

George Bebis

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Research Interests

Computer Vision
Image Processing
Pattern Recognition
Machine Learning

Education

Ph.D. in Electrical & Computer Engineering
University of Central Florida, Orlando, FL 32816
Dissertation Topic: *Indexing-Based Object Recognition*.
Graduation: August 1996

Master of Science in Computer Science
University of Crete, Heraklion, Crete, Greece
Thesis topic: *Model Based Object Recognition using
Multi-resolution Segmentation and Neural Network Models*.
Graduation: July 1991

Bachelor of Science in Mathematics
University of Crete, Heraklion, Crete, Greece
Major Areas: *Numerical Analysis, Probability Theory and Statistics*
Graduation: September 1987

Academic Experience

July 2002 - present, Associate Professor
Department of Computer Science and Engineering, UNR

January 1998 - present, Founder and Director
Computer Vision Laboratory (CVL), UNR

January 1998 - June 2002, Assistant Professor
Department of Computer Science and Engineering, UNR

August 1997 - December 1997, *Visiting Assistant Professor*
Department of Computer Science and Engineering, UNR

July 1998 - August 1998, *Summer Faculty*
Center for Applied Scientific Computing (CASC), Lawrence Livermore National Laboratory

August 1996 - August 1997, *Visiting Assistant Professor*
Department of Mathematics and Computer Science, University of Missouri-St. Louis (UMSL)

Ph.D. Dissertations

On-Road Vehicle Detection, Zehang Sun, Fall 2003.

Hand-Based Biometrics, Gholmareza Amayeh (expected in 2008)

Perceptual Grouping Using Tensor Voting, Leandro Loss (expected in 2008)

Note: The Computer Science and Engineering Department only recently obtained a Ph.D program. I have graduated the first Ph.D. student in my Department (Zehang Sun, Fall 2003).

Master Theses

Gender Classification, Zhiming Liu, Spring 2007.

Fingerprint Template Synthesis, Tamer Uz, Spring 2006.

Improving the Performance of Fingerprint Classification, Uday Rajanna, Spring 2006.

Shape Metamorphism Using p -Laplacian Equation, Mehmet Eser, Spring 2005.

Geometric Approach to Segmentation and Protein Localization in Cell Cultured Assays, Sreevatsan Raman, Fall 2005.

Automatic Recognition of a Baby Gesture, Jigna Bhatt, Spring 2005.

Global Hand Pose Estimation by Multiple Camera Ellipse Tracking, Jorge Usabiaga, Spring 2005.

Rendering Optimizations Guided by Head-Pose Estimates and their Uncertainty, Javier Martinez, Summer 2005.

Face Recognition Experiments Using Random Projection, Navin Goel, Spring 2004.

Infrared and Visible Image Fusion for Face Recognition, Saurabh Singh, Spring 2004.

Heliopsis-Zea Classification Using Image Analysis, Tom Patten, Spring 2004.

Face Detection Using Multi-Band Fusion, Jonathan Dowdall, Spring 2003.

Multiresolution Image Retrieval Through Fusion, Vladimir Nikulin, Fall 2003.

Face Recognition Using Image Fusion, Aglika Gyaourova, Spring 2003.

Fingerprint Minutiae Extraction, Chris Smith, Fall 2002.

Computational Analysis of Functionally Unknown Proteins from Expressed Sequence Tags (EST) Datasets, Elham Alavi, Fall 2002.

Improving Fingerprint Recognition, Xiaosheng Tu, Summer 2000.

Genetic Search for Face Recognition, Satish Uthiram, Summer 1999.

Face Detection using Convex Grouping, Alexey Kryuchkov, Fall 1998.

Fingerprint Recognition using Delaunay Triangulation, Taisa Deaconu, Fall 1998.

Honors

Lemelson Award for Innovation and Entrepreneurship, May 2002

Patents

"Hand-based Verification Using Palm-Finger Segmentation", provisional patent, filed on 6/16/2006.

"Hand-based Verification Using Palm-Finger Segmentation", full patent, filed on 6/15/2007.

Departmental and College Committee Services

2005 - present, Graduate Director

2001 - 2004, Graduate Committee (Member)

2003 - 2004, Assessment Committee (Chair)

2002 - 2003, Strategic Planning Committee (Chair)

2003 - 2004, Evaluation Committee (Member)

2003-2005, 2007, Search Committee (Member)

2006 - present, College Personnel Committee (Member)

State, National, and International Committee Services

2002 - present, IAPR Education Committee

2001 - present, NASA Space Grant Consortium

Professional Activities

NSF panelist, 2002-2005

Invited Talks

- *University of Crete*, July 2005.
- *Desert Research Institute*, September 2004.
- *NASA Bioastronautics Investigator's Workshop*, January 2003.
- *Arizona State University*, March 2003.
- *Washington State University*, April 2002.
- *Lawrence Livermore National Laboratory*, July 1998.

