- State of Ohio Thomas Edison Program, February - March 1990. Technical assessment of the results of a Phase I research and development grant in color machine vision systems. Recommendations concerning the corresponding Phase II proposal.

- Eastman Kodak Company, Rochester, NY, March 1989. Recommendation of techniques for feature extraction and 2- and 3-D shape analysis of SEM photomicrographs of crystalline structures.

- "An Information-Theoretic Approach to Optimal Relational Isomorphism in Structural Descriptions," Purdue University, West Lafayette, IN, Spring 1985. Lecturer in short course on Image Processing and Computer Vision.

- Department of Radiological Sciences, UCLA Medical Center, Center for the Health Sciences, University of California at Los Angeles, Los Angeles, CA, Autumn 1984. Preliminary design study for a fast two-dimensional Discrete Cosine Transform Image Coder.

- The Technology Strategy Center, Honeywell, Inc., Minneapolis, MN, Summer 1984. Investigation of the Pile Analysis problem in robot vision. Developed a labeled graph decomposition strategy for segmenting the edge-vertex drawing of a scene consisting of a complex pile of convex objects.

6.4 Participation in National and International Programs

6.4.1 Visiting Appointments and National Service

- Visiting Scholar, University of Chile, Santiago, CHILE, December 2014. Funded by FONDECYT (Chilean National Science Foundation).

- Visiting Professor, Computational Intelligence Summer School, University of Chile, Santiago, CHILE, December 2009. Funded by FONDECYT (Chilean National Science Foundation).

- Visiting Professor, Computational Intelligence Summer School, University of Chile, Santiago, CHILE, December 2007. Funded by FONDECYT (Chilean National Science Foundation).

- Visiting Scholar, Universidada Federal do Parana, Department of Informatics, Curitiba, BRAZIL, January - February 2004. Funded by CNPq (Brazilian National Science Foundation).

- Gastprofessor (Visiting Professor), University of Berne, Institute of Computer Science and Applied Mathematics, Bern, SWITZERLAND, July 1994 - January 1995 (while on sabbatical leave from The Ohio State University).

- Appointed Member, Advisory Board, ARPA-ORD RADIUS Aerial Image Understanding Project (1994-1996).

- Appointed Member, ARPA Image Understanding Environment (IUE) Advisory Committee (1994-1998).

- *1989 IEEE Satellite Videoconference on Machine Vision* local contact person and organizer.

6.4.2 Invited Conference Presentations

- *Mexican Conference on Pattern Recognition* (MCPR 2011), Cancun, MEXICO, June 2011.
  - Keynote Speaker

- *International Conference on Pattern Recognition and Information Processing* (PRIP 2009), Minsk, BELARUS, May 2009.
  - Keynote Speaker

- XVII *Brazilian Symposium on Computer Graphics and Image Processing* (SIBGRAPI 2004), Curitiba, BRAZIL, October 2004
  - Keynote Speaker

- *International Symposium on Computer and Information Sciences,* Izmir, TURKEY, October 1999.
  - Invited Speaker

- *3rd International Workshop on Visual Form*, Isle of Capri, ITALY, May 1997.
  - Invited Speaker

- *ISPRS Workshop on The Role of Models in Automated Scene Analysis,* Stockholm, SWEDEN, August 1995.
  - Invited Speaker

- *Workshop on Computer Vision,* Islamabad, PAKISTAN, January 1995.
  - Keynote Speaker

6.4.3 International Conference and Workshop Organization

- *25th International Conference on Pattern Recognition,* Milano ITALY, August 2020
  - Program Co-Chair

- *International Conference on Informatics, Electronics, and Vision, 2013 -*
  - Member of the Advisory Board

- *22nd International Conference on Pattern Recognition,* Stockholm, SWEDEN, Aug 2014.
  - International Liaison Chair

- *Ibero-American Conference on Graphics, Patterns, and Images – 2013, Arequipa, PERU*
  - Program Chair for Computer Vision

- *Asian Conference on Pattern Recognition – 2013, Okinawa, JAPAN*
  - General Co-Chair
  - Awards Committee

- *IEEE International Conference on Image Processing,* Orlando, FL, October 2012.
  - Member of the program committee

- *Mexican Conference on Pattern Recognition-2012,* Huatulco, Oaxaca, MEXICO, Jun 2012.
  - Honorary Conference Chair

- *21st International Conference on Pattern Recognition,* Tsukuba, JAPAN, Nov. 2012.
  - Program Co-Chair

- *International Workshop on Depth Image Analysis,* Tsukuba, JAPAN, November 2012.
  - Member of the program committee

- *20th International Conference on Pattern Recognition,* Istanbul, TURKEY, August 2010.
  - Program Co-Chair

- *IEEE Computer Society Conference on Computer Vision and Pattern Recognition,* Anchorage, AK, June 2008.
  - Program Co-Chair

