

## Curriculum Vitae

Notarization. I have read the following and certify that this *curriculum vitae* is a current and accurate statement of my professional record.

Signature\_\_\_\_\_

Date\_\_\_\_\_

### **I. Personal Information**

#### I.A. UID, Last Name, First Name, Middle Name, Contact Information

Chellappa, Ramalingam  
Rm # 4411 A.V. Williams Building  
Department of Electrical and Computer Engineering  
and Center for Automation Research  
University of Maryland  
College Park, MD 20742  
Tel # (301) 405-4526  
e-mail:rama@umiacs.umd.edu  
<http://www.umiacs.umd.edu/~rama/>

#### I.B. Academic Appointments at UMD

- 1991 - Present Professor  
Department of Electrical and Computer Engineering,  
Member, UMIACS  
Affiliate Professor  
Department of Computer Science,  
Applied Mathematics & Statistics and Scientific Computation  
University of Maryland  
College Park, MD 20742
- 2001 – Present Permanent Member  
UMIACS
- 2005 – Present Minta Martin Professor of Engineering
- 2016 – Present Distinguished University Professor

#### I.C. Administrative Appointments at UMD

- 1992 - 2001: Associate Director  
Center for Automation Research,  
University of Maryland  
College Park, MD 20742.
- 2001- 2012 Director  
Center for Automation Research,  
Permanent Member, UMIACS  
University of Maryland

College Park, MD 20742.

2011 - 2012    Interim Chair  
ECE Department  
University of Maryland  
College Park, MD 20742.

2012 – 2017    Chair  
ECE Department  
University of Maryland  
College Park, MD 20742.

### I.D. Other Employment

1977-1981:    Research Assistant and Instructor  
School of Electrical Engineering  
Purdue University  
W. Lafayette, Indiana 47907.

1979 -1981:    Research Assistant and Faculty Research Assistant  
Center for Automation Research  
University of Maryland  
College Park, MD 20742.

1981- 1991    Assistant, Associate Professor  
Department of Electrical Engineering Systems  
University of Southern California  
Los Angeles, CA 90089

1988-90:        Director  
Signal and Image Processing Institute  
Department of Electrical Engineering - Systems  
University of Southern California  
Los Angeles, CA 90089

### I.E. Educational Background

B.E.              (Honors) 1975  
University of Madras, Madras, India

M.E.              (Distinction) 1977  
Electrical Communication Engineering  
Indian Institute of Science  
Bangalore, India

M.S.E.E         Electrical Engineering, 1978  
Purdue University

Ph.D.             Electrical Engineering, 1981  
Purdue University

Thesis           Stochastic Models for Image Analysis and Processing  
Advisor:       Professors R.L. Kashyap  
                  School of Electrical Engineering  
                  Purdue University  
                  West Lafayette, Indiana 47907

## **II. Research, Scholarly and Creative Activities**

### **II.A. Books (include full citation information and ISBN)**

#### **II.A.1. Books Authored (specify original or revised edition)**

1.       *Artificial Neural Networks for Computer Vision*, Y.T. Zhou and R. Chellappa, Springer-Verlag, 1991. ISBN-10: 0387976833, ISBN-13: 978-0387976839.
2.       *Recognition of Humans and Their Activities Using Video*, Morgan Claypool, Rama Chellappa, Amit R. Chowdhury and Shaohua Zhou, Morgan & Claypool Publishers, 2005. ISBN-10: 1598290061, ISBN-13: 978-1598290066.
3.       *Human Identification Based on Gait*, Springer, Mark Nixon, Tieniu Tan and Rama Chellappa, 2005. ISBN: 978-0-387-29488-9.
4.       *Unconstrained Face Recognition*, Springer, Shaohua Zhou and Rama Chellappa, 2005. ISBN: 978-0-387-29486-5.
5.       *Statistical Models and Methods for Video-based Tracking and Recognition*, Now Publishers Inc, Rama Chellappa, Aswin Sankaranarayanan, Ashok Veeraghavan and Pavan Turaga, March 2010. ISBN: 978-1-60198-314-5.
6.       *Sparse Representations and Compressive Sensing for Imaging and Vision*, Vishal Patel and Rama Chellappa, Springer Briefs in Electrical and Computer Engineering, March 2013. ISBN 978-1-4614-6381-8.
7.       *Domain Adaptation for Visual Recognition*, Raghuraman Gopalan, Ruonan Li, Vishal M. Patel and Rama Chellappa, Foundations and Trends in Computer Graphics and Vision: Vol. 8: No. 4, pp 285-378, 2015. <http://dx.doi.org/10.1561/06000000057>

#### **II.A.2. Books Edited**

1.       . *Markov Random Fields: Theory and Applications*, Academic Press, Boston, R. Chellappa and A.K. Jain (eds.), 1993. ISBN-10: 0121706087, ISBN-13: 978-0121706081.
2.       *Face Processing: Advanced Modeling and Methods*, Academic Press, Wenye Zhao and Rama Chellappa (eds.), Academic Press, 2006. ISBN: 978-0-12-088452-0.
3.       *Academic Press Library in Signal Processing, Volumes 1-5*, Sergios Theodoridis and Rama Chellappa (eds.), Academic Press, MA, 2014.
4.       *Motion Deblurring: Algorithms and Systems*, A.N. Rajagopalan and Rama Chellappa, Cambridge University press, UK, 2014. ISBN: 9781107044364

### **II.A.7. Other**

1. *Selected Papers and Tutorial in Digital Image Processing and Analysis, Volumes 1 and 2, Digital Image Processing and Analysis*, IEEE Computer Society Press, R. Chellappa and A. A. Sawchuk (eds.), June 1985. ISBN: 0818606665.
2. *Digital Image Processing (a collection of papers)*, IEEE Computer Society Press, Ed. R. Chellappa, 1992. ISBN-10: 0818623616, ISBN-13: 9780818623615.

### **II.B. Chapters**

#### **II.B.1. Books**

1. R. Chellappa, "Multiresolution Models for Image Analysis and Processing", in *Multi-resolution Image Analysis and Processing*, A. Rosenfeld (Ed.), Springer-Verlag, pp. 102-108, 1984.
2. R. Chellappa, "Two-Dimensional Discrete Gauss Markovian Random Field Models for Image Processing", in *Progress in Pattern Recognition, Vol. 2*, L.N. Kanal and A. Rosenfeld (Eds.), North-Holland, pp. 79-112, 1985.
3. R.T. Frankot and R. Chellappa, "A Method for Enforcing Integrability in Shape from Shading Algorithms", in *Shape from Shading* (eds.), B.K.P. Horn and M.J. Brooks, M.I.T. Press, pp. 89-122, 1989.
4. Y.T. Zhou and R. Chellappa, "Image Restoration", in *Neural Networks: Introduction to Theory and Applications*, (ed.), B. Kosko, Prentice-Hall, pp. 63-89, 1991.
5. B. S. Manjunath, T. Simchony and R. Chellappa, "Parallel Networks for Texture Segmentation", in *Neural Networks: Introduction to Theory and Applications*, (ed.), B. Kosko, Prentice-Hall, pp. 37-61, 1991.
6. T. Simchony, R. Chellappa and Z. Lichtenstein, "Image Estimation Using 2-D Noncausal Gauss Markov Random Fields", in *Image Restoration*, (ed.), A. Katsaggelos, Springer Series in Information Sciences, pp. 109-141, 1991.
7. A. Rangarajan, B.S. Manjunath and R. Chellappa, "Markov Random Fields and Neural Networks with Applications in Early Vision Problems", in *Artificial Neural Networks and Statistical Pattern Recognition: Old and New Connections*, (eds.), I.K. Sethi and A.K. Jain, Elsevier Science Publishers, 1991.
8. Y.T. Zhou and R. Chellappa, "A Neural Network for Motion Processing", in *Neural Networks for Human and Machine Perception*, (ed.), Vol. 1, H. Wechsler, Academic Press Inc., pp. 492-516, 1991.