Associate Editor

- *Machine Vision and Applications Journal*

Editorial Board Member

- *Pattern Recognition Journal*
- *International Journal on Artificial Intelligence Tools*

Guest Editor

- *IEEE Multimedia Magazine* (special issue on Digital Multimedia on Demand, January-March 2004).
- *International Journal on Artificial Intelligence Tools* (special issue on Applications of Computer Vision, June 2000).

Reviewer

- *Computer Vision and Image Understanding (CVIU)*
- *Pattern Recognition (PR)*
- *Image and Vision Computing (IVC)*

- *IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI)*
- *Machine Vision and Applications (MVA)*
- *International Conference on Computer Vision (ICCV)*
- *Computer Vision and Pattern Recognition Conference (CVPR)*

Program Chair/co-Chair

- *First International Symposium on Visual Computing (ISVC05)*, December 5-7, 2005, Lake Tahoe, Nevada (program chair - LNCS, Springer Verlag).
- *IEEE International Symposium on Bio-Informatics & Biomedical Engineering*, November 2000, Washington DC (program co-chair).
- *IEEE Symposium on Image, Speech, and Natural Language Systems*, November 1999, Maryland (program co-chair).

Area Chair

- *Visual Information Engineering*, (N. America Area Chair) July 25-27, 2007, London, UK.

Organizer/co-Organizer

- *ACM SIG 2003 Multimedia Biometrics Methods and Applications Workshop*, (in conjunction with ACM Multimedia 03), Berkeley, November 8, 2003 (co-organizer).
- *IEEE Workshop on Combined Research-Curriculum Development in Computer Vision*, (in conjunction with CVPR01), Kauai, Hawaii, December 11-13, 2001 (organizer).

Steering Committee Chair

- *Third International Symposium on Visual Computing (ISVC07)*, November 26-28, 2007, Lake Tahoe, Nevada (LNCS, Springer Verlag).
- *Second International Symposium on Visual Computing (ISVC06)*, November 6-8, 2006, Lake Tahoe, Nevada (LNCS, Springer Verlag).

Program Committee Member

- *SPIE Defense and Security Symposium (DS26: Biometric Technology for Human Identification V)*, March 16-20, 2008, Orlando, Florida.
- *IEEE International Conference on Advanced Video and Signal Based Surveillance (AVSS07)*, September 5-7, 2007, London, UK.
- *International Workshop on Combinatorial Image Analysis (IWCA08)*, April 7-9, 2008, Buffalo, NY, USA.
- *International Conference on Signal-Image Technology and Internet-Based Systems*

(SITIS07), December 16-19, 2007, China.

- *IEEE International Conference on Information Reuse and Integration* August 13-15, 2007, Las Vegas, Nevada.
- *4th IEEE Workshop on Object Tracking and Classification in and Beyond the Visible Spectrum*, Minneapolis, MN, USA, Friday, June 22, 2007.
- *5th International Conference on New Horizons in Industry, Business and Education*, August 30-31, 2007, Rhodes island, Greece.
- *International Conference on Cyberwolds*, Hannover, Germany, Oct 24-26, 2007.
- *Visual Information Engineering*, July 25-27, 2007, London, UK.
- *International Conference on Sciences of Electronic, Technology of Information and Telecommunications (SETIT07)*, March 25-29, 2007, Hammamet, Tunisia.
- *IEEE International Conference on Advanced Video and Signal Based Surveillance (AVSS06)*, November 22-24, 2006, Sydney, Australia.
- *International Conference on Cyberwolds*, Ecole Polytechnique Fdrale de Lausanne (EPFL), Switzerland, Nov 28-30, 2006.
- *IEE Conference on Crime and Security: Imaging for Crime Detection and Prevention*, London, UK, 13-15 June 2006.
- *Third IEEE Workshop on Object Tracking and Classification in and Beyond the Visible Spectrum*, (in conjunction with CVPR06), New York, NY, June 22, 2006.
- *International Conference on Computer Games Development*, Las Vegas, NV, June 26-29, 2006.
- *IEEE International Conference on Information Reuse and Integration*, Sep 16-18, 2006, Waikoloa, Hawaii.
- *International Conference on Sciences of Electronic, Technology of Information and Telecommunications (SETIT 2007)*, March 25-29, 2007, Hammamet, Tunisia.
- *International Conference on Computer Vision Theory and Applications (VISAPP)*, February 22-25, 2006, Setubal, Portugal.
- *IEEE International Conference on Advanced Video and Signal Based Surveillance (AVSS05)*, September 15-16, 2005, Como, Italy.
- *IEEE International Conference on Image Processing (ICIP05)*, September 11-14, 2005, Genova, Italy.
- *Second IEEE Workshop on Object Tracking and Classification in and Beyond the Visible Spectrum*, (in conjunction with CVPR05), San Diego, CA, June 20, 2005.
- *IEEE Workshop on Machine Vision for Intelligent Vehicles*, (in conjunction with CVPR05), San Diego, CA, June 21, 2005.

