

## Curriculum Vitae

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### **ZYGMUNT PIZLO**

Purdue University  
Department of Psychological Sciences  
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#### ***Education***

- 1973-78 Warsaw University of Technology, Poland, Department of Electronic Engineering, M.Sc. thesis: "Tolerance assignment for selection tests of integrated circuits," 1978.
- 1978-82 Institute of Electron Technology, Warsaw, Poland, Ph.D. thesis: "The optimization of technological parameters of integrated circuits," 1982.
- 1988-91 Department of Psychology, University of Maryland at College Park. Ph.D. thesis: "Shape constancy in human beings and computers based on a perspective invariant," 1991.

#### ***Honors***

- Doctoral thesis judged to be "Distinguished" by the Scientific Committee of the Institute of Electron Technology, Warsaw, 1982.
- Jack Bartlett Award for the excellence in doctoral research, Department of Psychology, University of Maryland, 1991.
- New Investigator Award from the Society for Mathematical Psychology, 1994.
- Team Excellence Award in the Purdue College of Engineering, 2006.

### ***Professional Experience***

- 1982-1984     Research Fellow, Nencki Institute of Experimental Biology, Department of Neurophysiology, Laboratory of Psychophysiology, Polish Academy of Sciences, Warsaw.
- 1984-1987     Research Fellow, Central Institute of Occupational Hazards, Department of Ergonomics, Warsaw.
- 1987-1988     Research Fellow, Nencki Institute of Experimental Biology, Department of Neurophysiology, Laboratory of Afferent Systems, Polish Academy of Sciences, Warsaw.
- 1991-1997     Assistant Professor, Department of Psychological Sciences, Purdue University, West Lafayette, IN.
- 1997-2004     Associate Professor, Department of Psychological Sciences, Purdue University, West Lafayette, IN.
- 2004-            Professor, Department of Psychological Sciences, Purdue University, West Lafayette, IN.

### ***Professional Affiliations***

Association for Psychological Science  
 Psychonomic Society  
 Society for Mathematical Psychology  
 Vision Sciences Society

### ***Editorial Work***

Member of the Editorial Board of *Behavior Research Methods, Instruments, & Computers* (1995-98).

Member of the Editorial Board of the *Journal of Mathematical Psychology* (2003-).

Editor of the *Journal of Problem Solving* (2005-) <http://docs.lib.purdue.edu/jps/>

***Ad hoc reviewer for***

*Acta Neurobiologiae Experimentalis*  
*Acta Psychologica*  
*Cognition*  
*Cognitive Science*  
*Graphical Models*  
*IEEE Transactions on Circuits and Systems for Video Technology*  
*IEEE Transactions on Haptics*  
*IEEE Transactions on Image Processing*  
*IEEE Transactions on Pattern Analysis & Machine Intelligence*  
*IEEE Transactions on Systems, Man, and Cybernetics*  
*Journal of Experimental Psychology*  
*Journal of Mathematical Psychology*  
*Journal of Vision*  
*Memory & Cognition*  
*Pattern Recognition*  
*Perception*  
*Perception and Psychophysics*  
*Psychological Research*  
*Psychological Review*  
*Psychonomic Bulletin & Review*  
*Quarterly Journal of Experimental Psychology*  
*Spatial Vision*  
*Vision Research*

***Other Professional Activities***

Chair of a Symposium on Perception and Action in Human and Machines. Society for Philosophy and Psychology, 1990, College Park, MD.

Member of the program committee of the 9th Workshop on Image and Multidimensional Signal Processing organized by the IEEE Signal Processing Society and the Society for Imaging Science and Technology. Belize City, Belize, 1996.

Member of the program committee for IS&T/SPIE Symposium on Electronic Imaging: Science & Technology, Conference on Human Vision and Electronic Imaging. San Jose, California, 1996-2000.

Member of the program committee for IS&T/SPIE Symposium on Electronic Imaging: Science & Technology, Conference on Computational Imaging. San Jose, California, 2004-2008.

Co-author (with Prof. Hong Tan) of a one-day tutorial on psychophysics at the Human Computer Interaction Conference, New Orleans, Louisiana, 2001, and in Las Vegas Nevada, 2005.

Co-author (with Prof. Hong Tan) of a half-day tutorial on psychophysics at the Human Computer Interaction Conference, Crete, Greece, 2003.

Member of the Executive Board of the Society for Mathematical Psychology (2005-)

Co-organizer of an international Workshop on Human Problem Solving at Purdue University – June 2005.

Co-author (with Prof. Longin Jan Latecki) of a half-day tutorial on Human Shape Perception at the Electronic Imaging Conference, San Jose, CA, 2006.

Member of the Program Committee of the IEEE Computer Society Workshop on Perceptual Organization in Computer Vision, New York, June 2006.

Member of the program committee for IS&T/SPIE Symposium on Electronic Imaging: Science & Technology, Conference on Vision Geometry. San Jose, California, 2007.

Co-organizer (with Sven Dickinson) of the First International Workshop on Shape Perception in Human and Computer Vision. European Conference on Computer Vision, Marseille, France, October 2008.

Co-Organizer (with Robert Goldstone) of the Purdue Winer Memorial Lectures: Symposium on New Perspectives in Human Problem Solving, Purdue University, November 2008.