9. R. Chellappa and A. Rosenfeld, "Vision Engineering: Designing Computer Vision Systems", in Handbook of Pattern Recognition and Computer Vision, (eds.), C.H. Chen, L.F. Pau and P.S.P. Wang, World Scientific Publishing Company, Singapore, pp. 805-815, 1993.
10. R. Chellappa, R.L. Kashyap and B.S. Manjunath, "Model Based Texture Segmentation and Classification", in Handbook of Pattern Recognition and Computer Vision, (eds.), C.H. Chen, L.F. Pau and P.S.P. Wang, World Scientific Publishing Company, Singapore, pp. 277-310, 1993.
11. R. Chellappa, S. Der and E.J.M. Rignot, "Statistical Characterization of FLIR, LADAR and SAR Imagery", in Statistics and Images, K.V Mardia, (ed.), Carfax publishers, Oxfordshire, U.K., pp. 273-312, 1994.
12. R. Chellappa, T.H. Wu, Q. Zheng and p. Burlina, "Visual Motion Analysis" in Control and Dynamic Systems, C.T. Leondes, (ed.), Vol.67, pp.199-261, 1994.
13. A. Rangarajan and R. Chellappa, "Markov Random Field Models in Image Processing", in the Handbook of Brain Theory and Neural Networks, M.A, Arbib (ed.), MIT Press, Boston MA, pp. 564-567, 1995.
14. R. Chellappa, P. Burlina, X. Zhang, Q. Zheng, C.L. Lin, V. Parameswaran, L.S. Davis and A. Rosenfeld "Site Model Mediated Detection of Movable Object Activities, RADIUS: IU for Imagery Intelligence, O. Firschein (ed.), Morgan Kaufman, pp. 285-318, 1997.
15. R. Chellappa , Q. Zheng, S. Kuttikad, S. Shekhar, and P. Burlina, "Site Model Construction for Exploitation of EO and SAR Images", RADIUS: IU for Imagery Intelligence, O. Firschein (ed.), Morgan Kaufman, pp. 185-208, 1997.
16. R. Chellappa, Q. Zheng, C. Shekhar and P. Burlina, "Site Model Supported Targeting", RADIUS: IU for Imagery Intelligence, O. Firschein, (ed.), Morgan Kaufman, pp. 357-372, 1997.
17. C. Morimoto and R. Chellappa, "Electronic Digital Image Stabilization and Mosaicking", in Visual Information Representation, Communication and Image Processing, (C.W. Chen and Y.Q. Zheng, eds.), Marcel Dekker, Inc., New York, NY, 1999.
18. S. Srinivasan and R. Chellappa, "Electronic Image Stabilization and Mosaicking Algorithms", Image Processing, A.C. Bovik (ed.), Academic Press pp. 259-268, 2000.
19. R. Chellappa and B.S. Manjunath, "Texture Classification and Segmentation", in Foundations of Image Understanding L.S. Davis (ed.) Kluwer Academic Publishers, Boston, pp. 219-240, 2001.
20. R. Chellappa and A. Rosenfeld, "Image Processing and Analysis," in Encyclopedia of Physical Science and Technology, San Diego: Academic Press, pp. 595-630, 2001.

21. W. Zhao and R. Chellappa, "Image-based Face Recognition: Issues and Methods", in *Pattern Recognition: Algorithms, Systems and Applications*, (B. Javidi, ed.), Marcel Dekker, Inc., New York, NY, 2002.
22. S. Der, et al, "View-Based Recognition of Military Vehicles in Ladar Imagery Using CAD Model Matching", in *Image Recognition: Algorithms, Systems, and Applications*, B. Javidi, (ed.), New York, NY, Marcel Dekker.
23. R. Chellappa and S. Zhou, "Face Recognition in Video in Hand book on Face Recognition", S. Li and A K. Jain (eds.), Springer-Verlag, 2003.
24. N. Vaswani, A.K. Agrawal, Q. Zheng and R. Chellappa, "Moving Object Detection and Compression in IR Sequences", *Computer Vision beyond the Visible Spectrum*, Eds B. Bhanu and I. Pavlidis, Springer, 2003.
25. Rama Chellappa and S. Zhou, "Face Recognition in Video", in *Handbook on Face Recognition*, S. Li and A.K. Jain (eds.), Springer-Verlag, 2003.
26. R. Chellappa, A. Roy Chowdhury and S. Zhou, "Human Identification Using Gait and Faces", D. Etter (ed.), *The Electrical Engineering Handbook*, CRC Press, 2004.
27. S. Zhou and R. Chellappa, "Face Recognition from Still Images and Videos", *Handbook of Image and Video Processing*, 2nd Edition, A. Bovik (Ed.), Academic Press, 2005.
28. A. Kale, N. Cuntoor, B. Yegnanarayana, A.N. Rajagoplan and Rama Chellappa, "Gait-based Human Identification Using Appearance Matching", in *Optical and Digital Techniques of Information Security*, B. Javidi, (ed.), Springer 2005.
29. S. Srinivasan, R. Chellappa, A. Veeraraghavan and G. Aggarwal, "Electronic Image Stabilization and Mosaicking Algorithms", *Handbook of Image and Video Processing*, 2nd edition, A. Bovik (ed.), Academic Press, 2005.
30. Narayanan Ramanathan and Rama Chellappa, " Recognizing Faces Across Age Progression ", *Multi-Biometric Systems for Identity Recognition : Theory and Experiments* (Eds R. Hammoud, M. Abidi and B. Abidi), Springer-Verlag, 2006.
31. R. Chellappa, N. Cuntoor, S.W. Joo, V. Subrahmanian and P. Turaga, "Computational Vision Approaches for Event Modeling", in *Understanding Events: from Perception to Action*, Oxford series in Visual Cognition, pp. 473-521, 2006.
32. M. Ramachandran, A. Veeraraghavan and R. Chellappa, "Video Stabilization and Mosaicking", *The Essential Guide to Video Processing*, Al Bovik (Ed.), Elsevier Inc., pp. 109-140, 2009.