- *IEEE International Conference on Information Reuse and Integration*, Las Vegas, August 15-17, 2005.
- *Genetic and Evolutionary Computing Conference (GECCO 2005)*, Washington, DC, June 25-29, 2005.
- *Fourth International Conference on New Horizons in Industry, Business and Education*, 25-26 August 2005, Corfu, Greece.
- *Signal, Image Technology and Internet-Based Systems (SITIS2005)*, November 27 - December 2, 2005, Cameroon.
- *International Conference on Cyberworlds (CW2005)*, November 23-25, 2005, Singapore.
- *Third International Conference on Sciences of Electronic, Technology of Information and Telecommunications*, March 27-31, 2005, Susa, Tunisia.
- *IEEE Workshop on Object Tracking and Classification Beyond the Visible Spectrum*, (in conjunction with CVPR04), Washington, DC, June 28, 2004.
- *International Joint Conference on Neural Networks (IJCNN04)*, Budapest, Hungary, July 25-29, 2004.
- *15th IEEE International Conference on Tools with Artificial Intelligence*, Sacramento, November 3-5, 2003.
- *IEEE International Symposium on Bio-Informatics and Biomedical Engineering*, Bethesda, March 10-12, 2003.
- *IEEE International Conference on Advanced Video and Signal Based Surveillance*, July 21-22, 2003 Miami, FL.
- *Third International Conference on New Horizons in Industry and Education*, 28-29 August 2003, Santorini, Greece.
- *14th IEEE International Conference on Tools with Artificial Intelligence*, November 4-6, 2002, Washington D.C.
- *INNS-IEEE International Joint Conference on Neural Networks (IJCNN02)*, Honolulu, Hawaii, May 12-17 2002.
- *IEEE International Symposium on Bio-Informatics and Biomedical Engineering*, November 2001, Washington DC.
- *IEEE Workshop on Models versus Exemplars in Computer Vision*, (in conjunction with CVPR01), Kauai, Hawaii, December 11-13, 2001.
- *IEEE Workshop on Computer Vision Beyond the Visible Spectrum: Methods and Applications*, (in conjunction with CVPR01), Kauai, Hawaii, December 14, 2001.
- *INNS-IEEE International Joint Conference on Neural Networks (IJCNN01)*, Washington DC, July 14-19, 2001.

- *Neural Networks and Expert Systems in Medicine and Health Care*, Milos Island, Greece, 20-22 June 2001.
- *IEEE Workshop on Computer Vision Beyond the Visible Spectrum: Methods and Applications* (in conjunction with CVPR00), June 2000, Hilton Head Island, SC.
- *IEEE International Conference on Information, Intelligence, and Systems*, November 1999, Maryland.
- *International Conference on Imaging Science, Systems, and Technology*, July 6-9, 1998, Las Vegas, Nevada, USA.
- *11th International Conference on Computer Applications in Industry and Engineering*, November 11-13, 1998, Las Vegas, Nevada, USA.

Session Chair

- *13th International Conference on Parallel and Distributed Computing Systems* Las Vegas, August 8-10, 2000 (Digital Video II).
- *Signal and Image Processing Conference*, Las Vegas, Nevada, October, 1998 (Object Recognition).
- *IEEE International Conference on Systems, Man, and Cybernetics*, Orlando, Florida, October, 1997 (Applications of Neural Networks in Computer Vision).

Editorials

- [1] N. Bourbakis and G. Bebis, "Digital Multimedia on Demand", **IEEE Multimedia**, January-March 2004 (editorial).

Books

- [1] G. Bebis, R. Boyle, B. Parvin, and D. Koracin (eds) *Advances in Visual Computing*, Lecture Notes in Computer Science (LNCS), Vol. 3804, First International Symposium, ISVC 2005, Lake Tahoe, NV, USA, December 5-7, 2005.
- [2] G. Bebis et. al (eds) *Advances in Visual Computing*, Lecture Notes in Computer Science (LNCS), Vol. 4291 Second International Symposium, ISVC 2006, Lake Tahoe, NV, USA, November 6-8, 2006.
- [2] G. Bebis et. al (eds) *Advances in Visual Computing*, Lecture Notes in Computer Science (LNCS), Vol 4292, Second International Symposium, ISVC 2006, Lake Tahoe, NV, USA, November 6-8, 2006.