President of the Society for Mathematical Psychology, 2008-2009.

### ***Grants & Fellowships***

1986, Fellowship sponsored by the United Nations Development Program to visit British Universities engaged in research on the role of eye movements in visual perception (Nottingham, Birmingham, Durham and Reading).

1994, July to 1996, June. PHS-NIH Grant: Preclinical ROC Studies of Digital Stereomammography, co-PI (award for Z. Pizlo, \$65,383.00).

1995, August to 1996, July. Hewlett-Packard Grant: Research on Printer Characterization and Print Quality Assessment, co-PI (award for Z. Pizlo, \$86,280.00).

- 1996-1998, Hewlett-Packard Grant: Infrastructure for a New Curriculum in Video and Image Systems Engineering (\$1,376,002.00-Shared institutional teaching grant with 7 participants).
- 1996, July to 1997, June. Hewlett-Packard Grant: Human Visual System Based Image Quality Metrics, co-PI (award for Z. Pizlo, \$63,666.00).
- 1997, August to 1998, August. Hewlett-Packard contract: Improving image quality: metrics, models, and scaling. (\$390,399.00-shared institutional contract with 4 participants).
- 2000, May-2002, May. 21<sup>st</sup> Century Research and Technology Fund: Advanced Imaging Technology for Disease Detection and Control, co-PI (award for Z. Pizlo, \$11,183.00).
- 2001, January-2005, January. Ford Foundation gift to Purdue University to create "Perception-Based Engineering Laboratory" (award for a number of co-PIs from Mechanical Engineering, Electrical and Computer Engineering, Audiology and Speech Sciences, and Psychology: \$3,500,000.).
- 2001, August-2004, January. NSF grant: Haptic texture perception and rendering for personal robotics, co-PI (award for Z. Pizlo, \$13,793.).
- 1998, February-2008, January. Hewlett-Packard Grant: Print Quality Improvement, co-PI (total award for Z. Pizlo, \$297,191.).
- 2002, May-2004, April, Ford Motor Company: "Haptic perception", co-PI (award for Z. Pizlo, \$11,920.00).
- 2004, June: 12 day visit to the Vienna University of Technology sponsored by European Cognitive Computer Vision.
- 2004, May-2006, April: Air Force Office of Scientific Research grant: Human problem solving – an extension of Newell & Simon's paradigm, PI (award for Z. Pizlo \$193,397.).
- 2005, National Science Foundation grant for organizing a workshop titled "Human problem solving: difficult optimization problems." Total award: \$14,300. (Dr. Edward Chronicle – co-PI). Supplementary funds (\$16,000) provided by the Air Force Office of Scientific Research.
- 2005, July–2008, June: National Science Foundation collaborative grant (Latecki and Pizlo) titled: From edge pixels to recognition of parts of object contours, co-PI (total award for Pizlo, \$105,418.)

- 2006, May- 2009, May: Air Force Office of Scientific Research grant: Human problem solving: the complete model of the traveling salesman problem., PI (total award for Z. Pizlo \$390,155.).
- 2006, September 15- 2009, September: US Department of Energy grant (Latecki and Pizlo): Image recognition and classification based on object parts. Co-PI (total award for Pizlo, \$147,520.)
- 2008, August – 2011, July: National Science Foundation Collaborative Grant (Latecki and Pizlo) titled: Simultaneous Contour Grouping and Medial Axis Estimation. Co-PI (total award for Pizlo, \$150,000.)
- 2008, AFOSR grant for organizing the First Interdisciplinary Workshop on Shape Perception in Human and Computer Vision. Total award: \$15,000. (Dr. Sven Dickinson – co-PI).
- 2008, AFOSR grant for organizing a Symposium on New Perspectives in Human Problem Solving. Total award: \$25,000. (Dr. Robert Goldstone – co-PI). Supplementary funds provided by the Purdue Winer Memorial Fund (\$5,000.) and the Department of Psychological Sciences, Purdue University (\$5,000.).
- 2009, Summer, National Science Foundation. Supplemental funding for undergraduate students: Collaborative Grant titled: Simultaneous Contour Grouping and Medial Axis Estimation. (\$12,000).
- 2009, March – 2010, March: Department of Defense equipment grant (DURIP): Robotic navigation emulating human performance (total award: \$297,201. Latecki, Temple U. – collaborator).
- 2009, March – 2011, November: Air Force Office of Scientific Research grant: Robotic navigation emulating human performance: research plan (total award \$655,000. Latecki, Temple U. – collaborator).
- 2009, August – 2012, July, National Science Foundation Collaborative Grant (Latecki – Co-PI) titled: Recovery of 3D shapes from single views (total award \$297,338.)