33. S.K. Zhou, R. Chellappa and N. Ramanathan, " Unconstrained Face Recognition from a Single Image", *The Essential Guide to Image Processing*, Al Bovik (Ed.), Elsevier, pp. 677-713, 2009.
34. R. Chellappa, M. Bicego and P. Turaga, "A Review of Video-Based Face Recognition Algorithms". in *Handbook of Remote Biometrics*, M. Tistarelli, S. Li and R. Chellappa (eds.), Springer, June 2009.
35. R. Chellappa, A. Veeraraghavan and A. C. Sankaranarayanan, "Knowledge Extraction from Surveillance Sensors", *Wiley Handbook on Science and Technology for Homeland Security*.
36. P. Turaga, R. Chellappa, and A. Veeraraghavan, "Advances in Video-based Human Activity Analysis", in *Advances in Computers*, Elsevier, vol. 80, pp. 237-290, July 2010.
37. P. Turaga, A. Veeraraghavan, A. Srivastava, and R. Chellappa, "Statistical Analysis on Manifolds and its applications to Video Analysis", in *Video Search and Mining, Studies in Computational Intelligence*, D. Schonfeld, (Ed.), Springer-Verlag, 2010.
38. M. Albanese, P. Turaga, R. Chellappa, A. Pugliese, V. S. Subrahmanian, "Semantic Video Content Analysis", in *Video Search and Mining, Studies in Computational Intelligence*, D. Schonfeld, (Ed.), Springer-Verlag, 2010.
39. V. M. Patel, J. K. Pillai, and R. Chellappa, "Image and Video-based Biometrics," in *Visual Analysis of Humans: Looking at People*, T. B. Moeslund, A. Hilton, V. Kruger, and L. Siga (Eds.), Springer-Verlag, 2011.
40. H. V. Nguyen, A. Banerjee, P. Burlina, J. Broadwater, and R. Chellappa, "Tracking and Identification via Object Reflectance using a Hyperspectral Camera", in *Machine Vision Beyond Visible Spectrum*, Guoliang Fan (Ed.), Springer 2011.
41. M. Du, A. Sankaranarayanan and R. Chellappa, "Face Tracking and Recognition in Video, in *Multibiometrics for Human Identification*", B. Bhanu and V. Govindaraju (Eds.), Cambridge University Press, 2011.
42. R. Chellappa, M. Du, P. Turaga and S.K. Zhou, "Face Tracking and Recognition in Video", in *Handbook of Face Recognition (2nd Edition)*, S. Z. Li and A. K. Jain (Eds.), Springer, 2011.
43. R. Gopalan, W. Schwartz, R. Chellappa, and A. Srivastava, " Face detection", *A Guide to Visual Analysis of Humans: Looking at People*, T. B. Moeslund, A. Hilton, V. Kruger, and L. Siga (eds.), Springer-Verlag, 2011.
44. Venu Madhav Govindu and R. Chellappa, "Feature-based image to image registration", *Image Registration for Remote Sensing*, J. Lemoigne and N. Nethanyahu (eds.), pp. 215-239, 2011.

45. Rama Chellappa and Pavan K. Turaga, "Advances in Video-Based Biometrics", *Advances in Computers*, pp. 183-203, 2011.
46. V. M. Patel and R. Chellappa, "Approximation methods for the recovery of shapes and images from gradients," in *Excursions in Harmonic Analysis: The February Fourier Talks at the Norbert Wiener Center*, T. Andrews, R. Balan, J. J. Benedetto, W. Czaja, and K. Okoudjou (Eds.), Springer, 2012.
47. J. K. Pillai, V. M. Patel, R. Chellappa, and N. K. Ratha, "Robust and Secure Iris Recognition," in *Handbook of Iris Recognition*, M. J. Burge and K. W. Bowyer (Eds.), Springer-Verlag, 2012.
48. G. Warnell and R. Chellappa. "Compressive Sensing in Visual Tracking." *Video Surveillance*. Ed. H. El-Alfy. InTech. 2012.
49. P. Turaga, R. Chellappa and A. Srivastava, "Statistical Methods on Special Manifolds for Image and Video Understanding", *Handbook of Statistics*, Vol. 31, C.R Rao and V. Govindaraju (eds.), Elsevier, 2013.
50. V.M. Patel and R. Chellappa, "Dictionary-Based Methods for Object Recognition", in *Handbook of Statistics*, Vol. 31, C.R Rao and V. Govindaraju (eds.), Elsevier, 2013.
51. Q. Qiu, J. Ni and R. Chellappa, "Dictionary-based Domain Adaptation Methods for the Re-Identification of Faces", in *Person Re-Identification*, S. Gong, et al., (eds.), pp. 271-288, Springer 2014.

### **II.B.2. Collections**

1. T.J. Broida and R. Chellappa, Estimation of Object Motion Parameters from a Sequence of Noisy Images, in *Computer Vision*, IEEE Computer Society Press, (eds.), R. Kasturi and R. Jain, pp. 378-387, 1991.
2. Q. Zheng and R. Chellappa, Estimation of Illuminant Direction, Albedo and Shape from Shading , in *Physics-Based Vision: Shape Recovery*, (eds.), L.B. Wolff, S.A. Shafer and G.E. Healey, Jones and Bartlett Publishers, Boston, MA, pp. 39-61, 1992.
3. R.T. Frankot and R. Chellappa, Estimation of Surface Topography from SAR Imagery Using Shape from Shading Techniques, in *Physics-Based Vision: Shape Recovery*, (eds.), L.B. Wolff, S.A. Shafer and G.E. Healey, Jones and Bartlett Publishers, Boston, MA, pp. 62-101, 1992.

### **II.B.3. Encyclopedia**



1. R. Chellappa and R.L. Kashyap, Image Models, Encyclopedia of Artificial Intelligence, S. Schwartz (Ed.), 1992, pp. 628-637.
2. R. Chellappa and A. C. Sankaranarayanan, “Surveillance”, Encyclopedia of Biometrics, S. Li (ed.), Springer, 2009.
3. R. Chellappa, G. Aggarwal and S.K. Zhou, “Video-based Face Recognition”, Encyclopedia of Biometrics, S. Li (ed.), Springer, 2009.
4. R. Chellappa, A. Veeraraghavan and N. Ramanathan, “Overview of Gait Biometrics”, Encyclopedia of Biometrics, S. Li (ed.), Springer, 2009.

## I.I.C. Articles in Refereed Journals

### 2016

1. G. Warnell, P. David and R. Chellappa, “Ray Saliency: Bottom-Up Visual Saliency for a Rotating and Zooming Camera”, International JI. of Computer Vision, vol. 116, pp. 174-189, Jan. 2016.
2. J. Zheng, Z. Jiang and R. Chellappa, “Cross-view Action Recognition via Transferable Dictionary Learning”, IEEE Transactions on Image Processing, vol, 25, pp. 2542-2556, June 2016.
3. V. M. Patel, R. Chellappa, D. Chandra and B. barbell, “Continuous User Authentication on Mobile Devices”, IEEE Signal Processing Magazine, vol. 33, pp. 49-61, July 2016.
4. Raviteja Vemulapalli, Felipe Arrate, Rama Chellappa, “R3DG Features: Relative 3D Geometry-based Skeletal Representations for Human Action Recognition”, Accepted for Computer Vision and Image Understanding.
5. X. Gibert, V. M. Patel, and R. Chellappa, “Deep Multi-task Learning for Railway Track Inspection”, Accepted for IEEE Trans. on Intelligent Transportation Systems.
6. P. Samangoueia, V. M. Patel and R. Chellappaa, “Facial Attributes for Active Authentication on Mobile Devices”, Image and Vision Computing (In Press).
7. R. Chellappa, “The Changing Fortunes of Pattern Recognition and Computer Vision”, Image and Vision Computing, 2016.
8. K. Hara and R. Chellappa, “Growing Regression Tree Forests by Classification for Continuous Object Pose Estimation”, Accepted for Intl. JI. of Computer Vision.