Journal Publications

- [30] J. Usabiaga, A. Erol, G. Bebis, R. Boyle, and X. Towmbly, "Global Hand-Pose Estimation by Multiple Camera Ellipse Tracking", **Machine Vision and Applications** (under revision), 2007.
- [29] W. Li, G. Bebis, and N. Bourbakis, "3D Object Recognition Using 2D Views", **IEEE Transactions on Image Processing**, (under revision), 2007.
- [28] J. Wang, G. Bebis, Mircea Nicolescu, Monica Nicolescu, and R. Miller, "Improving Target Detection by Coupling It with Tracking", **Machine Vision and Applications** (under revision), 2007.
- [27] A. Tavakkoli, Mircea Nicolescu, G. Bebis, and Monica Nicolescu, "Non-parametric Statistical Background Modeling for Efficient Foreground Region Detection", **Machine Vision and Applications** (under revision), 2007.
- [26] A. Tavakkoli, Mircea Nicolescu, G. Bebis, and Monica Nicolescu, "A Support Vector Data Description Approach for Background Modeling in Videos with Quasi-Stationary Backgrounds", **International Journal of Artificial Intelligence Tools**, (under revision), 2007.
- [25] A. Erol, G. Bebis, M. Nicolescu, R. Boyle, X. Twombly, "Vision-Based Hand Pose Estimation: A Review", **Computer Vision and Image Understanding** (special issue on Vision for Human-Computer Interaction), October/November 2007.
- [24] G. Bebis, A. Gyaourova, S. Singh, and I. Pavlidis, "Face Recognition by Fusing Thermal Infrared and Visible Imagery", **Image and Vision Computing**, vol. 24, no. 7, pp. 727-742, 2006.
- [23] Z. Sun, G. Bebis, and R. Miller, "On-road Vehicle Detection: A review", **IEEE Transactions on Pattern Analysis and Machine Intelligence**, vol. 28, no. 5, pp. 694-711, 2006.
- [22] Z. Sun, G. Bebis, and R. Miller, "Monocular Pre-crash Vehicle Detection: Features and Classifiers", **IEEE Transactions on Image Processing**, vol. 15, no. 7, pp. 2019-2034, July 2006.
- [21] Z. Sun, G. Bebis, and R. Miller, "On-Road Vehicle Detection Using Evolutionary Gabor Filter Optimization", **IEEE Transactions on Intelligent Transportation Systems**, vol. 6, no. 2, pp. 125-137, 2005.
- [20] Z. Sun, G. Bebis, and R. Miller, "Boosting Object Detection Using Feature Selection", **Pattern Recognition**, vol. 37, pp. 2165-2176, 2004.
- [19] N. Bourbakis, J. Gattiker, and G. Bebis "A Synergistic Model for Interpreting Human Activities and Events from Video", **International Journal on Artificial Intelligence Tools** , vol. 12, no. 1, 2003.

- [18] J. Dowdall, I. Pavlidis, and G. Bebis, "Face Detection Using Multi-Band Fusion", **Image and Vision Computing**, vol 21, no. 7, pp. 565-578, 2003.
- [17] G. Bebis, D. Egbert, and M. Shah, "Review of Computer Vision Education", **IEEE Transactions on Education**, vol. 46, no. 1, pp. 2-21, 2003.
- [16] G. Bebis, S. Louis, Y. Varol, and A. Yfantis, "Genetic Object Recognition Using Combinations of Views", **IEEE Transactions on Evolutionary Computing**, vol 6, no. 2, pp. 132-146, April 2002.
- [15] G. Bebis, S. Uthiram, and M. Georgiopoulos, "Face Detection and Verification Using Genetic Search", **International Journal on Artificial Intelligence Tools**, vol 9, no 2, pp. 225-246, 2000.
- [14] E. Yfantis, T. Lazarakis, G. Bebis, and M. Gallitano, "An Algorithm for Cancer Recognition of Ultrasound Images", **International Journal on Artificial Intelligence Tools**, vol 9, no 2, pp. 265-276, 2000.
- [13] M. Georgiopoulos, I. Dagher, G. Heilman, and G. Bebis, "Properties of Learning of a Fuzzy ART Variant", **Neural Networks**, vol. 12, No. 6, pp. 837-850, 1999.
- [12] G. Bebis, M. Georgiopoulos, N. La Vitoria Lobo, and M. Shah, "Recognition by Learning Affine Transformations", **Pattern Recognition**, Vol. 32, No. 10, pp. 1783-1799, 1999.
- [11] G. Bebis, G. Papadourakis and S. Orphanoudakis, "Curvature Scale Space Driven Object Recognition with an Indexing Scheme based on Artificial Neural Networks", **Pattern Recognition**, Vol. 32, No. 7, pp. 1175-1201, 1999.
- [10] I. Dagher, M. Georgiopoulos, G. Heilman, and G. Bebis, "An Ordering Algorithm for Pattern Presentation in Fuzzy ARTMAP That Tends to Improve Generalization Performance", **IEEE Transactions on Neural Networks**, Vol. 10, No. 4, pp. 768-778, 1999.
- [9] G. Bebis, M. Georgiopoulos, M. Shah, and N. La Vitoria Lobo, "Indexing based on algebraic functions of views", **Computer Vision and Image Understanding**, vol. 72, no. 3, pp. 360-378, 1998.
- [8] G. Bebis, M. Georgiopoulos and N. La Vitoria Lobo, "Using Self-Organizing Maps to Learn Geometric Hashing Functions for Model-Based Object Recognition", **IEEE Transactions on Neural Networks**, Vol 9, No. 3, pp. 560-570, 1998.
- [7] G. Bebis, M. Georgiopoulos, and T. Kasparis "Coupling weight elimination with genetic algorithms to reduce network size and preserve generalization" **Neurocomputing**, Vol. 17, No. 3&4, pp. 167-194, 1997.
- [6] M. Georgiopoulos, H. Fernlund, G. Bebis, and G. Heileman, "Order of Search in Fuzzy ART and Fuzzy ARTMAP: Effect of the Choice Parameter", **Neural Networks**, vol. 9, no. 9, pp. 1541-1559, 1996.
- [5] G. Bebis and M. Georgiopoulos, "Feed-forward neural networks: why network size is so important", **IEEE Potentials**, pp. 27-31, October/November 1994.

