Lawrence B. Wolff

EDUCATION

Ph.D.	1991	Computer Science Columbia University, New York, NY
M.S.	1988	Computer Science Columbia University, New York, NY
B.S.	1981	Mathematics and Physics Yale University, New Haven, Conn

EMPLOYMENT

July 1999 to present, Professor
July 1995 to June 1999, Associate Professor
July 1990 to June 1995, Assistant Professor
The Johns Hopkins University, Department of Computer Science. Joint appointment in Department of Electrical and Computer Engineering. Founder and Director Computer Vision Laboratory at Johns Hopkins University.

September 1986 to September 1990. Columbia University, Department of Computer Science, Graduate Research Assistant.

May 1988 to September 1988. IBM T.J. Watson Research Center, Yorktown Heights, NY, Summer Researcher in Industrial Machine Vision.

May 1987 to September 1987. AT&T Bell Laboratories, Holmdel, N.J., Summer Member of Technical Staff (area of research: Computer Vision).

May 1986 to September 1986. AT&T Bell Laboratories, Holmdel N.J., Summer Member of Technical Staff (area of research: Computer Vision).

August 1983 to April 1986. Singer-Kearfott Division. Little Falls, New Jersey. Algorithm development in pattern recognition for Forward Looking InfRared high strategic targets.

November 1981 to August 1983. Advanced Technology Systems, Fairlawn, New Jersey. Image Processing, Optical Projection System, Computer Graphics.

HONORS

NSF Young Investigator Award (NYI), 1993-1998.

NSF Research Initiation Award, 1991-1993.

IBM Graduate Fellowship Award 1987-1990.

Anthony D. Stanley Prize for excellence in pure and applied mathematics, junior year Yale University, 1980.

PROFESSIONAL ACTIVITIES

Editorial Board, IEEE Transactions of Pattern Analysis and Machine Intelligence (PAMI)

Editorial Board, VIDERE: Journal of Computer Vision Research (electronic journal), MIT Press

Program Committee Member for IEEE International Conference on Computer Vision (ICCV), September, 1999, Corfu, Greece.

Program Committee Member and Invited Keynote Speaker SPIE EUROPTO Conference on Polarization and Colour in Industrial Inspection, Munich, Germany, June 1999.

Program Co-Chair for IEEE Workshop on Photometric Modeling for Vision and Graphics, in conjunction with IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 1999, Boulder Colorado.

Program Committee member for IEEE Workshop on Computer Vision Beyond the Visible Spectrum: Methods and Applications, in conjunction with IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 1999, Boulder Colorado.

Program Committee Member for IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 1998, Santa Barbara, California.

Program Committee Member for the International Workshop on Computer Architectures for Machine Perception (CAMP), 1997.

Program Committee Member for IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 1997, San Juan, Puerto Rico.

Program Committee Member for IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 1996. San Francisco, California, Area Co-chair, Low-level and Physics-Based Vision.

Program Committee Member for IEEE Workshop on Physics-Based Modeling in Computer Vision, June, 1995.

Program Committee Member for IEEE Workshop on Applications of Computer Vision, 1994.

Program Committee Member for IEEE International Conference on Pattern Recognition (ICPR), 1994.

Program Committee Member for IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 1992, Urbana-Champaign, Illinois.

Co-organizer of Symposium on Physics-Based Vision as part of CVPR 1992.

Program Committee Member for SPIE Conference on Optics, Illumination, and Image Sensing for Machine Vision 1992, 1993, 1994, 1995, 1996, 1997.

Referee and have been on a number of Review Panels for National Science Foundation. Referee for the following Journals and Conferences: IEEE Transactions on PAMI, International Journal of Computer Vision, IEEE Computer Graphics and Applications, SIGGRAPH, IEEE Conference on Computer Vision and Pattern Recognition, IEEE Conference on Robotics and Automation.

PHD STUDENTS GRADUATED

Pisupati Chandrasekhar "Geometric Analysis of Dynamic Three-Dimensional Tree Structures", Defended October, 1996. Employment at General Electric, Schenectaty, New York as of November 1996.