### 2015

1. Y.C. Chen, V.M. Patel, R. Chellappa, P.J. Phillips, "Salient Views and View-dependent Dictionaries for Object Recognition", Pattern Recognition: Special Issue on Discriminative Feature Learning from Big Data for Visual Recognition, Jan. 2015.
2. V. M. Patel, R. Gopalan, R. Li, and R. Chellappa, "Visual domain adaptation: a survey of recent advances," IEEE Signal Processing Magazine, vol. 32, no. 3, pp. 53 - 69, May 2015.
3. A. Punnappurath, A. N. Rajagopalan, S. Taheri, R. Chellappa and G. Seetharaman, "Face Recognition across Non-Uniform Motion Blur, Illumination, and Pose", IEEE Trans. on Image Processing, vol. 24, pp. 2067 – 2082, July 2015.
4. A. Srivastava, J. Pillai, V.M. Patel and R. Chellappa, "Multiple Kernel-based Dictionary Learning for Weakly Supervised Classification", Pattern Recognition Journal, vol. 48, pp. 2667-2675, Aug. 2015.
5. A. Srivastava, J. Pillai, V.M. Patel and R. Chellappa, ""Generalized Dictionaries for Multiple Instance Learning", Intl. JI. of Computer Vision, vol. 114, pp. 288-305, Sept. 2015.
6. V. M. Patel, N. K. Ratha, and R. Chellappa, "Cancelable biometrics: A review," IEEE Signal Processing Magazine: Special Issue on Biometric Security and Privacy, vol. 32, pp. 54-65, Sept. 2015.
7. S. Shekhar, V.M. Patel and R. Chellappa, "Coupled Projections for Adaptation of Dictionaries", IEEE Transactions on Image Processing, vol. 24, pp. 2941-2954, Oct. 2015.
8. Y.C. Chen, V.M. Patel, P.J. Phillips and R. Chellappa, "Dictionary-based Face and Person Recognition from Unconstrained Video", IEEE Access: Special Issue on 4D's of Machine Learning for Biometrics: Deep Learning, Dictionary Learning, Domain Adaptation, and Distance Metric Learning, vol. 3, pp. 1783 - 1798, Oct. 2015.
9. A. Srivastava, V.M. Patel and R. Chellappa, "Non-Linear Dictionary Learning with Partially Labeled Data", Pattern Recognition Journal, vol. 48, no. 11, pp. 283-3292, Nov. 2015 (Invited).
10. G. Warnell, S. Bhattacharya, R. Chellappa and T. Basar, "Adaptive-Rate Compressive Sensing Using Side Information", IEEE Trans. on Image Processing, vol. 24, pp. 3846 – 3857, Nov. 2015.
11. H. V. Nguyen, H. T. Ho, V. M. Patel, and R.Chellappa, "DASH-N: Joint Hierarchical Domain Adaptation and Feature Learning", IEEE Trans. on Image Processing, vol. 24, pp. 5479 - 5491, Dec. 2015.
12. N. Batool and R. Chellappa, "Fast Detection of Facial Wrinkles based on Gabor Features using Image Morphology and Geometric Constraints", Pattern Recognition Journal, vol. 48, pp.642 – 658, 2015.

13. Q. Qiu and R. Chellappa, "Compositional Dictionaries for Domain Adaptive Face Recognition", IEEE Trans. on Image Processing, vol. 24, pp. 5152 – 5165, Dec. 2015.
14. M. Du and R. Chellappa, "Face Association for Videos Using Conditional Random Fields and Max-Margin Markov Networks", IEEE Trans. on Patt. Anal. And Mach. Intell., vol. 37, Dec. 2015.
15. X. Lan, A. J. Ma, P. C. Yuen, and R. Chellappa, "Joint Sparse Representation and Robust Feature-Level Fusion for Multi-Cue Visual Tracking", Accepted for IEEE Trans. on Image Processing

## 2014

1. J. Pillai, M. Puertas, and R. Chellappa, "Sensor Adaptation in Iris Recognition", Accepted for Publication, IEEE Trans. on Patt. Anal. and Mach. Intell., vol. 36, pp. 73-85, Jan. 2014.
2. M. Yu Liu, O. Tuzel, S. Ramalingam, and R. Chellappa, "Entropy-Rate Clustering: Cluster Analysis via Maximizing a Submodular Function subject to a Matroid Constraint", IEEE Trans. on Patt. Anal. and Mach. Intell., vol. 36, pp. 99-112, Jan. 2014.
3. S. Shekhar, V. Patel, N. Nasrabadi and R. Chellappa, "Joint Sparse Representation for Robust Multimodal Biometrics Recognition", IEEE Trans. on Patt. Anal. and Mach. Intell., vol. 36, pp. 113-126, Jan. 2014.
4. V. M. Patel, G. R. Easley, R. Chellappa, and N. M. Nasrabadi, "Separated Component-Based Restoration of Speckled SAR Images", IEEE Trans. on Geoscience and Remote Sensing, vol. 52, pp. 1019-1029, Feb 2014.
5. M. Du, A. Sankaranarayanan and R. Chellappa, "Robust Face Recognition from Multi-View Videos", IEEE Trans. on Image Processing, vol. 23, pp. 1105-1107, March 2014.
6. C.H. Chen, F. Julien, G. Kurillo, T. Andriacchi, R. Bajcsy, and R. Chellappa, "Camera Networks for Healthcare, Tele-immersion and Surveillance", IEEE Computer, vol. 47, pp. 26-26, May 2014.
7. R. Li, P. Turaga, A. Srivastava and R. Chellappa, "Differential Geometric Representations and Algorithms for Some Pattern Recognition and Computer Vision Problems", Pattern Recognition Letters, vol. 43, pp. 3-16, 2014. Invited Paper. (ICPR 2012 Special Issue.)
8. N.T. Smith, M.J. Lewis and R. Chellappa, "Detection, Localization and Tracking of Shock Contour Salient Points in Schlieren Sequences", American Institute of Aeronautics and Astronautics Journal.

9. V. M. Patel, Y. C. Chen, R. Chellappa, and P. J. Phillips, "Dictionaries for Image and Video-based Face Recognition" Invited Paper , 30<sup>th</sup> Anniversary Issue, JI. Opt. Society of America, vol. 31, pp. 1090-1103, May 2014.
10. A. Srivastava, V.M. Patel and R. Chellappa, "Multiple Kernel learning for Sparse Representation-based Classification", IEEE Trans. on Image Processing, vol. 23, pp. 3013-3024, July 2014.
11. S. Taheri, Q. Qiu and R. Chellappa, "Structure-Preserving Sparse Decomposition for Facial Expression Analysis," IEEE Transactions on Image Processing, vol. 23, pp. 3590-3603, Aug. 2014.
12. M. E. Fathy, V. M. Patel, T. Yeh, Y. Zhang, R. Chellappa, and L. S. Davis, "Screen-based Active User Authentication", Pattern Recognition Letters, vo. 42, pp. 122-127, 2014.
13. N. Batool and R. Chellappa, "Detection and Inpainting of Facial Wrinkles using Texture Orientation Fields and Markov Random Field Modeling", IEEE Trans. on Image Processing, vol. 23, pp. 3773-3788, Sept. 2014.
14. R. Gopalan, R. Li and R. Chellappa, "Unsupervised Adaptation across Domain Shift by Generating Intermediate Data Representations", IEEE Trans. on Patt. Anal. and Mach. Intell., vol. 36, pp. 2288-2302, Nov.2014.
15. Q. Qiu, V. Patel and R. Chellappa, "Information-theoretic Dictionary Learning for Image Classification", IEEE Trans. on Patt. Anal. and Mach. Intell., vol. 36, pp. 2173-2184, Nov. 2014.
16. X. Gibert-Serra1, V.M. Patel, D. Labate, and R. Chellappa, "Discrete Shearlet Transform on GPU with Applications in Anomaly Detection and Denoising", EURASIP Journal on Applied Signal Processing, vol. 64, 2014.
17. Y-C. Chen, V. M. Patel, R. Chellappa, and P. J. Phillips, "Ambiguously labeled learning using dictionaries," IEEE Transactions on Information Forensics and Security: Special Issue on Facial Biometrics in the Wild, vol. 9, no. 12, pp. 2076-2088, Dec. 2014.