- [4] G. Bebis and G. Papadourakis, "Object Recognition Using Invariant Object Boundary Contour Representations and Neural Network Models", **Pattern Recognition**, Vol. 25, No. 1, pp. 25-44, January 1992.
- [3] G. Papadourakis and G. Bebis, "Artificial Neural Networks I", **Scientific Journal of the Technical Chamber of Greece**, Vol. 11, No. 3, pp. 57-73, 1991.
- [2] G. Papadourakis and G. Bebis, "Artificial Neural Networks II", **Scientific Journal of the Technical Chamber of Greece**, Vol. 12, No. 1, pp. 107-131, 1992.
- [1] G. Bebis, G. Papadourakis and M. Georgiopoulos, "Back Propagation: Increasing Rate of Convergence by Predictable Pattern Loading", **Intelligent Systems Review**, Vol. 1, No. 3, pp. 14-30, 1989.

Conference Publications

- [83] M. Webster, K. McDermott, and G. Bebis, "Fitting the world to the mind: Transforming images to mimic perceptual adaptation", **3rd International Symposium on Visual Computing**, Lake Tahoe, Nevada, November 2007.
- [82] Z. Sun, G. Bebis, and N. Bourbakis, "Decision-Level Fusion for Vehicle Detection", **11th International Conference on Computers**, July 2007, Crete, Greece.
- [81] G. Amayeh, G. Bebis, A. Erol, and M. Nicolescu, "A new approach to Hand-based Authentication", **SPIE Defense and Security Symposium (DS26: Biometric Technology for Human Identification V)**, April 2007, Orlando, Florida.
- [80] G. Amayeh, G. Bebis, A. Erol, and M. Nicolescu, "A component-based Approach to Hand Verification", **IEEE Workshop on Biometrics (in conjunction with CVPR07)**, Minneapolis, MN, June 2007.
- [79] T. Uz, G. Bebis, A. Erol, and S. Prabhakar, "Minutia-Based Template Synthesis and Matching Using Hierarchical Delaunay Triangulations", **IEEE International Conference on Biometrics: Theory, Applications and Systems (BTAS07)**, September 27-29, 2007, Washington DC.
- [78] L. Loss, G. Bebis, M. Nicolescu, and A. Skurikhin, "An Automatic Framework for Figure-Ground Segmentation in Cluttered Backgrounds", **British Machine Vision Conference (BMVC 2007)**, University of Warwick, UK, September 10-13, 2007.
- [77] G. Amayeh, S. Kasaei, G. Bebis, A. Tavakkoli, and K. Veropoulos, "Improvement of Zernike Moment Descriptors on Affine Transformed Shapes", **International Symposium on Signal Processing and its Applications (ISSPA07)**, United Arab Emirates, February 12-15, 2007.
- [76] L. Loss, G. Bebis, M. Nicolescu, and A. Skourikhine, "Perceptual Grouping Based on Iterative Multi-Scale Tensor Voting", **2nd International Symposium on Visual Computing (ISVC06)**, Lake Tahoe, November 6-8, 2006..