Elli Angelopoulou, "Photometric Invariance in Shape Analysis,", Defended March, 1997, Postdoc at GRASP Laboratory at the University of Pennsylvania under Ruzena Bajzcsy started summer 1998.

James P. Williams, "Representation of Axial Shape", Defended August 1997, Employment at Siemens, Princeton, New Jersey starting summer 1998.

MS STUDENT THESES

Joel Fan, May 1994, M.S. Thesis "Surface Curvature From Integrability"

Christopher Eveland, May 1996, M.S. Thesis "Computational Algorithms for the Isometric Embedding of Riemannian Surfaces"

PUBLICATIONS

Books

Physics-Based Vision: Principles and Practice, Volume 1: Radiometry, editors L.B. Wolff, S. Shafer, G. Healey, Jones and Bartlett Publishers Inc., 1992.

Physics-Based Vision: Principles and Practice, Volume 2: Color, editors G. Healey, S. Shafer, L.B. Wolff, Jones and Bartlett Publishers Inc., 1992.

Physics-Based Vision: Principles and Practice, Volume 3: Shape Recovery, editors L.B. Wolff, S. Shafer, G. Healey, Jones and Bartlett Publishers Inc., 1992.

Book Chapter Articles

Wolff, L.B., *Photometric Light Sources*, Encyclopedia of Electrical and Electronics Engineering, published by John Wiley & Sons. , 1999

Wolff, L.B., *Enhanced Capabilities For Battlefield Awareness Using Polarization Sensors*, Appearing in the book on "Reconnaisance, Surveillance, and Target Acquisition For the Unmanned Ground Vehicle: Providing Surveillance 'Eyes' for an Autonomous Vehicle", edited by Oscar Firschein, Tom Strat, Morgan Kaufmann Publishers, 1997. pp. 429-438.

N. Shashar, T.W. Cronin, G. Johnson, L.B. Wolff, *Designs for Submersible Imaging Polarimeters*, Appearing in Ultraviolet Radiation and Coral Reefs, 1995.

Magazine Articles

Cronin, T., Shashar, N., and Wolff, L.B., *Underwater Portable Imaging Polarimeters*, Biophotonics, April, 1995. Showcased on Magazine cover for this issue.

Wolff, L.B., *Applications of Polarization Camera Technology*, IEEE EXPERT, October, 1995.

Journal Articles

Angelopoulou, E, and Wolff, L.B., *Sign of Gaussian Curvature from Curve Orientation in Photometric Space*, IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI) October 1998.

Wolff, L.B., Nayar, S.K., and Oren, M., *Improved Diffuse Reflection Models For Computer Vision*, International Journal of Computer Vision (IJCV), October 1998

Chen, H. and Wolff, L.B., *A Polarization Phase-Based Method For Material Classification In Computer Vision*, International Journal of Computer Vision (IJCV), June, 1998.

Kalayjian, Z, Andreou A., Wolff L.B., *1D Polarization Contrast Retina.* Electronics Letters. September 1997, vol. 33, pp.38-40.

Wolff, L.B., Mancini, T., Pouliquen, P., and Andreou, A., *Liquid Crystal Polarization Camera*, IEEE Transactions on Robotics and Automation, April 1997.

Williams, J.P. and Wolff, L.B., "Analysis of the Pulmonary Vascular Tree Using Differential Geometry Based Vector Fields", Journal of Computer Vision and Image Understanding (CVIU) February 1997.

Fan, J.. and Wolff, L.B., "Surface Curvature and Shape Reconstruction From Unknown Multiple Illumination and Integrability", Journal of Computer Vision and Image Understanding (CVIU) February 1997.

Clark, J., Trucco, E., Wolff, L.B. "Using Light Polarization in Laser Scanning", Image and Vision Computing Journal (IVCJ) February 1997, pp. 107-117.

Shashar N,. T.W. Cronin, L.B. Wolff and M.A. Condon, "The polarization of light in a tropical rain forest" Biotropica. February 1997.

Wolff, L.B., "Polarization Vision: A New Sensory Approach To Image Understanding.", Image and Vision Computing Journal (IVCJ) October 1996, pp. 81-93. (Invited for Promising Directions Track).