**Publications** (Refereed Journals)

- Sobotka, S., Pizlo, Z. & Budohoska, W. (1984). Hemispheric differences in evoked potentials to pictures of faces in the left and right visual fields. *Electroencephalography and Clinical Neurophysiology*, **59**, 441-453.
- Maly, W. & Pizlo, Z. (1985). Tolerance assignment for IC selection tests. *IEEE Computer Aided Design*-**4**, 156-162.
- Pizlo, Z. (1988). Physiology-based simulation model of triangle shape recognition. *Biological Cybernetics*, **58**, 41-62.
- Tarnecki, R., Kaluzny, P. & Pizlo, Z. (1989). Correlations of neural spike discharges of VL neurons during spontaneous firing and during the activity evoked by peripheral stimulation. *Acta Physiologica Polonica*, **40**, 215-234.
- Pizlo, Z. & Rosenfeld, A. (1992). Recognition of planar shapes from perspective images using contour-based invariants. *Computer Vision, Graphics and Image Processing: Image Understanding*, **56**, 330-350.
- Pizlo, Z. (1994). A theory of shape constancy based on perspective invariants. *Vision Research*, **34**, 1637-1658.
- Pizlo, Z. & Salach-Golyska, M. (1994). Is vision metric? Comment on Lappin and Love. *Perception and Psychophysics*, **55**, 230-234.
- Pizlo, Z., Rosenfeld, A. & Epelboim, J. (1995). An exponential pyramid model of the time course of size processing. *Vision Research*, **35**, 1089-1107.
- Pizlo, Z. & Salach-Golyska, M. (1995). 3-D shape perception. *Perception & Psychophysics*, **57**, 692-713.
- Hsu, J., Chelberg, D. M., Babbs, C. F., Pizlo, Z. & Delp, E. J. (1995). Preclinical ROC Studies of Digital Stereomammography. *IEEE Transactions on Medical Imaging*, **14**, 318-327.
- Epelboim, J., Kowler, E., Steinman, R. M., Collewijn, H. Erkelens, C. J. & Pizlo, Z. (1995). When push comes to shove: Compensation for passive perturbations of the head during natural gaze shifts. *Journal of Vestibular Research*, **5**, 421-442.
- Epelboim, J., Steinman, R. M., Kowler, E. Edwards, M., Pizlo, Z., Erkelens, C. J. & Collewijn, H. (1995). The function of visual search and memory in sequential looking tasks. *VisionResearch*, **35**, 3401-3422.

- Hsu, J., Pizlo, Z., Chelberg, D. M., Babbs, C. F. & Delp, E. J. (1996). Issues in the design of studies to test the effectiveness of stereo imaging. *IEEE Transactions on Systems, Man and Cybernetics*, **A 26**, 810-819.
- Pizlo, Z., Rosenfeld, A. & Weiss, I. (1997). The geometry of visual space: About the incompatibility between science and mathematics. Dialogue. *Computer Vision and Image Understanding*, **65**, 425-433.
- Pizlo, Z., Rosenfeld, A. & Weiss, I. (1997). Visual Space: Mathematics, Engineering and Science. Response. *Computer Vision & Image Understanding*, **65**, 450-454.
- Pizlo, Z., Salach-Golyska, M. & Rosenfeld, A. (1997). Curve detection in a noisy image. *Vision Research*, **37**, 1217-1241.
- Epelboim, J., Steinman, R. M., Kowler, E., Pizlo, Z., Erkelens, C. J. & Collewijn, H. (1997). Gaze-shift dynamics in two kinds of sequential looking tasks. *Vision Research*, **37**, 2597-2607.
- Pizlo, Z. & Stevenson, A. (1999). Shape constancy from novel views. *Perception & Psychophysics*, **61**, 1299-1307.
- Chan, M.W., Pizlo, Z. & Chelberg, D.M. (1999) Binocular shape reconstruction: psychological plausibility of the 8 point algorithm. *Computer Vision & Image Understanding* **74**, 121-137.
- Pizlo, Z. & Loubier, K. (2000) Recognition of a solid shape from its single perspective image obtained by a calibrated camera. *Pattern Recognition* **33**, 1675-1681.
- Steinman, R.M., Pizlo, Z. & Pizlo, F.J. (2000) Phi is not beta, and why Wertheimer's discovery launched the Gestalt revolution. Minireview. *Vision Research* **40**, 2257-2264.
- Graham, S.M., Joshi, A. & Pizlo, Z. (2000) The traveling salesman problem: a hierarchical model. *Memory & Cognition* **28**, 1191-1204.
- Pizlo, Z. (2001) Perception viewed as an inverse problem. Minireview. *Vision Research* **41**, 3145-61.
- Steinman, R.M., Pizlo, Z., Forofonova, T.I. & Epelboim, J. (2003) One fixates accurately *in order to see clearly* not *because one sees clearly*. *Spatial Vision*, **16**, 225-241.
- Ng, D-Y., Allebach, J.P., Analoui, M. & Pizlo, Z. (2003) Non-Contact Imaging Colorimeter for Human Tooth Color Assessment Using A Digital Camera. *Journal of Imaging Science & Technology*, **47**, 531-542.