- [75] A. Tavakkoli, M. Nicolescu, and G. Bebis, "A Novelty Detection Approach for Foreground Region Detection in Videos with Quasi-stationary Backgrounds", **2nd International Symposium on Visual Computing (ISVC06)**, Lake Tahoe, November 6-8, 2006.
- [74] J. Usabiaga, A. Erol, G. Bebis, R. Boyle, and X. Twombly, "Global Hand Pose Estimation by Multiple Camera Ellipse Tracking", **2nd International Symposium on Visual Computing (ISVC06)**, Lake Tahoe, November 6-8, 2006.
- [73] N. Bourbakis and G. Bebis, "A Method for Associating Patterns of Motion in Events from Video: A Case Study", **IEEE International Conference on Tools with Artificial Intelligence (ICTAI06)**, Washington, DC, November 2006.
- [72] A. Tavakkoli, M. Nicolescu, G. Bebis, "Robust Recursive Learning for Foreground Region Detection in Videos with Quasi-Stationary Backgrounds", **International Conference on Pattern Recognition (ICPR06)**, Hong Kong, August 2006.
- [71] G. Amayeh, G. Bebis, A. Erol, and M. Nicolescu, "Peg-Free Hand Shape Verification Using High Order Zernike Moments", **IEEE Workshop on Biometrics** (in conjunction with CVPR06), New York, NY, June 2006.
- [70] J. Wang, G. Bebis, and R. Miller, "Robust Video-Based Surveillance by Integrating Target Detection with Tracking", **IEEE Workshop on Object Tracking and Classification Beyond the Visible Spectrum** (in conjunction with CVPR06), New York, NY, June 2006.
- [69] A. Tavakkoli, M. Nicolescu, and G. Bebis, "An Adaptive Recursive Learning Technique for Robust Foreground Object Detection", **Workshop on Statistical Methods in Multi-image and Video Processing** (in conjunction with ECCV06), Graz, Austria, May 2006.
- [68] A. Tavakkoli, M. Nicolescu, and G. Bebis, "Automatic Statistical Object Detection for Visual Surveillance", **IEEE Southwest Symposium on Image Analysis and Interpretation**, Denver, CO, March 2006.
- [67] K. McDermott, J. Mulligan, G. Bebis, and M. Webster, "Visual Search and Eye Movements in Novel and Familiar Contexts", **SPIE Electronic Imaging (Human Vision and Electronic Imaging XI)**, San Jose, January 2006.
- [66] K. Veropoulos, G. Bebis, and M. Webster, "Investigating the Impact of Face Categorization on Recognition Performance", **1st International Symposium on Visual Computing**, (LNCS, vol 3804), Lake Tahoe, NV, December 2005.
- [65] G. Amayeh, A. Erol, G. Bebis, and M. Nicolescu, "Accurate and Efficient Computation of High Order Zernike Moments", **1st International Symposium on Visual Computing**, (LNCS, vol 3804), Lake Tahoe, NV, December 2005.
- [64] J. Martinez, A. Erol, G. Bebis, R. Boyle, and X. Twombly, "Rendering Optimizations Guided by Head-Pose Estimates and their Uncertainty", **1st International Symposium on Visual Computing**, (LNCS, vol 3804), Lake Tahoe, NV, December 2005.
- [63] A. Tavakkoli, M. Nicolescu, and G. Bebis, "Automatic Robust Background Modeling Using Multivariate Non-Parametric Kernel Density estimation for Visual Surveillance",

1st International Symposium on Visual Computing, (LNCS, vol 3804), Lake Tahoe, NV, December 2005.

