

Dr. Vidya Manian
Assistant Professor

Office Address:

Electrical and Computer Engineering Department
PO Box 9042
University of Puerto Rico, Mayagüez, PR 00681-9042
Ph. 787-832-2825, FAX 787-832-2485
E-mail: manian@ece.uprm.edu

Research and Teaching Interests:

Image processing, hyperspectral image analysis, computational modeling for classification of high dimensional images. Variational algorithms and manifold graph geometry for solving problems in image processing, biomedical image processing, computational algorithm analysis and hardware implementations of algorithms.

Education:

- Ph.D.** Computing, Information Science and Engineering, University of Puerto Rico, Mayagüez, 2004.
- M.S.** Electrical Engineering, University of Puerto Rico, Mayagüez, May 1995.
- B.E.** Electrical and Electronics Engineering, A. C. College of Eng. and Tech., Karaikudi, India, June 1990.

Experience:

Department of Electrical and Computer Engineering, University of Puerto Rico Mayagüez Campus, Assistant Professor Post doctoral Associate, CenSSIS	Mayagüez, P.R. Aug 2006 - present Jan 2005-July 2006
Lane Department of Computer Science and Electrical Engineering, West Virginia University, Visiting Scholar	Morgantown, WV. Jan 2004-Dec 2004

NSF Precise & Space Information Laboratory, UPRM. 1/2001-12/2003, Research assistant and NASA investigator in summer

Department of Electrical and Computer Engineering, UPRM, 7/99-12/2000, Instructor

Laboratory for Applied Remote Sensing and Image Processing, UPRM, 8/95 -6/99, Remote Sensing and Image Processing Specialist

Department of Electrical and Computer Engineering, UPRM, 8/93-5/95,
Research Assistant

W.S. Industries (I) Ltd., Chennai, India, 7/90-2/92, Engineer.

Teaching and research in Electrical Engineering. Currently involved in research in computational models for high dimensional images and teaching courses in Image Processing, Fundamentals of Computing and Pattern Recognition.

Journal Publications:

S. Velasco-Forero and V. Manian, "Improving hyperspectral image classification using spatial preprocessing," **IEEE Trans. Geoscience and Remote Sensing Letters**, to appear in Vol. 6, No. 2, pp 297-301, April 2009.

V. Manian and M. Velez-Reyes, "Support vector classification of land cover and benthic habitat from hyperspectral images", **Intl. Journal of high speed electronics and systems**, Vol. 18, No. 2, pp. 337-348, June 2008.

V. Manian and L. O Jimenez, "Land cover and benthic habitat classification using texture features from multispectral and hyperspectral images", **Journal of Electronic Imaging**, SPIE, Vol. 16, No. 2, 2007.

V. Manian and A. Ross, "Face detection using statistical and multi-resolution texture features", **Multimedia Cyberspace Journal, Special Issue on Pattern Recognition and Bioinformatics**, Vol. 3, No. 3, pp. 1-9, 2005.

V. Manian and R. Vasquez, "Approaches to color and texture based image classification", **Journal of Optical Engineering**, SPIE, Vol. 41, No. 7, pp. 1480-1490, July 2002.

V. Manian, R. Vasquez, and P. Katiyar, "Texture classification using logical operators", **IEEE Trans. on Image Processing**, Vol. 9, No: 10, pp. 1693-1703, Oct. 2000.

V. Manian and R. Vasquez, "Scaled and rotated texture classification using a class of basis functions", **Journal of Pattern Recognition**, Vol. 31, No. 12, pp. 1937-1948, 1998.

Publications in Conference Proceedings:

N. Diaz and V. Manian, "Hyperspectral texture synthesis by multiresolution pyramid decomposition," **Proceedings SPIE Intl. Conf. defense, security and sensing**, Vol. 7334, Orlando, April 2009.

S. Velasco and V. Manian, "Accelerating hyperspectral manifold learning using graphical processing units," **Proceedings SPIE Intl. Conf. defense, security and sensing**, Vol. 7334, Orlando, April 2009.

S. Velasco and V. Manian, "Improving hyperspectral image classification based on graphs using spatial preprocessing," **Proceedings IEEE Intl. Conf. IGARSS**, Boston, July 2008.

A. Alarcon and V. Manian, "A variational method for target detection in hyperspectral images," **Proceedings SPIE Intl. Conf. Defense & Security**, Vol. 6967, Orlando, April 2008.