- Kropatsch, W.G., Haxhimusa, Y., Pizlo, Z. & Langs, G. (2005) Vision pyramids that do not grow too high. *Pattern Recognition Letters*, **26**, 319-337.
- Pizlo, Z., Li, Y. & Francis, G. (2005) A new look at binocular stereopsis. *Vision Research*, **45**, 2244-2255.
- Pizlo, Z. & Li, Z. (2005) Solving combinatorial problems: 15-puzzle. *Memory & Cognition*, **33**, 1069-1084.
- Taskiran, C.M., Pizlo, Z., Amir, A., Ponceleon, D. & Delp, E.J. (2006) Automated Video Program Summarization Using Speech Transcripts. *IEEE Transactions on Multimedia*, **8**, 775-791.
- Arslan, O., Pizlo, Z. & Allebach, J.P. (2007) Softcopy banding visibility assessment. *Journal of Imaging Science & Technology*, **51**, 271-281.
- Chan, M.W., Stevenson, A.K., Li, Y. & Pizlo, Z. (2006) Binocular shape constancy from novel views: the role of a priori constraints. *Perception & Psychophysics*, **68**, 1124-1139.
- Hoffmann, C., Pizlo, Z., Popescu, V. & Rosen, P. (2006) Study of the perception of 3D spatial relations for a volumetric display. *Journal of Electronic Imaging*, **15**(3), 33002.
- Pizlo, Z., Stefanov, E., Saalweachter, J., Li, Z., Haxhimusa, Y. & Kropatsch, W.G. (2006) Traveling Salesman Problem: a Foveating Pyramid Model. *Journal of Problem Solving I*, 83-101.
- Bang, B., Pizlo, Z. & Allebach, J.P. (2006) Banding assessment with controlled halftoning: The ten printer experiment. *Journal of Imaging Science and Technology*, **50**, 522-529.
- Scheessele, M.W. & Pizlo, Z. (2007) Does contour classification precede contour grouping in perception of partially visible figures? *Perception*, **36**, 558-580.
- Lee, B.S., Pizlo, Z. & Allebach, J.P. (2007) Characterization of red-green and blue-yellow opponent channels. *Journal of Imagine Science & Technology*, **51**, 23-33.
- Bernal, E., Allebach, J.P. & Pizlo, Z. (2007) Improved pen alignment for bidirectional printing. *Journal of Imaging Science and Technology*, **51**, 1-22.
- Pu, J., Kalyanaraman, Y., Jayanti, S., Ramani, K. & Pizlo, Z. (2007) Navigation and discovery of 3D models in a CAD repository. *IEEE Transactions on Computer Graphics and Applications*, **27**, 38-47.

- Pizlo, Z., Li, Y. & Steinman, R.M. (2008) Binocular disparity only comes into play when everything else fails; a finding with broader implications than one might suppose. *Spatial Vision*, **21**, 495-508.
- Sawada, T. & Pizlo, Z. (2008) Detection of skewed symmetry. *Journal of Vision* **8(5)**, No. 14.
- Tan, H.Z., Yang, S., Pizlo, Z., Buttolo, P. & Johnston, M. (2008) Manual detection of spatial and temporal torque variation through a rotary switch. *IEEE Transactions on Haptics*, **1**, 96-107.
- Haxhimusa, Y., Kropatsch, W.G., Pizlo, Z., & Ion, A. (2009) Approximate graph pyramid solution of the E-TSP. *Journal of Image and Vision Computing* **27**, 887-896.
- Li, Y., Pizlo, Z. & Steinman, R.M. (2009) A computational model that recovers the 3D shape of an object from a single 2D retinal representation. *Vision Research* **49**, 979-991.
- Troscianko, T., Benton, C.P., Lovell, P.G., Tolhurst, D.J. & Pizlo, Z. (2009) Camouflage and visual perception. *Philosophical Transactions of the Royal Society B* **364**, 449-461.

### **Book**

- Pizlo, Z. (2008) 3D shape: its unique place in visual perception. Cambridge, MA: MIT Press.

### **Book Reviews**

- Pizlo, Z. (2001) The whole is different from the sum of its parts. Review of S. Edelman's Representation and Recognition in Vision. *Journal of Mathematical Psychology* **45**, 402-409.
- Sawada, T. & Pizlo, Z. (2008) There is no royal road to vision science. Review of M.R.M. Jenkin & L.R. Harris's Seeing spatial form. *Perception*, **37**, 1612-1616.
- Pizlo, Z. (2009) Visual versions: Philosophy of vision. Review of R. Schwartz's Visual Versions. *American Journal of Psychology* (in press).