Wolff, L.B. and Andreou, A., *Polarization Camera Sensors*, Image and Vision Computing Journal (IVCJ), August 1995, pp. 497-510.

Wolff, L.B., and Angelopoulou, E., *Three-dimensional Stereo by Photometric Ratios*, Journal of the Optical Society of America. Optics, Image Science, and Vision, (JOSA A), Vol. 11, No. 11, November, 1994, pp. 3069-3078.

Wolff, L.B., *A Diffuse-reflectance Model for Smooth Dielectric Surfaces*, Journal of the Optical Society of America, Optics, Image Science, and Vision, (JOSA A), Vol. 11, No. 11, November, 1994, pp. 2956-2968.

Wolff, L.B., *Polarization Camera For Computer Vision with a Beam Splitter*, Journal of the Optical Society of America, Optics, Image Science, and Vision, (JOSA A), Vol. 11, No. 11, November, 1994, pp. 2935-2945.

Wolff, L.B., *Segmentation of Surface Curvature With a Photometric Invariant*, Journal of the Optical Society of America, Optics, Image Science, and Vision, (JOSA A), Vol. 11, No. 11, November, 1994, pp. 3090-3100.

Wolff, L.B., *Relative Brightness of Specular and Diffuse Reflection*, SPIE journal of Optical Engineering, pp. 285-293, January, 1994.

Wolff, L.B., and Boult, T.E., *Constraining Object Features Using a Polarization Reflectance Model*, IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), Special Issue on Physical Models For Computer Vision, pp. 635-657, July, 1991.

Wolff, L.B., and Kurlander, D.J., *Ray Tracing With Polarization Parameters*, IEEE Computer Graphics and Applications, pp. 44-55, November 1990.

Wolff, L.B., *Polarization-Based Material Classification from Specular Reflection*, IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), Vol. 12, No. 11, pp. 1059-1071, November 1990.

Submitted Journal Articles

Wolff, L.B., Lundberg, A., and Tang, R., "Thermal Emission Polarization", Submitted to JOSA.

Refereed Articles for Conferences and Workshops

Socolinsky, D.A. and Wolff, L.B., "A New Paradigm for Visualizing Multispectral Imagery", IEEE conference on Computer Vision and Pattern Recognition (CVPR), June 1999, Ft. Collins, Co.

Wolff, L.B., Lundberg, A., and Tang, R., "Image Understanding From Polarization of Thermal Emission", IEEE conference on Computer Vision and Pattern Recognition (CVPR), June 1998, Santa Barbara.

Angelopoulou, A., Williams, J. and Wolff, L., "A Curvature based descriptor invariant to pose and albedo derived from Photometric data", Proceedings of the IEEE conference on Computer Vision and Pattern Recognition (CVPR), June 1997, Puerto Rico, pp. 165-171

Angelopoulou, A., and Wolff, L., "Photometric Computation of the Sign of Gaussian Curvature Using a Curve-Orientation Invariant", Proceedings of the IEEE conference on Computer Vision and Pattern Recognition (CVPR), June 1997, Puerto Rico, pp. 432-437.

Williams, J., Johnstone, J., and Wolff, L., "Rational Discrete Generalized Cylinders and their Application to Shape Recovery in Medical Images", Proceedings of the IEEE conference on Computer Vision and Pattern Recognition (CVPR), June 1997, Puerto Rico, pp. 387-392

Wolff, L.B., and Socolinsky, D.A., "Theory and Analysis of Color Discrimination for the Computation of Color edges Using Camera Sensors in Machine Vision", Proceedings of AIC Color 97: The 8th International Congress of the International Colour Association, Kyoto, Japan, May 1997.

Socolinsky, D.A., and Wolff, L.B., "Accurate Visualization of the CIE Color Surface in 3-Space", Proceedings of AIC Color 97: The 8th International Congress of the International

Colour Association, Kyoto, Japan, May 1997.

Williams, J.P. and Wolff, L.B., "Analysis of the Pulmonary Vascular Tree Using Differential Geometry Based Vector Fields", Journal of Computer Vision and Image Understanding (CVIU) February 1997.

Angelopoulou, E., Williams, J.P., and Wolff, L.B., *Curvature Based Signatures for Object Description and Recognition*, ECCV Workshop on Object Recognition, Cambridge, England, 1996.