- [62] A. Erol, G. Bebis, M. Nicolescu, R. Boyle and X. Twombly, "A Review on Vision-Based Full DOF Hand Motion Estimation", **IEEE Workshop on Vision for Human-Computer Interaction**, (in conjunction with CVPR 05), San Diego, CA, June 21, 2005.
- [61] J. Wang, G. Bebis, and R. Miller, "Overtaking Vehicle Detection Using Dynamic and Quasi-Static Background Modeling", **IEEE Workshop on Machine Vision for Intelligent Vehicles**, (in conjunction with CVPR 05), San Diego, CA, June 21, 2005.
- [60] N. Goel, G. Bebis, A. Nefian, "Face Recognition Experiments with Random Projection", **SPIE Defense and Security Symposium (Biometric Technology for Human Identification)**, Orlando, FL, March 28 - April 1, 2005.
- [59] A. Erol, G. Bebis, R. Boyle and M. Nicolescu, "Visual Hull Construction Using Adaptive Sampling", **IEEE Workshop on Applications of Computer Vision**, (WACC05), Breckenridge, CO, January 5-7, 2005.
- [58] T. Patten, W. Li, G. Bebis, and M. Freeman, "Automatic Heliopsis Zea Classification Using Image Analysis", **IEEE International Conference on Tools with Artificial Intelligence**, Boca Raton, FL, November 15-17, 2004.
- [57] K. She, G. Bebis, H. Gu, and R. Miller, "Vehicle Tracking Using On-Line Fusion of Color and Shape Features", **IEEE International Conference on Intelligent Transportation Systems**, Washington, DC, October 3-6, 2004.
- [56] Z. Sun, G. Bebis, and R. Miller, "On-road Vehicle Detection Using Optical Sensors: A Review", **IEEE International Conference on Intelligent Transportation Systems**, Washington, DC, October 3-6, 2004.
- [55] M. Eser, G. Cong, B. Parvin, and G. Bebis, "Shape Metamorphism Using p-Laplacian Equation", **International Conference on Pattern Recognition (ICPR04)**, Cambridge UK, 23-26 August 2004.
- [54] W. Li, G. Bebis, and N. Bourbakis, "Integrating Algebraic Functions of Views with Indexing and Learning for 3D Object Recognition", **IEEE Workshop on Learning in Computer Vision and Pattern Recognition**, Washington DC, June 28, 2004.
- [53] A. Sighn, A. Gyaourova, G. Bebis, and I. Pavlidis, "Infrared and Visible Image Fusion for Face Recognition", **SPIE Defense and Security Symposium (Biometric Technology for Human Identification)**, Orlando, 12-16 April, 2004.
- [52] A. Gyaourova, G. Bebis, and I. Pavlidis, "Infrared and Visible Image Fusion for Face Recognition", **European Conference on Computer Vision (ECCV)**, May 2004.
- [51] V. Nikulin and G. Bebis, "Multiresolution Image Retrieval Through Fusion", **SPIE Electronic Imaging (Storage and Retrieval Methods and Applications for Multimedia)**, San Jose, January 2004.

- [50] Z. Sun, G. Bebis, and R. Miller, "Evolutionary Gabor Filter Optimization with Application to Vehicle Detection", **IEEE International Conference on Data Mining**, pp. 307-314, Melbourne FL, November 2003.
- [49] J. Bhatt, N. Lobo, M. Shah, and G. Bebis "Automatic recognition of a baby gesture", **IEEE International Conference on Tools with Artificial Intelligence**, November 2003, Sacramento.
- [48] Z. Sun, G. Bebis, and R. Miller, "Boosting Object Detection Using Feature Selection", **IEEE International Conference on Advanced Video and Signal Based Surveillance**, pp. 290-296, Miami, July 2003.
- [47] Z. Sun, Z. Sun, Y. Varol and G. Bebis, "A distributed Visual Surveillance System", **IEEE International Conference on Advanced Video and Signal Based Surveillance**, Miami, July 2003.
- [46] J. Dowdall, I. Pavlidis, and G. Bebis "Face Detection in the Near-IR Spectrum", **AeroSense SPIE Conference**, April 2003, Orlando.
- [45] Dwight Egbert, George Bebis, and Dave Williams, "Computer Vision Research Teaching Modules for Community College Computer Science and Engineering Courses", **SEE Annual Conference & Exposition**, June 2003.
- [44] G. Bebis and D. Egbert, "Using Computer Vision to Improve Learning and Knowledge Acquisition, **4th International Conference on Information Communication Technologies in Education**, Samos, Greece, July 2003.
- [43] G. Bebis and D. Egbert, "Integrating Teaching with Research Using Computer Vision Examples, **International Conference on Computers and Advanced Technology in Education**, Rhodes, Greece, July 2003.
- [42] Z. Sun, G. Bebis, X. Yuan, and S. Louis, "Genetic Feature Subset Selection for Gender Classification: A Comparison Study", **IEEE Workshop on Applications of Computer Vision (WACV02)**, Orlando, December 2002.
- [41] Z. Sun, R. Miller, G. Bebis, and D. DiMeo, "A Real-time Pre-crash Vehicle Detection System", **IEEE Workshop on Applications of Computer Vision (WACV02)**, Orlando, December 2002.
- [40] Z. Sun, G. Bebis, and R. Miller, "On-Road Vehicle Detection Using Gabor Filters and Support Vector Machines", **IEEE International Conference on Digital Signal Processing**, Santorini, Greece, July 2002.
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Research Grants (serving as Principal Investigator (PI))

Agency: NSF
Investigators: G. Bebis (PI)
Title: Hand-Based Biometrics
Period of Proposed Funding: July 2006 - July 2008
Amount Granted : \$70,000

Agency: eTreppid Technologies, LLC
Investigators: G. Bebis (PI)
Title: Object Detection, Tracking, and Classification
Period of Proposed Funding: June 2006 - December 2007
Amount Granted : \$130,000