### ***Book Chapters***

- Kowler, E., Pizlo, Z., Zhu, G-L., Erkelens, C. J., Steinman, R. M. & Collewijn, H. (1992) Coordination of head and eyes during the performance of natural (and unnatural) visual tasks. In A. Berthoz, W. Graf & P. P. Vidal (Eds.), *The Head-Neck Sensory Motor System: Evolution, Development, Disorders and Neuronal Mechanisms* (pp. 419-426). Cambridge: Oxford University Press.
- Collewijn, H., Steinman, R. M., Erkelens, C. J., Pizlo, Z. & Van der Steen, J. (1992) The effect of freeing the head on eye movement characteristics during 3-D shifts of gaze and tracking. In A. Berthoz, W. Graf & P. P. Vidal (Eds.), *The Head-Neck Sensory Motor System: Evolution, Development, Disorders and Neuronal Mechanisms* (pp. 412-418). Cambridge: Oxford University Press.
- Collewijn, H., Steinman, R. M., Erkelens, C. J., Pizlo, Z., Kowler, E. & Van der Steen, J. (1992) Binocular gaze control under free-head conditions. In H. Shimazu & Y. Shinoda (Eds.), *Vestibular and Brain Stem Control of Eye, Head and Body Movements* (pp. 203-220). New York: Springer Verlag.
- Collewijn, H, Erkelens, C. J., Pizlo, Z. & Steinman, R. M. (1994) Binocular gaze movements: Coordination of vergence and version. In J. Ygge & G. Lennerstrand (Eds.), *Eye Movements in Reading* (pp. 97-115). Oxford, England: Pergamon.
- Pizlo, Z., Rosenfeld, A. & Weiss, I. (1995) Interdisciplinary study of visual invariants. In D. Dori & A. Bruckstein (Eds.), *Structure and Syntax in Pattern Recognition* (pp. 118-127). World Scientific, Singapore.
- Burningham, N., Pizlo, Z. & Allebach, J.P. (2002) Image quality metrics. In *Encyclopedia of Imaging Science and Technology*, Editor J.P. Hornak, Vol. 1, Wiley (pp 598-616)
- Pizlo, Z. (2007) Shape Constancy and Perceptual Simplicity: Hochberg's fundamental contributions. In: Peterson, M.A., Gillam, B. & Sedgwick, H.A. (Eds.), *In the Mind's Eye: Julian Hochberg on the Perception of Pictures, Film, and the World*. Oxford University Press (pp. 525-533).
- Saalweachter, J. & Pizlo, Z. (2008) Non-Euclidean Traveling Salesman Problem. In: T. Kugler, J.C. Smith, Y-J. Sun, T. Connolly, *Decision Modeling and Behavior in Complex and Uncertain Environments*. NY: Springer (pp. 339-358).

### *Conference Proceedings*

- Pizlo, Z. & Szczechura, J. (1987) Simulation model of judgments of asymmetry of a triangle based on eye fixations. In J. K. O'Regan & A. Levy-Schoen (Eds.). *Eye Movements: From Physiology to Cognition* (pp. 376-377). North Holland.
- Pizlo, Z. & Tarnecki, R. (1987) Simulation model of the process of human shape recognition. *Proceedings of the VI International Conference on Ergonomics* (pp. 563-568). Cracow.
- Pizlo, Z. & Tarnecki, R. (1987) The importance of eye movements in triangle shape discrimination. In G. Luer & U. Lass (Eds.), *Proceedings of the 4th European Conference on Eye Movement* (pp. 49-52). Lewiston, N.Y.: C. J. Hogrefe.
- Hsu, J., Babbs, C. F., Chelberg, D. M., Pizlo, Z. & Delp, E. J. (1993) A study of the effectiveness of stereo imaging with applications in mammography. *Proceedings of SPIE Conference on Human Vision, Visual Processing and Digital Display IV*, vol. **1913**, pp. 154-165.
- Epelboim, J., Kowler, E., Edwards, M., Collewyn, H., Erkelens, C. J., Pizlo, Z. & Steinman, R. M. (1994) Natural oculomotor performance in looking and tapping tasks. *Proceedings of the Cognitive Science Society*, **16**, 272-277.
- Hsu, J., Z. Pizlo, Babbs, C. F., Chelberg, D. M. & Delp, E. J. (1994) Design of studies to test the effectiveness of stereo imaging. Truth or dare: Is stereo viewing really better? *Proceedings of SPIE (Conference on Stereoscopic Displays and Applications V*, vol. **2177 A**, pp. 211-222.
- Chelberg, D. M., Hsu, J., Babbs, C. F., Pizlo, Z. & Delp, E. J. (1994) Digital stereomammography. *Proceedings of the 2nd International Workshop on Digital Mammography, Excerpta Medica, International Congress Series* **1069**, pp. 181-190. York, England.
- Pizlo, Z. (1995) The concept of group and the theory of shape perception. *Proceedings of IS&T/SPIE Conference on Human Vision, Visual Processing and Digital display*, vol. **2411**, pp. 333-343.
- Scheessele, M., Graham, S. & Pizlo, Z. (1996) Exponential Pyramid as a Model of the Human Visual System. *Proceedings of the Ninth Workshop on Image and Multidimensional Signal Processing* (pp. 108-109). Belize City, Belize.
- Allebach, J. P., Bouman, C. A., Coyle, E. J., Delp, E. J., Maciejewski, A. A., Landgrebe, D.A., Pizlo, Z., Scheoff, N. B. & Zoltowski, M. D. (1996) Video and Image Systems Engineering Education for the 21st Century. *Proceedings of IEEE International Conference on Image Processing*, Lausanne, Switzerland, vol. 1, pp. 449-452.