Chen, H. and Wolff, L.B., *A Polarization Phase-Based Method For Material Classification And Object Recognition In Computer Vision*, Proceedings of IEEE Conference on Computer Vision and Pattern Recognition (CVPR), June, 1996, San Francisco, Ca.

Chandrasekhar P., Wolff L.B., Mitzner W., Zerhouni E., "Geometric Tree Matching with Applications to 3D Lung Structures", 12th ACM Symposium on Computational Geometry, Philadelphia, PA, May 1996.

Chandrasekhar P., Wolff L.B., Mitzner W., Zerhouni E., "Segmentation of 3D Pulmonary Trees Using Mathematical morphology", International Symposium on Mathematical Morphology, Atlanta, GA, May 1996.

Wolff, L.B. , *Generalizing Lambert's Law For Smooth Surfaces*, Proceedings of the Fourth European Conference on Computer Vision (ECCV) April, 1996, Cambridge, England.

Chandrasekhar P., Wolff L.B., Mitzner W., Zerhouni E., *A Central Axis Algorithm for 3D Bronchial Tree Structures*, IEEE International Symposium on Computer Vision, November 1995, Coral Gables, Florida.

Williams, J.P. and Wolff, L.B.,*Form From Function: A Vector Field Based Approach to the Analysis of CT Images of the Vascular tree*, IEEE Proceedings of the Workshop On Physics-Based Modeling in Computer Vision, Cambridge, Massachusetts, June, 1995, pp. 70-77.

Cronin, T., Shashar, N., and Wolff, L.B., *Portable Imaging Polarimeter*, To appear in the Proceedings of the International Conference on Pattern Recognition (ICPR), Jerusalem, Israel, October 1994.

Wolff, L.B. and Angelopoulou, E., *3-D Stereo Using Photometric ratios*, Proceedings of the Third European Conference on Computer Vision (ECCV) May, 1994, Stockholm Sweden, pp. 247-258. (Selected as one of the top 5 out of 311 submissions.)

Wolff, L.B., *On the Relative Brightness of Specular and Diffuse Reflection*, Proceedings of IEEE Conference on Computer Vision and Pattern Recognition (CVPR), June, 1994, Seattle, Washington, pp.369-376.

Wolff, L.B., and Fan, J., *Segmentation of Surface Curvature Using A Photometric Invariant*, Proceedings of IEEE Conference on Computer Vision and Pattern Recognition (CVPR), June, 1994, Seattle, Washington, p.23-30.

Fan, J., and Wolff, L.B., *Surface Curvature From Integrability*, Proceedings of IEEE Conference on Computer Vision and Pattern Recognition (CVPR), June, 1994, Seattle, Washington, pp.520-526.

Wolff, L.B., *Scene Understanding From Propagation and Consistency of Polarization-Based Constraints*, Proceedings of IEEE Conference on Computer Vision and Pattern Recognition (CVPR), June, 1994, Seattle, Washington, pp. 1000-1005.

Wolff, L.B., and Mancini, T.A., *Liquid Crystal Polarization Camera*, Proceedings of the first IEEE Conference on Applications in Computer Vision, Palm Springs Ca., December 1992, pp. 120-127.

Wolff, L.B., *Diffuse Reflection*, Proceedings of IEEE Conference on Computer Vision and Pattern Recognition (CVPR), June, 1992, Urbana-Champaign Illinois, pages 472-478.

Mancini, T.A., and Wolff, L.B., "3-D Shape and Source Location from Depth and Reflectance", Proceedings of IEEE Conference on Computer Vision and Pattern Recognition (CVPR)", June, 1992, Urbana-Champaign, Illinois, pages 707-709.

Boult, T.E. and Wolff, L.B., *Physically-Based Edge Labeling*, Proceedings of IEEE Conference on Computer Vision and Pattern Recognition (CVPR), Hawaii, June 1991.

Wolff, L.B., *A Photometric Invariant and Shape Constraints at Parabolic Points*, IEEE Proceedings of the Third International Conference on Computer Vision (ICCV), Osaka, Japan, pp. 344-349, December, 1990.