### 2013

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6. G. Sharma and R. Chellappa, "Confidence Intervals for a class of 2-D Spectral Estimates", Proc. of the Intl. Conf. on Acoust., Speech and Signal Proc., Tampa, Florida, March 1985.

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1. R. Chellappa, Y.H.Hu, and S.Y.Kung , "On Two-Dimensional Maximum Entropy Spectral Estimation", Proc. of the IEEE Computer Society Conf. on Patt. Recog. and Image Proc., Las Vegas, pp. 72-76, June 1982.

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#### **II.D.2. Non-Refereed Conference Proceedings**

##### **2011**

1. V. M. Patel and R. Chellappa, "Sparse representations, compressive sensing and dictionaries for pattern recognition," Asian Conference on Pattern Recognition (ACPR), Beijing, China, 2011.

2. V. M. Patel, G. R. Easley, and R. Chellappa, "Multilayered Image representation-based compressive SAR imaging," IEEE International Symposium on Antennas and Propagation and USNC/URSI National Radio Science Meeting, Spokane , WA, 2011. (Invited).

##### **2006**

1. S.-W. Joo and R. Chellappa, "Attribute Grammar-Based Event Recognition and Anomaly Detection," In Proc. International Workshop on Semantic Learning Applications in Multimedia, New York , NY June, 2006.

2. Mohamed F. Abdelkader, Rama Chellappa, Qinfen Zheng and Alex L. Chan "Integrated Motion Detection and Tracking for Visual Surveillance", International Conference for Vision Systems (ICVS), Vol. 28, Jan. 2006.

##### **2005**

1. A. Agrawal & R. Chellappa, "Fusing Depth and Video using Rao-Blackwellized Particle Filter", First International Conference on Pattern Recognition and Machine Intelligence, Kolkata, India, 2005.

2. Rama Chellappa, Ashok Veeraraghavan and Gaurav Aggarwal, "Pattern Recognition in Video", International Conference on Pattern Recognition and Machine Intelligence, Kolkata, India, December, 2005.

3. Gaurav Aggarwal, Ashok Veeraraghavan and Rama Chellappa, "Facial Pose Tracking in Un calibrated Videos" for International Conference on Pattern Recognition and Machine Intelligence, Kolkata, India December, 2005.

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7. J. Li, and R. Chellappa, "A factorization approach for structure from planar motion", IEEE Workshop on Motion and Video Computing, January, 2005.

#### 2004

1. J.B. Broadwater, R. Meth, and R. Chellappa, "Dimensionality Estimation in Hyperspectral Imagery Using Minimum Description Length," in Proc. of the Army Science Conference 2004 , Orlando, FL, November, 2004.

#### 2001

2. B. Li, R Chellappa and H. Moon "Monte Carlo Simulation Techniques for Probabilistic Tracking", Conference Record of the Thirty-Fifth Asilomar Conference on Signals, Systems and Computers, Vol. 1, pp. 75-82, 2001.

#### 1993

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2. T.H. Wu and R. Chellappa, " Experiments on Estimating Motion and Structure Parameters Using Long Monocular Image Sequences", Proc. Conf. on Information Sciences and Systems, The Johns Hopkins University, Baltimore, MD, March 1993.
3. K. Etemad and R. Chellappa, "A Neural Network Based Edge Detector", Proc. Intl. Conf. on Neural Networks, San Francisco, CA, March 1993.

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1. Y.T. Zhou and R. Chellappa, "A Novel Approach to Image Restoration Based on a Neural Network," First Annual Intl. Conf. on Neural Network, First Annual Intl. Conf. on Neural Network, San Diego, CA, June 1987.

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3. R.L. Kashyap and R.Chellappa, "Classification of Images Using Features Derived From Random Field Models", Proceedings of IFAC Symposium on Theory and Application of Digital Control, New Delhi, India, 1982.

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1. R.L. Kashyap and R.Chellappa, "Filtering of Noisy Images Using Markov Random Field Models of Images," Proceedings of the Nineteenth Allerton Conf. on Commn. Control and Computing, Univ. of Illinois, Urbana, Oct. 1981.

### 1980

1. R.L. Kashyap and R. Chellappa "Image Restoration Using Random Field Models," Proc. of the Eighteenth Allerton Conf. on Commn., Control and Computing, University of Illinois, Urbana, pp. 956-965, Oct. 1980.

## II.E. Conferences, Workshops, and Talks

### II.E.1. Keynotes

Norwegian National Conference on Image Processing (May 1997), First Intl. Conf. on Audio-Video Biometric Based Person Authentication (March 1997), EUSIPCO (Sept. 1998), Events workshop (2003), Fourth Workshop on Auto ID (Nov. 2005), IEEE International Conf. on Image Processing, Atlanta, GA, Oct. 2006, International Conf. on Image Analysis and Processing, Modena, Italy, 2007, DICTA, Canberra, Australia (Dec. 2008), SCIA, BMVC, K.S. Fu Prize Lecture at ICPR, Tokyo, Japan, (Nov. 2012)

### II.E.2. Invited Talks (Since 1996)

Invited talks in IMDSP workshop, (1996), ICASSP'97 (expert summary), NATO ASI on Face Recognition (July 1997), OSA Annual Symposium (Oct. 1998), Real-time Face Recognition Tracking

Workshop (2001), NSF Biometrics workshop (July, 2003), Interagency Biometrics Meeting (Sept. 2003) SPIE, Conf. on Homeland Security (Dec. 2003). First US-European workshop on Micro Air Vehicles (Sept. 2005), First Indo-US Workshop Micro Air Vehicles (August 2005), Distinguished talks at CMU, Rutgers and Northwestern in Fall 2006, in UPenn (Feb. 2007), UIC (Nov. 2007), Noblis (Nov. 2007), Rice University (Feb. 2008), UT Austin (Feb. 2008), Univ. of Nebraska, Lincoln, (Feb. 2008), First US-Asian workshop on Micro air Vehicles, Agra, India (March 2008), NC State (March 2008), Syracuse University (Nov. 2008), Oslo, Norway (June 2009), London, UK (Sept. 2009), Univ. of Florida, Gainesville (March 2010), George McKay Visiting Professor, Univ. of California, Berkeley, April 19-23, 2010, Spencer Lecture, U. of Missouri-St. Louis (May 2010), Automatic Face and Gestures Conference, Santa Barbara, CA (March 2011), The Johns Hopkins University ( April 2011), Univ. of Delaware, (May 2011), JHU/Applied Physics Laboratory (May 2011), Brown University, (Oct. 2011), Keynote Speaker, ICCV Workshop on Stochastic Grammars, Barcelona, Spain (Nov. 2011), Keynote speaker, First Asian Conf. on Pattern Recognition, Beijing, (Nov. 2011), Keynote Speaker, BTAS 2012, Washington D.C. (Sept. 2012), Keynote Speaker, ECCV Workshop on Re-Identification of Humans, Florence, Italy (Oct. 2012), CVPR Workshop on Activity Recognition Using 3D Data, Portland, OR (June 2013), ICCV 2013 Workshop on Visual Domain Adaptation and Dataset Bias, Sydney, Australia (Dec. 2013), Distinguished Lecture, 25<sup>th</sup> year anniversary celebrations, Hong Kong Baptist University, Hong Kong (March 2014), Mercer lecture, ECSE Dept, RPI (April 2014), Distinguished lecture, EE, EPFL, Switzerland (June 2014), E.I. Jury Lecture, ECE department, Univ. of Miami (Dec. 2014), Banquet Speaker, ISVC 2014, Las Vegas (Dec. 2014), Distinguished Lecture, Dept. of ECE, Northwestern University, IL, (April 2015).