- *XIX Brazilian Symposium on Computer Graphics and Image Processing* (SIBGRAPI 2006), Manaus, BRAZIL, October 2006.
  - Member of the program committee

- *Joint IAPR International workshop on Structural and Syntactic Pattern Recognition,* Hong Kong, CHINA, August 2006.
  - Member of the program committee

- *IEEE workshop on Perceptual Organization in Computer Vision,* New York, NY, June 2006.
  - Member of the program committee

- *International Conference on Computer Vision Systems,* New York City, January 2006.
  - Member of the program committee

- *18th International Conference on Pattern Recognition,* Hong Kong, CHINA, August 2006.
  - Member of the program committee
  - ICPR Oversight Task Force

- *XVIII Brazilian Symposium on Computer Graphics and Image Processing* (SIBGRAPI 2005), Natal, BRAZIL, October 2005.
  - Member of the program committee

- IEEE Workshop on Human-Computer Interaction, Beijing, CHINA, October 2005.
  - Member of the program committee

- *International Conference on Computer Vision,* Beijing, CHINA, October 2005.
  - Member of the program committee

- *17th International Conference on Pattern Recognition,* Cambridge, ENGLAND, August 2004.
  - Member of the program committee
  - Session Chair

- *International Workshop on Structural and Syntactic Pattern Recognition,* Lisbon, PORTUGAL, August 2004.
  - Member of the program committee

- *IEEE Computer Society Conference on Computer Vision and Pattern Recognition,* Washington, DC, June 2004.
  - Member of the program committee
  - Session Chair

- *IEEE workshop on Perceptual Organization in Computer Vision,* Washington, DC, June 2004.
  - Member of the program committee
  - Panelist

- *XVI Brazilian Symposium on Computer Graphics and Image Processing* (SIBGRAPI 2003), Sao Carlos, BRAZIL, October 2003.
  - Member of the program committee

- *IEEE Workshop on Computer Vision for Human-Computer Interaction,* Madison, WI, June 2003.
  - Member of the program committee
  - Session Chair

- *IEEE Computer Society Conference on Computer Vision and Pattern Recognition,* Madison, WI, June 2003.
  - Member of the Organizing Committee: Workshops Chair
  - Member of the program committee

- *International Workshop on Structural and Syntactic Pattern Recognition,* Windsor, ON, CANADA, August 2002.

- Member of the program committee

- *16th International Conference on Pattern Recognition,* Quebec City, PQ, CANADA, August 2002.
  - Program Co-Chair: Computer Vision and Robotics
  - Secion Chair: Robotics

- *IEEE Computer Society Conference on Computer Vision and Pattern Recognition,* Kauai, HI, December 2001.
  - Program Committee Area Chair
  - Session Chair

- *IEEE Workshop on Perceptual Organization in Computer Vision,* Vancouver, BC, CANADA, July 2001.
  - Member of the Program Committee
  - Session Chair

- *IEEE Computer Society Conference on Computer Vision and Patter Recognition,* Hilton Head, SC, June 2000.
  - Program Committee Area Chair

- *IEEE-CS/NSF Workshop on Perceptual Organization in Computer Vision: Assessing the state of the community and charting new research directions,* Corfu, GREECE, September 1999.
  - Organizer and General Co-Chair

- *IEEE Computer Society Conference on Computer Vision and Pattern Recognition,* Fort Collins, CO, June 1999.
  - Member of the program committee

- *IEEE Computer Society workshop on Perceptual Organization in Computer Vision,* Santa Barbara, CA, June 1998.
  - General Co-Chair
  - NOTE: This was the first such workshop.

- *IEEE Computer Society Conference on Computer Vision and Pattern Recognition,* San Juan, PR, June 1997.
  - Member of the program committee, Area Chair
  - Session Chair: Image Level representations

- *IEEE Computer Society Workshop on Applications of Computer Vision,* Sarasota, FL, December 1996.
  - Member of the program committee
  - Co-Chair, Panel on Industry Needs in Computer Vision

- *IEEE Computer Society Conference on Computer Vision and Pattern Recognition,* San Francisco, CA, June 1996.
  - Program Committee Area Co-Chair for ALow and Intermediate Vision@.
  - Session Chair: ASegmentation and Low Level Processing@.

- *IEEE Workshop on CAD-Based Vision Systems,* San Francisco, CA, June 1996.
  - Member of the program Committee, Area Chair

- *IEEE International Symposium on Computer Vision,* Coral Gables, FL., November 1995.
  - Member of the program committee
  - Session Chair: ALow Level Vision@.

- *IEEE Workshop on Context-Based Vision,* Cambridge, MA., June 1995.
  - Member of the program committee

- *IEEE workshop on CAD-Based Computer Vision,* Seven Springs, PA., February 1994.
  - Session Chair: "Indexing and Geometric Hashing."