S. Cruz and V. Manian, "Hyperspectral image classification using spectral histograms and semi-supervised learning," **Proceedings SPIE Intl. Conf. Defense & Security**, Vol. 6966, Orlando, April 2008.

V. Manian, L. O. Jimenez and M. Velez-Reyes, "A comparison of statistical and multiresolution texture features for improving hyperspectral image classification." **Proceedings SPIE Intl Conf. Remote Sensing**, SPIE, Belgium, Sept. 2005.

V. Manian and M. Velez-Reyes, "A boosted learning algorithm for texture classification and object detection", **Proceedings SPIE Conf. Defense & Security**, SPIE, Vol. 5817, Orlando, April 2005.

V. Manian and R. Vasquez, "Application of nonlinear texture dynamics for image classification." **Proceedings SPIE Conf. Defense and Security**, SPIE, Orlando, FL, April 2004.

V. Manian and R. Vasquez, "Texture discrimination based on neural dynamics of visual perception." **Proceedings IEEE Joint Intl. conf. Neural Networks**, Proceedings IEEE, Vol. 1, pp. 113-118, Portland, Oregon, July 2003.

V. Manian and R. Vasquez, "Texture based cloud detection in MODIS images, **Proceedings SPIE Remote Sensing conference**, Crete, Greece, Sept. 23-28, 2002.

V. Manian and R. Vasquez, A genetic algorithm for texture description and classification, **Proceedings SPIE Intl. Conf. AeroSense'02**, Orlando, FL, April 2002.

V. Manian, A. Vega and R. Vasquez, Comparison of feature selection algorithms for texture image classification, **Proceedings SPIE International Conference AeroSense'01**, Orlando, FL, April 2001.

V. Manian, Roger Hernandez and R. Vasquez, Classifier performance for SAR image classification, **Proceedings IEEE conference IGARSS'00**, Hawaii, July 2000.

V. Manian, Michael Diaz and R. Vasquez, Wavelet features for color image classification, **Proceedings ASPRS 2000**, Washington D.C., May 2000.

V. Manian, Marcel Castro and R. Vasquez "Texture based algorithm for color image classification, **Proceedings SPIE International Conference AeroSense'2000**, Orlando, April 2000.

V. Manian and R. Vásquez, Image classification using semivariogram method, **Proceedings World Multiconference on Systemics, Cybernetics and Informatics**, Vol. 6, Orlando, FL, August, 1999.

V. Manian and R. Vasquez, "Multiresolution edge detection algorithm applied to SAR images," **Proceedings IEEE Intl. Conference IGARSS'99**, Hamburg, July 1999.

V. Manian and R. Vásquez, On remote sensing image classification and segmentation using a toolbox, **Proceedings 4th Intl. Airborne remote sensing conference ERIM**, Ottawa, Canada, June 1999.

V. Manian, M. Ruiz and R. Vasquez, "The use of a robust toolbox for texture classification and segmentation, **Proceedings of SPIE AeroSense'99**, Orlando, FL, April' 1999.

V. Manian and R. Vasquez, "On the use of transform features for SAR image classification, **Proceedings IEEE Intl. Conference IGARSS'98**, Seattle, July 1998.

V. Manian and R. Vasquez, "Texture discrimination in noise using wavelets," **Proceedings SPIE Intl. Conference on AeroSense'98**, Orlando, FL, April 1998.

V. Manian and R. Vásquez, Comparison of traditional and wavelet methods for invariant texture classification, **Proceedings of COPIMERA'97**, Santiago, Chile, Oct'97.

V. Manian and R. Vasquez, "A framework for SAR image classification: comparison of co-occurrence and a Gabor based method," **Proceedings IEEE IGARSS**, Singapore, Aug. 1997.

V. Manian and R. Vásquez, On scaled and rotated texture segmentation using a class of basis functions, **Proceedings SPIE conf. on AeroSense**, Orlando, April 1997.

V. Manian and R. Vásquez, Feature analysis for scaled and rotated texture segmentation, **Proceedings 21st Int. Conf. on Computers and Industrial Engineering**, San Juan, PR, March 1997.

V. Manian and R. Vásquez, A framework for the recognition of scaled, translated and rotated objects using the short time Fourier transform, **Proceedings IEEE conf. SMC**, Beijing, China, Oct.1996.

V. Manian and R. Vásquez, On the implementation of wavelet transforms in multicomputer networks, **Proceedings of ICSPAT'96**, Boston, Oct. 1996.