## II.J. Sponsored Research

### II.J.1. Grants

1. NSF, Principal Investigator, *Maximum Likelihood Estimation in Stationary Random Fields*, 05/01/82 - 04/31/84, \$48,000. (Research Initiation Grant)
2. USC, Principal Investigator, *Algorithms for Image Classification*, 07/01/83 - 06/31/84, \$19,535.
3. NSF, Co-Principal Investigator, *Estimation of Intramuscular Potentials Using Surface EMG Signal Analysis*, 07/01/84 - 06/30/87, \$261,460. (G.A. Bekey, Principal Investigator)
4. NSF, PRESIDENTIAL YOUNG INVESTIGATOR AWARD, Principal Investigator *Research in Signal Processing*, 07/01/85 - 08/31/90, \$312,500.
5. NSF, Principal Investigator, *Modern 2-D Spectral Estimation with Applications in Image Processing*, 06/01/85 - 11/30/87, \$20,274.
6. ONR, Principal Investigator, *Modern High Resolution Two-Dimensional Spectral Estimation*, 06/01/86 - 12/31/88, \$146,85.
7. AFOSR, Principal Investigator, Research Instrumentation for Computer Vision, Image Understanding, and Optical Symbolic Computing, \$150,666, with A.A. Sawchuk.
8. NSF, Principal Investigator, *Estimation of Kinematics and Structure of a 3-D Rigid Object from a Sequence of Noisy Images*, 01/01/88 - 12/31/89, \$177,915.

9. *ONR*, Principal Investigator, Robust Methods for Planar Array Processing, 01/01/89 - 12/31/91, \$191,270.
10. *NSF*, Senior Investigator, VISCOM: A Multiprocessor System for Image-Vision processing and Neural Network Computing, 07/01/89-06/30/90, \$500,000 (K. Hwang, Principal Investigator).
11. *NSF*, Co-Principal Investigator, Workshop on Theory and Applications of Markov Random Fields for Signal and Image Processing, and Computer Vision, 04/01/89 - 03/31/90, \$15,000. (with A. K Jain, Principal Investigator)
12. *NSF*, Principal Investigator, Representation and Recovery of Discontinuities in some Image Processing Problems, 10/01/91 - 03/31/93, \$132,169.
13. *AFOSR*, Principal Investigator, Segmentation of Multi-frequency, Multi-look and Multi-polarimetric SAR Data, 02/01/92 - 01/31/95, \$193,000.
14. *NSF*, Co-Principal Investigator, High Performance Computing for Land Cover Dynamics, 10/01/93-09/30/98. \$3,000,000 with L. S. Davis, (Principal Investigator) J. Townsend, J.Ja'Ja, N. Roussopoulos, J. Saltz and H. Samet.
15. *ARO/AASERT*, Principal Investigator, Model Supported Positioning of SAR Images, 07/01/96-06/30/99, \$104,000.
16. *AFOSR/AASERT*, Principal Investigator, Non-cooperative Target Identification, 07/01/96-06/30/99, \$104,000
17. *NSF*, Principal Investigator, Multi-camera Based Tracking of Humans, \$ 150,000, 09/01/02 – 08/31/04, with L.S. Davis.
18. *NSF*, Principal Investigator, ITR: New Technology for Capture, Analysis and Visualization of Human Movement Using Distributed Cameras, \$ 2,560,000 09/15/03-09/14/09, with T. Andriacchi (Stanford) and C. Bregler (NYU).
19. *NSF*, Co-Principal Investigator, ITR: Distributed Smart Cameras: Algorithms, Architectures and Synthesis, 09/30/03 - 09/29/09, \$ 1,650, 000 with S. Bhattacharya (Principal Investigator) and W. Wolf (Princeton).

### **II.J.2. Contracts**

1. *Hughes Aircraft Company*, Principal Investigator, *Analysis of Segmentation Errors Due to Spatial Sampling*, 10/01/84 - 02/31/85, \$10,000.
2. *Joint Services Electronics Program*, Senior Investigator, *Research in Computer Vision*, 04/01/85 - 03/31/88, \$160,305. (W.H. Steier, Principal Investigator).

3. AFOSR, Co-Principal Investigator, *Optical Symbolic Computing Tasks*, 06/01/86 - 05/31/89, \$469,626, with B.K. Jenkins (Principal Investigator) and A.A. Sawchuk.
4. AFOSR/URI, Senior Investigator, Center for Integration of Optical Computing, 10/01/86 - 09/30/89, \$175,000. (W.H. Steier and A.A. Sawchuk, Principal Investigators), Total Grant: \$1,900,900.
5. *Joint Services Electronics Program*, Senior Investigator, SAR Image Understanding, 04/01/88 - 03/31/91, \$200,000. (W.H. Steier, Principal Investigator)
6. AFOSR/URI, Senior Investigator, Center for the Integration of Optical Computing, 10/01/89 - 09/30/92, \$280,000, (W.H. Steier and A.A. Sawchuk, Principal Investigators), Total Grant: \$3,000,000.
7. ARPA, Principal Investigator, Site-Model-Based Image Registration and Change Detection, 07/01/92 - 06/30/95, \$750,000 with L.S. Davis and A. Rosenfeld.
8. ARPA, Co-Principal Investigator, Integrated Active Vision for UGV RSTA, 07/01/93 - 06/30/96, \$335,000, with Y. Aloimonos, L.S. Davis (Principal Investigator) and A. Rosenfeld.
9. ARPA, Co-Principal Investigator, Advanced Automatic Target Recognition, 07/15/93 - 01/14/95, \$948,622 with L.S. Davis and A. Rosenfeld. (Principal Investigator)
10. ARPA, Principal Investigator, Multi-resolution Processing and Image Understanding for Automatic Target Detection /Recognition identification, 03/01/95 - 05/14/96, \$125,000. (subcontract from McDonnell-Douglas Corporation)
11. ARPA/ONR, Co-Principal Investigator, Appearance Based Vision for Complex Environments, 04/01/95-03/31/00, \$2,650,000, with L.S. Davis and A. Rosenfeld. (Principal Investigator)
12. ARPA, Principal Investigator, SAR/IR Registration, 02/15/95-07/15/95, \$35,000 (subcontract from HNC, Inc)
13. AFSOR, Principal Investigator, Multi-sensor Fusion 10/01/95-05/31/96, \$ 35,000 (subcontract from LNK corporation, Inc.)
14. ARL, Principal Investigator, Advanced sensors consortium, \$1,850,000, 02/01/1996-05/31/2001 with L.S. Davis and A. Rosenfeld.
15. DARPA, Principal Investigator, Context-Based Temporal Reasoning and Analysis of Vehicular Activities from SAR-EO Images, 01/01/97-02/28/99 \$600,000 with L.S. Davis and A. Rosenfeld.
16. DARPA, Principal Investigator, Model-Based Recognition of Targets in Foliage Penetrating SAR Images, 03/01/97-09/30/00, \$ 490,000 Subcontractor, DEMACO, Inc.