- *ISPRS Workshop on Understanding Aerial Images with Emphasis on Urban Scenes,* Columbus, OH, November 1993.
  - Member of the Scientific Organizing Committee

- *IEEE computer Society Conference on Computer Vision and Pattern Recognition,* Seattle, WA, June 1994.
  - Member of the program committee, Area Chair
  - Member of the Best Paper Award Selection Committee
  - Session Chair: "Low Level Processing, Filtering."

- *IEEE workshop on Biomedical Image Analysis,* Seattle, WA., June 1994.
  - Member of the program committee

- *CIPPRS Vision Interface Conference,* Banff, Alberta, CANADA, May 1994.
  - Member of the program committee

- *International Society for Photogrammetry and Remote Sensing*
  - Appointed Member, Working Group III/3; Semantic Models and Object Recognition, 1990-1994.

- *SPIE Conference on Applications of Artificial Intelligence: Machine Vision and Robotics,* Orlando, FL., April 1993.
  - Conference Co-Chair

- *IAPR International Workshop on Structural and Syntactic Pattern Recognition,* Bern, SWITZERLAND, August 1992.
  - Session chair: "Image Processing, Segmentation and Interpretation."

- *IEEE Computer Society Conference on Computer Vision and Pattern Recognition,* Champaign, IL, June 1992.
  - Session chair: "Stereo"

- *SPIE Conference on Applications of Artificial Intelligence: Machine Vision and Robotics,* Orlando, FL., April 1992.
  - Member of the program committee
  - Session Organizer and Chairman and Panel Discussion Moderator: Special session on modern edge detection theory.

- *1st IEEE Conference on control Applications,* Dayton, OH 1992.
  - Tutorials chairman
  - Member of the program committee

- *IEEE Workshop on Directions in Automated CAD-based Vision,* Lahaina, HI, 1991.
  - Discussion moderator: "Systems"

- *1990 International Conference on Computer Vision*, Osaka, JAPAN.
  - Session Co-Chair: "Stereo Ranging"

- *1990 IEEE International Conference on Robotics and Automation,* Cincinnati, OH.
  - Member of the local arrangements committee

6.5 Other Professional Service: Proposal Reviewer

Since 1991

- National Sciences and Engineering Research Council of Canada (multiple times)

- National Science Foundation (panels in 1993, 2000, 2005)

- US Civilian Research and Development Foundation for the Independent States of the Former Soviet Union

- CIA-ORD RADIUS Project

- Department of Energy

- NSF/DARPA Joint Research Initiative in Image and Speech Understanding
- The Ohio State University Office of Research and Graduate Studies, University Seed Grant Proposals
- CONICYT, Chilean National Science Foundation, 2014.

7. ADMINISTRATIVE SERVICE

Through 2007 at Ohio State; 2008-2014 at Rensselaer; 2015- at University at Albany

7.1 Departmental

- Advisory Committee, 2004 – 2007.
- Chair, Graduate Studies Committee, 1996 – 2000, 2004 - 2005.
- Chair of Department Chair Search Committee, 2004 - 2005.
- Chair, Promotion and Tenure Committee, 2002 - 2004.
- Personnel Committee, 2001 - 2002
- Strategic Planning Committee, 2001.
- *Ad hoc* Space Committee, 2001.
- Research Committee, 2000 - 2007.
- Personnel Committee (for the Image Understanding and Computer Vision Academic Enrichment Faculty Search), Winter and Spring 1998.
- Elected to Faculty Council, Autumn 1996 - 2007.

7.2 College and University

University at Albany

- Blackstone Launch Pad Stewardship Council, 2015-
- University Honorary Degree Committee, 2015-
- Strategic Enrollment Council, 2016-
- Public Engagement Council, 2015-
- Steering Committee, Institute for Advanced Data Analytics, 2015-
- Strategic Planning Council, 2016-
- Branding Development Council, 2016-

Rensselaer Polytechnic Institute

- Core Search Committee, Center for Materials, Devices, and Integrated Systems Director, 2013.
- Chair, School of Engineering Dean's Task Committee on Strategic Masters Program Growth, 2013.
- Steering Committee, Center for Materials, Devices, and Integrated Systems, 2013 –
- Search Committee, Rensselaer NSF Smart Lighting ERC Director, 2009-10.
- Search Committee, Vice President for Research, Rensselaer, 2008.

The Ohio State University

- Appointed to Ohio State University Committee on Biomedical Imaging, 2002 - 2007.
- Appointed to Ohio State University Council on Libraries and Information Technology, 2002 - 2005.
- Elected to Ohio State University Senate, 2001 - 2004.
- Elected to Ohio State University Faculty Council, 2001 - 2004.