V. Manian and R. Vasquez, "A framework for object recognition in images using the short time Fourier transform," **Proceedings of SPIE's optical science, instrumentation and engineering**, Denver, August 1996 .

V. Manian and R. Vásquez, Efficient algorithms for Gabor transforms in multicomputer networks, **Proceedings SPIE's 1996 AeroSense conference**, Orlando, April 1996.

V. Manian and R. Vásquez, A computational framework for analyzing textured image classification, **Proceedings 1995 IEEE SMC**, Vancouver, Canada, Oct. 1995.

V. Manian and R. Vásquez, Analysis of transputer processor networks for image processing, **Proceedings SPIE's 1995 AeroSense conference**, Orlando, April 1995.

Book Chapter Contribution:

CenSSIS Spectral Sensing Book

Presentations:

V. Manian and M. Velez-Reyes, "Support vector classification of alnd cover and benthic habitat from hyperspectral images," **International Symposium on Spectral Sensing Research**, Bar Harbor, Maine, May 2006.

V. Manian and A. Ross, "A texture based approach to face detection," *presented at* **Biometric Consortium**, Washington, Sept. 2004.

Research Grants:

Co-PI in Hyperspectral Imaging for Biodiversity Assessment of Coastal and Terrestrial Ecosystems, NASA EPSCoR, \$750,000, September 2009 to August 2012.

Collaborator in National Center for Island, Maritime& Extreme Environment Security, Hawaii University, 2009-2011.

PI in Advanced processing and pattern recognition techniques for hyperspectral images, National Geospatial Agency, \$139,998, September 2008 to August 2010.

PI in **Advanced skin diagnostics and assessment**, Lockheed Martin, \$100,000, April 2008 to December 2008.

Co-PI in **Improving algorithms for target detection in hyperspectral infrared imagery**, (PI Miguel Velez-Reyes) Department of Defense, \$485,057, November 2005 to November 2008.

Co-PI in **A geometric approach for the analysis of hyperspectral imagery**, (PI Miguel Velez-Reyes), National Geospatial Agency, \$140,000, August 2006 to July 2008.

Collaborator in **Center for Subsurface Sensing and Imaging Systems (CenSSIS)**, (Co-PI Miguel Velez-Reyes) A consortium between Northeastern University (lead institution), Boston University, Rensselaer Polytechnic, and the University of Puerto Rico Mayaguez Campus, NSF Engineering Research Centers Program, UPRM component \$3.75M, September 2000- August 2010.

Collaborator in **NOAA - Co-operative Remote Sensing Science and Technology Center (CREST)**, A consortium with CUNY and other universities UPRM PI - Dr. Ramon Vasquez, 2006-2010.

PI in **Statistical modeling and classification of skin components using multispectral reflectance confocal microscopic and hypersepctral images**, UPRM MBRS-SCORE seed money grant, \$7000, 2005.

PI in **Hyperspectral texture modeling by multiple pairwise pixel interactions**, UPRM R&D seed money grant, \$5000, 2007.

Graduate Theses Supervised:

Sol Marie-Cruz, **Classification of Hyperspectral Images using Spectral Difference Histogram**, M.S. Electrical Engineering. Completed in July 2008.

Andres Alarcon, **A Variational Method for Target Detection in Hyperspectral Images**, M.S. Electrical Engineering Thesis. In Progress.

Nestor Diaz, **Hyperspectral texture synthesis and inpainting methods**, M.S. Electrical Engineering Thesis. In Progress.

Susi Huaman, **Graph cuts method for segmentation of hyperspectral images**, M.S. Computer Engineering Thesis. In Progress.

Fanny Nina, **Computational methods for hyperspectral image classification**, M.S. Computer Engineering Thesis. In Progress.

Romel Campana, "Implementation of hyperspectral manifold learning in GPUs, M.S. Computer Engineering Thesis. In Progress.

Current Professional Memberships and Affiliations:

Member, IEEE Society
Member, SPIE Society of Optical Engineering

Academic Service Activities:

Reviewer

IEEE Trans Systems, Man and Cybernetics.
IEEE Trans. Geoscience and Remote Sensing.
Sensors Journal
Journal of Advanced Optics.
Intl. Journal of Remote Sensing.

Personal Information:

U.S. Citizen.
Bilingual in English and Spanish.

References:

Available upon request.