17. DARPA, Principal Investigator, Advanced Automatic Target Recognition, 05/01/97-01/31/98, \$91,000 with L.S. Davis and A. Rosenfeld.
18. DARPA, Principal Investigator, Integrated FOA and Indexing, 02/01/97-01/31/98, \$ 70,000, (subcontract from SAIC, as part of MSTAR program)
19. DARPA, Principal Investigator, Activity Monitoring System for Airborne Visual Surveillance, 07/01/98-12/31/00, \$ 900,000 (subcontract from SRI International) with L.S. Davis, Y. Aloimonos and A. Rosenfeld.
20. NIJ, Co-Principal Investigator, Real-time Computer Surveillance for Crime Detection, \$ 353,870, 09/01/99 - 06/30/01, with L.S. Davis (Principal Investigator)
21. DARPA, Principal Investigator, Human Identification at a Distance, \$2,600,000, 08/15/00-12/31/03, with L.S. Davis, Y. Aloimonos and A. Rosenfeld.
22. ARDA/VACE, Co-Principal Investigator, Video Processing and Content Extraction, \$ 3, 100,000, 08/01/2000 – 07/31/2007 with Y. Aloimonos, D. Jacobs, D. Doermann and L.S. Davis (Principal Investigator).
23. ONR, Principal Investigator, Stochastic Approaches for Tracking, \$ 300,000, 01/01/01-12/31/03.
24. DARPA, Principal Investigator, Human Activity Inference, \$ 369,000, 08/01/02-07/31/03, with L.S. Davis.
25. ARL, Principal Investigator, Collaborative Technology Alliance on Advanced Sensors, \$ 2,100,000, 07/01/01 –06/30/06, with K.J.R. Liu and S. Bhattacharya.
26. ARL, Principal Investigator, Collaborative Technology Alliance on Advanced Decision Architectures, \$ 1, 529, 204, 07/01/01-09/30/09, with V. Subrahmanian.
27. ARL, Co-Principal Investigator, Collaborative Technology Alliance on Robotics, \$1,170,000, 07/01/01 – 06/30/03, with L.S. Davis (Principal Investigator)
28. DARPA/SRI, Co-Principal Investigator, Video Verification and Identification 12/01/03-11/30/05, \$800,000 with Y. Aloimonos and L.S. Davis (Principal Investigator).
29. DARPA/SAIC, Principal Investigator, Video Verification and Identification, 12/15/03-12/14/05, \$300,000.
30. ARO, MURI on The Science of Land Based Target Signatures, (subcontract from GTRI), Principal Investigator, 08/15/2002 – 08/19/2007, \$750,000.



31. ARO/MURI on Micro Air Vehicles, Senior Investigator, 07/01/04 – 06/30/09, \$ 250,000, I. Chopra (Principal Investigator).
32. ARDA/VACE, Phase11, Video Processing and Content Extraction, Co-Principal Investigator, \$1,700,000, 06/01/2004-05/31/2006, with Y. Aloimonos, D. Doermann and L.S. Davis (Principal Investigator).
33. HSARPA/ONR, Co-Principal Investigator, Detection of Unattended Packages, 06/01/2005 – 05/31/2007, \$1,000,000, with L.S. Davis (Principal Investigator). Siemens Corporate Research, NJ is a subcontractor.
34. HSARPA/ONR, Co-Principal Investigator, Persistent Tracking, 08/01/05-07/31/07, \$300,000, with L.S. Davis (Principal Investigator). Subcontract from Honeywell.
35. DoD, Co-Principal Investigator, Joint Institute for Knowledge Discovery, 10/01/04-09/30/05, \$ 1,500,000 with V. Subrahmanian (Principal Investigator).
36. DIA/MASINT, Principal Investigator, Distributed Tracking, 09/01/05 – 05/31/06, \$ 57, 000. with A. Srivastava.
37. UNISYS, Principal Investigator, Illumination-invariant Face Recognition, 07/01/06 – 08/14/07, \$ 66, 000.
38. DARPA, Co-Principal Investigator, Flexiview, 08/15/07 – 12/31/07, \$ 483, 000, with L.S. Davis and A. Varshney (Principal Investigator)
39. NIST, Principal Investigator, Lane Detection in Day and Night Video, 06/01/07-12/31/08, \$ 125, 000.
40. UNISYS, Principal Investigator, 3D Aging of Faces, 08/15/2007 – 08/14/08, \$ 50, 000.
41. NSP/SRI, Subcontractor, Video – based Face Recognition, 12/31/07 – 06/30/08, \$ 35, 000.
42. ONR, MURI, Principal Investigator, Remote Biometrics for Maritime Domains, 06/01/08 – 12/31/13, \$ 7, 500, 000.
43. DARPA, Co-Principal Investigator, VIRAT, 02/01/09 – 01/31/12, \$ 900, 000, with L.S. Davis (Principal Investigator). Subcontract from KitWare, Inc.
44. ARL, Principal Investigator, Multi-camera Pan-Tilt-Zoom Tracking, 09/10/07 – 12/31/08, \$ 120, 000 (with L. S. Davis and D. Doermann)
45. Northrop-Grumman, Principal Investigator, Fellowships, 12/08/08 -12/07/09, \$ 100, 000 (with L.S. Davis)

46. APL, Principal Investigator, Tracking in a Crowd, 01/14/08 – 08/31/09, \$ 70, 000
47. APL, Principal Investigator, Face Recognition in Hyperspectral Video, 04/01/09 - 08/31/09, \$ 20, 000.
48. ONR, Co-Principal Investigator, An Integrated Approach for Surveillance, 04/10/08 - 04/09/11, \$ 990, 000. Larry Davis, Principal Investigator.
49. ONR, Principal Investigator, DURIP: Sensors and Storage for Multi-modal Remote Biometrics, 04/15/09 – 09/30/2010, \$ 650, 000.
50. ARO, MURI, Co-Principal Investigator, Opportunistic Sensing for Object and Activity Recognition from Multi-Modal, Multi-Platform Data, 06/01/09 -05/31/14, \$ 1, 650, 000. Rich Baraniuk, Principal Investigator.
51. IARPA, Principal Investigator, Robust Face Recognition in Unconstrained Environments, 12/14/09 -12/13/11, \$ 1, 334, 000.
52. UNISYS, Principal Investigator, Compressive Sensing Methods for Face Recognition, 08/08/09 -12/01/09, \$ 50, 000.
53. ARO, Principal Investigator, Sparsity Inspired Selection and Recognition of Infrared Images, 08/15/09 – 05/14/10, \$ 50, 000.
54. JHU/APL, Principal Investigator, Hyperspectral Tracking of faces, 04/03/09 – 09/30/09, \$ 20, 000.
55. ONR, Principal Investigator, Compressive Video Acquisition, Fusion and Processing, 09/15/09 – 09/14/10, \$ 70, 000. Subcontract from Rice University. Rich Baraniuk, Principal Investigator.
56. ONR, Principal Investigator, Statistical and Semantic approaches for Object, Activity and Intent Recognition, 09/01/2009 – 08/31/2012., \$ 990, 000.
57. ONR, MURI, Co-Principal Investigator, Rich Representations with Exposed Semantics for Deep Visual Reasoning, 09/01/10 - -8/31/15, \$, 1, 750, 000, Subcontract from CMU. Martial Hebert, Principal Investigator.
58. NIST, Principal Investigator, Robust Face Recognition, 04/01/11 – 03/31/12, \$ 150, 000.
59. ARO, DURIP, 08/01/11 -07/31/12. \$337, 500.
60. ONR, Principal Investigator, Compressive Sensing for Image Understanding: Human Activity Analysis, 12/01/11 – 11/30/14, \$ 840, 287. (ASU and Rice are sub contractors)

61. DARPA, Principal Investigator, Screen Fingerprinting as a Novel Modality for Active Authentication, 05/23/12 – 05/22/13, \$ 499, 899. (Univ. of Colorado, Boulder, a sub contractor). Phase II funding, 10/01/13 -9/30/14, \$ 533, 000. Phase III funding, 10/01/14 -9/31/16, 1, 573, 716.