Agency: UtopiaCompression Inc.
Investigators: G. Bebis (PI)
Title: Visual Surveillance
Period of Proposed Funding: May 2006 - December 2006
Amount Granted : \$80,000

Agency: NASA
Investigators: G. Bebis (PI), F. Harris, A. Yfantis, and M. Nicolescu
Title: Computer Vision Technologies for Effective Human-Computer Interaction in Virtual Environments (2nd phase)
Period of Funding: 1/1/2006-2/29/2008
Amount Granted : \$780,000

Agency: NASA
Investigators: G. Bebis (PI), F. Harris, A. Yfantis, and P. Stubberud
Title: Computer Vision Technologies for Effective Human-Computer Interaction in Virtual Environments (1st phase)
Period of Funding: 9/1/02 - 12/31/05
Amount Granted: \$1,148,940

Agency: NSF
Investigators: G. Bebis (PI), D. Egbert, E. Jacobson, and M. McIntosh
Title: Combined Research-Curriculum Development in Computer Vision
Period of Funding: 1/1/2001 - 8/31/2004
Amount Granted: \$650,243

Agency: NSF
Investigators: G. Bebis (PI)
Title: Request for Travel Grant for Undergraduate and Graduate Students
Period of Funding: 6/1/2001 - 12/31/2001
Amount Granted: \$8,831

Agency: ONR
Investigators: G. Bebis (PI) and G. Mauer
Title: Automatic Target Recognition Using Algebraic Functions of Views

Period of Funding: 4/1/2001 - 3/31/2005
Amount Granted : \$587,887

Agency: Ford Motor Company
Investigators: G. Bebis (PI) and D. Egbert
Title: Vehicle Detection, Classification, Tracking, and Depth Estimation for Driver Assistance and Collision Avoidance as part of Vehicle Compatibility Big Bang
Period of Funding: 1/1/2003-8/31/2005
Amount Granted : \$80,000

Agency: University of Nevada (Applied Research Initiative)
Investigators: G. Bebis (PI) and D. Egbert
Title: Vehicle Detection, Classification, Tracking, and Depth Estimation
Period of Funding: 1/1/2003-8/31/2005
Amount Granted : \$80,000

Agency: UNR - Research Advisory Board
Investigators: G. Bebis (PI)
Title: Robotic Vision Systems
Period of Funding: 7/1/98 - 6/30/99
Amount Granted: \$8,000

Research Grants (serving as co Principal Investigator (co-PI))

Agency: Nevada Dept of Transportation (NDoT)
Investigators: T. Tan (PI), G. Bebis (PI)
Title: Evaluation of Video Detection Systems and Development of Application Guidelines at Signalized Intersections
Period of Proposed Funding: October 2007 - October 2009
Amount Granted : \$182,000

Agency: NSF
Investigators: S. Louis (PI), G. Bebis, et al.
Title: Cognitive Information Processing Systems (part of "Research Infrastructure for Nevada's Growth - Targeting Research with Uniqueness and Excellence")
Period of Proposed Funding: June 2005 - June 2008
Amount Granted : \$1,200,000

Agency: Sanford Center for Aging
Investigators: M. Webster (PI), G. Bebis, M. Wessinger, M. Crognale
Title: Adaptation and Aging in the Human Visual System
Period of Proposed Funding: 7/2005 - 12/2006
Amount Granted : \$20,000

Agency: NASA
Investigators: M. Webster (PI) and G. Bebis
Title: Adaptation and Visual Exploration

Period of Proposed Funding: 1/2005 - 12/2005
Amount Granted : \$39,619

Agency: NSF

Investigators: D. Koracin (PI), G. Bebis

Title: Development of an Air-Sea Interaction Model with the Parameterization of the Ocean Surface Gravity Waves

Period of Proposed Funding: 1/2006 - 12/2007

Amount Granted : \$70,000

Agency: UNR - Instructional Enhancement Grant

Investigators: D. Egbert (PI) and G. Bebis

Title: Teaching Modules for Computer Vision Research

Period of Funding: 1/1/2001 - 6/31/2001

Amount Granted: \$2,400

Agency: Honda

Investigators: Q. Ji (PI) and G. Bebis

Title: A Multi-Sensory Vision System for Monitoring Driver's Vigilance

Period of Funding: 11/1/98 - 10/31/99

Amount Granted: \$25,000

Agency: UNR - Applied Research Initiative

Investigators: Q. Ji (PI) and G. Bebis

Title: A Multi-Sensory Vision System for Monitoring Driver's Vigilance

Period of Funding: 11/1/98 - 10/31/99

Amount Granted: \$25,000