- Taylor, C. C., Pizlo, Z., Allebach, J. P. & Bouman, C. A. (1997) Image quality assessment with a Gabor pyramid model of the human visual system. *Proceedings of IS&T/SPIE conference on Human Vision and Electronic Imaging*, vol. **3016**, pp. 58-69.
- Chan, M. W., Pizlo, Z. & Delp, E. (1998) Shape reconstruction by a binocular fixating system. *Proceedings of IEEE Workshop on Image and Multidimensional Digital Signal Processing*. Niemann, H., Seidel, H-P. & Girod, B. (Eds.). Infix, Germany, pp. 1-4.
- Taylor, C. C., Pizlo, Z., Allebach, J. P. & Bouman, C. A. (1998) Perceptually relevant image fidelity assessment. *Proceedings of IS&T/SPIE Conference on Human Vision and Electronic Imaging*, vol. **3299**, pp. 110-118.
- Pizlo, Z. & Scheessele, M. R. (1998) Perception of 3-D scenes from pictures. *Proceedings of IS&T/SPIE Conference on Human Vision and Electronic Imaging*, vol. **3299**, pp. 410-423.
- Taylor, C.C., Allebach, J.P. & Pizlo, Z. (1998) The image fidelity assessor. *Proceedings of the 1998 IS&T Image Processing, Image Quality, Image Capture, and Systems Conference*, Portland, OR, May 1998, pp. 37-42.
- Taylor, C.C., Allebach, J.P. & Pizlo, Z. (1998) Discrimination based Gabor pyramid model for image fidelity assessment. *Proceedings of the 8<sup>th</sup> IEEE Workshop on Digital Signal Processing*, Bryce Canyon National Park, UT, August. Paper No. 165.
- Wu, W., Pizlo, Z. & Allebach, J.P. (2001) Color image fidelity assessor. *Proceedings of the 2001 IS&T Image Processing, Image Quality, Image Capture, and Systems Conference*. Quebec City, Canada, April. pp. 148-151.
- Ng, D.Y., Allebach, J.P., Pizlo, Z. & Analoui, M. (2002) Non-Contact Colorimeter for Human Tooth Color Assessment using a Digital Camera. *Proceedings of the IS&T/SID 10<sup>th</sup> Color Imaging Conference*, Scottsdale, AZ, 12 November – 15 November.
- Pizlo, Z. & Li, Z. (2003) Pyramid algorithms as models of human cognition. *Proceedings of IS&T/SPIE Conference on Computational Imaging*, vol. 5016, pp. 1-12.
- Bang, Y., Pizlo, Z., Burningham, N. & Allebach, J.P. (2003) Discrimination based banding assessment. *Proceedings of IS&T's NIP 19: International Conference on Digital Printing Technologies*, New Orleans, LA. 28 Sept. – 3 Oct.
- Yang, S., Tan, H.Z., Buttolo, B., Johnston, M.R. and Pizlo, Z. (2003) Thresholds for dynamic changes in a rotary switch, *Proceedings of EuroHaptics*, July 6-9, pp. 343-350.

- Rosen, P., Pizlo, Z., Hoffmann, C. & Popescu, V. (2004) Perception of 3D spatial relations for 3D displays. *Proceedings of IS&T/SPIE Conference on Stereoscopic Displays & Virtual Reality*, vol. 5291, 00. 9-16.
- Pizlo, Z. & Li, Z. (2004) Graph pyramid algorithms as models of human problem solving. *Proceedings of IS&T/SPIE Conference on Computational Imaging*, vol.5299, pp.205-15.
- Kropatsch, W.G., Haxhimusa, Y. & Pizlo, Z. (2004) Integral trees: subtree depth and diameter. *Lecture Notes in Computer Science*, 3322, 77-87. Springer.
- Arslan, O., Allebach, J.P. & Pizlo, Z. (2004) CRT calibration techniques for better accuracy including low luminance colors. *Color Imaging IX: Processing, Hardcopy, and Applications*. R. Eschbach & G.G. Marcu (Eds.), SPIE vol. 5293, San Jose, CA, 18-22 January.
- Pizlo, Z., Li, Y. & Chan, M. (2005) Regularization model of human binocular vision. *Proceedings of IS&T/SPIE Conference on Computational Imaging*, vol.5674, pp. 229-240.
- Arslan, O., Allebach, J.P. & Pizlo, Z. (2005) Softcopy banding visibility assessment. *Proceedings of IS&T/SPIE Conference on Image Quality & System Performance*, vol. 5668, 38-50.
- Bang, Y., Pizlo, Z., Allebach, J.P. & Burningham, N. (2005) Perception based hardcopy banding metric. *Proceedings of NIP21: 21<sup>st</sup> International Conference on Digital Printing Technologies*, Baltimore, MD, pp. 78-83.
- Zhang, B., Allebach, J.P. & Pizlo, Z. (2005) Investigation of perceived sharpness and sharpness metric. *Proceedings of IS&T/SPIE Conference on Image Quality & System Performance*, vol. 5668, pp. 98-110.
- Latecki, L.J., Lakaemper, R. & Pizlo, Z. (2006) Partial shape similarity of contours is needed for object recognition. *Proceedings of IS&T/SPIE Conference on Computational Imaging*.
- Bernal, E., Allebach, J.P. & Pizlo, Z. (2006) Improved pen alignment for bidirectional printing. *Image Quality and System Performance III*, L.C. Cui & Y. Miyake (Eds.), SPIE vol. 6059, San Jose, CA, 17-19 January.
- Sawada, T. & Pizlo, Z. (2007) Symmetry detection in 3D scenes. *Proceedings of IS&T/SPIE Conference on Computational Imaging*, vol. **6498**.
- Li, Y. & Pizlo, Z. (2007) Reconstruction of shapes of 3D symmetric objects by using planarity and compactness constraints. *Proceedings of IS&T/SPIE Conference on Vision Geometry*, vol. **6499**.