- Appointed member, OSU College of Engineering *Ad Hoc* Committee on the Electrical Engineering to Electrical and Computer Engineering department name change, 2001 - 2002.

- Chair, OSU College of Engineering Strategic Planning Committee, Spring 1998.

- Elected member, The Ohio State University Research & Graduate Council, 1998 - 2000.

- OSU Graduate Associate and Fellowship Committee, 1998 - 1999.

- Judge for the Ohio State University Undergraduate Research Forum, May 1998.

- Appointed member, OSU Center for Mapping Director Search Committee, Spring 1998.

- Appointed member, OSU Center for Mapping Faculty Oversight Committee, January 1998 -

- Appointed member of the Search Committee for Vice Provost for Graduate Studies and Dean of the Graduate School, The Ohio State University, Spring 1996.

- Judge for the OSU Biomedical Engineering Program ACE Day Graduate Student Poster Competition, May 1995.

- OSU College of Engineering *Ad Hoc* Committee on Intelligent Vehicle Highway Systems, March 1993 - 1997.

- Elected to the Faculty Council of the OSU Center for Mapping as a charter member, Autumn 1991, and subsequently elected its first Chairman, 1991 - 1994.

- Named in Autumn 1988 as a charter member of the Ohio State University Vision Sciences Steering Committee.

- Served as a proposal reviewer for The Office of Research and Graduate Studies for Ohio State University Seed Grants (2) in 1989.

- Department of Electrical Engineering representative on the OSU College of Engineering Honors Committee for the selection of Undergraduate Research Scholarship Recipients, 1989.

- Research Committee of The OSU Center for Mapping, 1987.

7.3 Affirmative Action and Mentoring Activities

- Summer Research Opportunities Program for minority undergraduates (SROP), Summer 1987. Advised Wendy K. Jen; project title: "Development of a LISP-Based Robotic Control Environment."

- Summer Research Opportunities Program for minority undergraduates (SROP), summer 1988. Advised *both* Lisa Armstrong and Danny Gamez; project titles: "Setup, Calibration, and Integration of a Video Image Recorder" and "Further Development of a LISP-Based Robotic Control Environment," respectively.

- Electrical Engineering Career Day: Gave opening address providing an overview of electrical engineering in general, and our program in particular, to visiting high school students and their parents.

7.4 Selected Philanthropy Developed

University at Albany

- $4 Million anonymous gift to College of Engineering and Applied Sciences, 2016. My interaction with the donor was indirect, through the VP for Development, so I can claim only limited credit. But the donor asked questions about the potential uses for the money and clearly assessed the College leadership and direction – making this a substantial vote of confidence in our future. Moreover, when the conversation began, the amount under consideration was $1Million – $1.5 Million; as the discussions progressed, the amount continued to escalate.

Rensselaer Polytechnic Institute

- Delman Mortenson Charitable Foundation, $15,000, discretionary (expendable), 2015.

- Delman Mortenson Charitable Foundation, $10,000, discretionary (expendable), 2013.

- Richard Felak, $250,000 endowment to support undergraduate scholarships, 2010.

- Douglas Mercer, "The Douglas Mercer '77 Laboratory for Student Exploration and Innovation." Gift of $500,000 (initial endowment) plus $50,000 (expendable), July 2011.

- Steven Sasson, $10,000 gift to Department Excellence Fund, October 2011.

- Analog Devices, $100,000 expendable gift to support "The Douglas Mercer '77 Laboratory for Student Exploration and Innovation," November 2011.

- Analog Devices, $20,000 expendable gift to support “The Douglas Mercer ’77 Laboratory for Student Exploration and Innovation,” April 2012.

- Douglas Mercer, $20,000 expendable gift to support “The Douglas Mercer ’77 Laboratory for Student Exploration and Innovation,” May 2012.

- Analog Devices, $18,000 expendable gift to support “The Douglas Mercer ’77 Laboratory for Student Exploration and Innovation,” July 2012.

- Analog Devices, $22,000 expendable gift to support “The Douglas Mercer ’77 Laboratory for Student Exploration and Innovation,” October 2012.

- Douglas Mercer, $20,000 gift to augment the endowment for “The Douglas Mercer ’77 Laboratory for Student Exploration and Innovation,” December 2012.

- Douglas Mercer, $20,000 expendable gift to launch the “Douglas Mercer Distinguished Lecture Series in ECSE,” October 2013.

- Douglas Mercer, “Douglas Mercer Distinguished Lecture Series in ECSE.” Gift of $500,000 (endowment, to be paid in four $125,000 annual installments), October 2013.

7.5 Other Administrative Services

- Judge, “Silicon Chef” competition organized by the Embedded Hardware Club, Rensselaer, 23 November 2013.

- Referee for 1996 - 97 OSU Center for Intelligent Transportation Research (CITR - OSU) Fellowships.