- Hoffmann, C., Pizlo, Z., Popescu, V. & Price, S. (2007) Perception of surfaces from line drawings. *Displays*, **28**, 1-7.
- Haxhimusa, Y., Kropatsch, W.G., Pizlo, Z., Ion, A. & Lehrbaum, A. (2007) Approximating TSP solution by MST based graph pyramid. Proceedings of the IAPR Workshop on Graph-Based Representations in Pattern Recognition, *Lecture Notes in Computer Science*, Escolano F. & Vento M. (Eds.), vol. 4538, (pp. 195-306). Berlin: Springer.
- Shelton, J.N., Chiu, G.T.-C., and Pizlo, Z. (2007) Exponentially Segmented Positioning of a Single Link Mechanism: A Control Algorithm that Satisfies Fitts' Law. In: Proceedings of the 2007 American Control Conference, pp. 5983-5988, New York City, USA, July 11-13.
- Pizlo, Z. (2007) Human perception of 3D shapes. Conference on Computer Analysis of Images and Patterns. *Lecture Notes in Computer Science*, vol 4673 (pp. 1-12). Berlin: Springer.
- Sawada T. Pizlo, Z. (2008) Detecting mirror-symmetry of a volumetric shape from its single 2D image. Proceedings of the Workshop on Perceptual Organization in Computer Vision, IEEE International Conference on Computer Vision and Pattern Recognition, Anchorage, Alaska, June 23.
- Dorjgotov, E., Bertoline, G.R., Arns, L., Pizlo, Z. & Dunlop, S.R. (2008) Force Amplitude Perception in Six Orthogonal Directions. In Proceedings of the 16th International IEEE Symposium on Haptic Interfaces for Virtual Environment and Teleoperator Systems (HAPTICS), pp. 121–127.
- Yang, X., Adluru, N., Latecki, L.J., Bai, X. & Pizlo, Z. (2008) Symmetry of shapes via self-similarity. 4<sup>th</sup> International Symposium on Visual Computing. Las Vegas, Nevada, December 1-3.
- Min, B., Pizlo, Z. & Allebach, J.P. (2008) Development of softcopy environment for primary color banding visibility. *Proceedings of IS&T/SPIE Conference on Image Quality and System Performance V*, S. P. Farnand and F. Gaykema (Eds.), vol. 6808, San Jose, CA, January 28-30.
- Park, H-K., Pizlo, Z. & Allebach, J.P. (2009) Analysis of optimal coring values from psychophysical experiments. Image Quality and System Performance VI, SPIE vol. 7242, S.P. Farnand & F. Gaykema (Eds.), San Jose, CA, January 18-22.

*Invited Colloquia*

- Problem solving by man and computer. Polish Cybernetics Society, 1981.
- The role of eye fixation position in shape perception. Department of Neurophysiology, Nencki Institute of Experimental Biology, Warsaw, 1984.
- Physiology-based simulation model of human shape recognition. Department of Neurophysiology, Nencki Institute of Experimental Biology, Warsaw, 1986.
- Simulation model of shape recognition based on eye fixations. Departments of Biomedical Engineering and Psychology, Rutgers University, New Brunswick, NJ, 1986.
- Modeling approach to form perception. Department of Psychology, Carnegie-Mellon University, Pittsburgh, PA, 1987.
- Shape perception. National Institute of Mental Health, Laboratory of Neuropsychology, Bethesda, MD, 1990.
- Shape constancy. Department of Psychology, University of Maryland, College Park, MD, 1992.
- Perception of 3-D shapes. Department of Neurophysiology, Nencki Institute of Experimental Biology, Warsaw, 1993.
- Invariance under perspective and human vision. European Conference on Computer Vision. Workshop on New Results in Geometric Invariants. Stockholm, Sweden, 1994.
- Interdisciplinary study of visual invariants. Workshop on Structural and Syntactic Pattern Recognition. Haifa, Israel, 1994.
- The concept of group and the theory of shape constancy. SPIE Conference on Human Vision, Visual Processing and Digital Display, San Jose, CA, 1995.
- Interdisciplinary study of visual invariants. Department of Psychology, Rutgers University, New Brunswick, NJ, 1995.
- Geometric models in psychology. Annual Meeting of the Society for Mathematical Psychology, Irvine, CA, 1995.
- Figure-ground segregation in human vision. Department of Neurophysiology, Nencki Institute of Experimental Biology, Warsaw, 1996.

Perception viewed as an inverse problem. Department of Psychology, Indiana University, IN, 1998.

Perception viewed as an inverse problem. Cognitive Science, Ohio State University, Columbus OH, 1999.

Perception viewed as an inverse problem. Institute for Mathematical Behavioral Sciences, University of California at Irvine, Irvine, 1999.

Binocular shape and space perception. Department of Psychology, Miami University, Oxford, OH, 2002.

Binocular shape reconstruction: computational model and psychophysics. Department of Psychology and Center for Automation Research, University of Maryland, College Park, MD, 2003.

Binocular shape reconstruction: psychophysics and a computational model. Institute of Computer Aided Automation, Vienna University of Technology, Austria, June 2004.

Human problem solving: a pyramid model. Institute of Computer Aided Automation, Vienna University of Technology, Austria, June 2004.

Human visual perception: the role of a priori constraints. Department of Computer and Information Sciences, Temple University, Philadelphia, PA, 2005.

Human shape perception: the role of priors. Department of Computer Science, University of Toronto, Canada, 2005.

Geometry of Human Vision. SPIE.IS&T Electronic Imaging Symposium, Vision Geometry Conference, San Jose, CA, January 2006.

3D shape reconstruction: the role of priors. Department of Psychology, University of Illinois, Urbana-Champaign, IL. 2006.

3D shape perception: the role of priors. Department of Psychology, Rutgers University, New Brunswick, NJ, 2006.

The traveling salesman problem: human performance and a computational model. Department of Psychology, Rutgers University, New Brunswick, NJ, 2006.

Human perception of 3D shapes. The 23<sup>th</sup> International Conference on Computer Analysis of Images and Patterns. Vienna University of Technology, Austria, 2007.

3D shape: its unique place in visual perception. Department of Computer Science, University of Toronto, Canada, 2007.

Symmetry, shapes and surfaces. AFOSR Workshop on surface representation in mid-level vision. Smith-Kettlewell Eye Research Institute, San Francisco, CA, 2008.

A new approach to 3D shape perception. Bodian Seminar in Mind/Brain Institute, Johns Hopkins University, 2009.

### *Teaching Experience*

#### Undergraduate

Statistics  
Sensation and Perception  
Introductory Psychology

#### Graduate

Statistics  
Multivariate Analysis  
Vision Seminar  
Shape Seminar  
Psychophysics  
Perceptual Processes  
Advanced Topics in Visual Perception  
Design of Human Subject Experiments in  
Immersive Environments

***Theses Directed***

- B. Zhang (2007) Ph.D. – School of Electrical and Computer Engineering  
(co-advisor with J. Allebach)  
Thesis: *Three Problems in Digital Photography: Image Sharpness, Image Interpolation, and Image Restoration.*
- E. Bernal (2006) Ph.D. – School of Electrical and Computer Engineering  
(co-advisor with J. Allebach)  
Thesis: *Improved Rendition of Text and Lines in Inkjet and Electrophotographic Printers.*
- O. Arslan (2006) Ph.D. – School of Electrical and Computer Engineering  
(co-advisor with J. Allebach)  
Thesis: *Development of a Softcopy Environment for Banding Visibility Assessment Experiments and Identification of Inkjet Printers for Forensic Applications.*
- Bong-sun Lee (2006) Ph.D. – School of Electrical and Computer Engineering  
(co-advisor with Prof. J. Allebach)  
Thesis: *Characterization of Opponent Channels, Automated Detection of PQ Defects, and Green Noise Mask Design by Dual Metric.*
- Oh-Sang Kwon (2005) M.Sc. – Psychological Sciences  
Thesis: *Multi-Resolution Model of Human Motor Control.*
- Yunfeng Li (2005) M.Sc. – Psychological Sciences  
Thesis: *Binocular disparity vs. a priori constraints in 3D shape perception.*
- Y. Bang (2005) Ph.D. – School of Electrical and Computer Engineering  
(co-advisor with Prof. J. Allebach)  
Thesis: *Hardcopy Banding Measurement and Assessment.*
- M.R. Scheessele (2001) Ph.D. – Psychological Sciences  
Thesis: *A model of the perception of partially occluded and fragmented figures.*
- W. Wu (2000) Ph.D. – School of Electrical and Computer Engineering  
(co-advisor with Prof. J. Allebach)  
Thesis: *Two problems in digital color imaging: colorimetry and image fidelity assessor.*
- M.W. Chan (1999) Ph.D. – School of Electrical and Computer Engineering  
(co-advisor with Prof. E. Delp)  
Thesis: *A psychologically plausible algorithm for binocular shape reconstruction.*

C.C. Taylor (1998) Ph.D. – School of Electrical and Computer Engineering  
(co-advisor with Prof. J. Allebach)  
Thesis: *Image quality assessment based on a human visual system model.*

M.R. Scheessele (1998) M.Sc. – Psychological Sciences  
Thesis: *Perception of partially occluded figures.*

S.M. Graham (1998) M.Sc. – Psychological Sciences  
Thesis: *A model of psychological processes involved in solving the traveling salesman problem.*

M. Salach-Golyska (1994) M.Sc. – Psychological Sciences  
Thesis: *Curve detection in a noisy image.*

### ***Doctoral theses currently supervised***

Hyung Jun Park (2006) School of Electrical and Computer Engineering  
(co-advisor with Prof. J. Allebach)

Oh-Sang Kwon (2005-) Department of Psychological Sciences

Yunfeng Li (2005-) Department of Psychological Sciences

### ***Master's and doctoral committees***

Dr. Pizlo is serving on about 25 committees in the Department of Psychological Sciences, School of Electrical and Computer Engineering, and Department of Mechanical Engineering.

### ***Post-doctoral fellows***

Dr. Yll Haxhimusa – problem solving and visual perception (March 2007-August 2008).

Dr. Tadamasa Sawada – figure-ground organization (April 1, 2006 – August 31, 2010).

### ***School and University Service Activities***

Member of the Graduate Committee of the Interdisciplinary Program in  
Computational Science and Engineering (1994- ).

Member of the University Senate (2009-2012)