62. NIST, Principal Investigator, Robust Face Recognition Using Video Dictionaries & Domain Adaptation Methods, 09/01/2012 - 04/05/2013 , \$ 99, 000.

63. IRAPA, Principal Investigator, JANUS Program, Sparse Heterogeneous Representations and Domain Adaptive Matching for Unconstrained Face Recognition, 08/04/14 – 09/01/18, \$13,682,312.

64. US Army Medical Research Acquisition Activity, Co-Principal Investigator, HandSight: Supporting Everyday Activities through Touch-Vision, 08/10/2014 - 09/29/2017, \$ 992, 821. Jon Froehlich, Principal Investigator.

### II.K. Fellowships, Gifts and Other Funded Research

#### II.K.2. Gifts

1. IBM, AT&T, Hughes Aircraft Company, Principal Investigator, *Matching Fund for Presidential Young investigator Award*, 07/01/85-06/31/87, \$150,000.

2. TRW/USC, Principal Investigator, Research in 3-D Motion Estimation, 10/01/86-09/30/87, \$15,856.

3. SUN *Microsystems*, Principal Investigator, Matching Equipment Grant for Presidential Young Investigator Award, \$17,990.

4. *Powell* Foundation, Co-Principal Investigator, Equipment Proposal for AI Workstation, 01/01/88 - 05/31/88, \$20,000, (With A.A. Sawchuk, Principal Investigator)

5. *Hughes Aircraft Company*, Principal Investigator, Research in Computer Vision, 06/01/88-05/31/90, \$25,000.

6. *AT &T*, Principal Investigator, Image Sequence Analysis, 07/01/88-06/30/90, \$143,000.

#### II.L.3. Manuscripts under Review (*indicate status: submitted or revising to resubmit*)

1. J. Zheng, Z. Jiang, R. Chellappa, and P. J. Phillips, “Submodular Attribute Selection for Visual Recognition”, Submitted to IEEE Transactions on Pattern Analysis and Machine Intelligence.

2. J. C. Chen, R. Rajeev Ranjan, S.Swami Sankaranarayanan, A.Kumar, C.H. Chen, V.M. Patel, C. D. Castillo and R. Chellappa, “An End-to-End System for Unconstrained Face Verification with Deep Convolutional Neural Networks”, Submitted to Intl. Jl. of Computer Vision.

3. R. Ranjan, V.M. Patel and R. Chellappa, “HyperFace: A Deep Multi-task Learning Framework for Face Detection, Landmark Localization, Pose Estimation, and Gender Recognition”, Submitted to IEEE Trans. Patt. Anal. And Mach. Intelligence.
4. H. Zhang, V.M. Patel and R. Chellappa, “Low-Rank and Joint Sparse Representation for Multimodal Recognition”, Submitted to IEEE Trans. on Image Processing.
5. C. H. Chen, V. M. Patel and R. Chellappa, “Learning from Ambiguously Labeled Face Images”, Submitted to IEEE Trans. on Patt. Anal. And Mach. Intelligence.

## II.M. Centers for Research, Scholarship, and Creative Activities

### II.M.2. Centers Directed

Name : Center for Automation Research, University of Maryland, College Park, MD 20742. 2001-2012  
 Description of Center: The Center for Automation Research (CfAR) at the University of Maryland is a leader in research and education involving computer vision, computer visualization, perceptual interfaces, and language and media processing.  
 Collaborators: Yiannis Aloimonos, Larry Davis, Ramani Duraiswami, David Jacobs, Hanan Samet, Amitabh Varshney.

## II.N. Patents

### II.N.1. Device

1. A. Roy Chowdhury, R. Chellappa and S. Srinivasan, U. S.Patent 7,184,071, “Method of three-dimensional object reconstruction from a video sequence using a generic model”, issued Feb. 27, 2007.
2. A. Sundaresan and R. Chellappa, U.S. Patent 8, 023,726, “Method and system for markerless motion capture using multiple cameras”, issued on September 20, 2011.
3. Y. Ran, Q. Zheng and R. Chellappa, U.S. Patent 8,179,440, “Method and System for Object Surveillance and Real Time Activity Recognition”, issued on May 15, 2012.
4. V. Cevher. C. Garbuz, J. McClellan and R. Chellappa, U.S. Patent 8,379, 485 B2, “Compressive Sensing System and Method for Bearing Estimation of Sparse Sources in the Angle Domain, issued on Feb. 2013.
5. D.M. Healy, V.M. Patel, G.R. Easley and R. Chellappa, u.S. Patent 9,291,711, Compressive Radar Imaging Technology”, issued on March 22, 2016.

## **III. Teaching, Mentoring and Advising.**

### III.A. Courses Taught

ENEE 633: Statistical Pattern Recognition, Fall 2005, 2007, 2009, 2011, 2013, 2015  
 ENEE 631: Image and Video Processing, Spring 2008, 2011  
 ENEE 324: Spring 2010  
 ENEE 698A: Spring 2010, Spring 2014, Spring 2015  
 ENEE 698Q: Fall 2011, 2013, Spring 2012, 2013, 2014  
 ENEE 733 Image Understanding, Fall 2006, 2008, 2010, 2012, 2014

GEMSTONE course: Fall 2006-Present

### III.B.5. Course or Curriculum Development

Developed graduate courses on Image Processing, Image Understanding and Statistical Pattern Recognition.

### III.C. Advising: Research or Clinical

#### III.C.1. Undergraduate

Since 2006, I have been advising three GEMSTONE groups. A total of 35 undergraduate students were advised as part of this program. I have also advised a few students as part of the REU program.

#### III.C.2. Master's

1. C.Y. Lau, 1992 *Computation of Optic Flow and Depth with Known Motion*.
2. G. Cheesman, 1992 *Classification of Millimeter Wave Radar Signatures*.
3. H. Singh, 1992 *An Improved Algorithm for Shape from Shading* (Aware Inc, MA).
4. V. Sabio, 1993 *Target Recognition in Ultrawide Band Images* (SAIC, Arlington, VA).
5. S. Sirohey, 1993 *Segmentation and Recognition of Faces* (General Electrical, Chicago)
6. D. Wason, 1994 *Enhancement and Minutiae Detection in Fingerprints*. (SAIC, VA)
7. R. Parulekar, 1995 *Parallel Algorithms for Classification of Remotely Sensed Imagery* (Shearson-Lehman).
8. S. Balakrisky, 1995 *Performance Characterization of Image Stabilization Algorithms* (National Institute of Standards and Technology).
9. C. Stevens, 1997, *Enhancement and Matching of Fingerprints* ( LNK Corporation, MD)
10. H. Mahmood, 1999, *Active Vision for LADAR ATR* (Wireless Company in S. Carolina)
11. D. Ayers, 2000, *Activity Monitoring in Video* (SAIC, MD)
12. H. Gupta, *3-D Face Modeling Using Contours*, (Object Video, VA)
13. Francesc, Frigole-Roma, *Image Stabilization for Unmanned Air Vehicles* (Barcelona, Spain)
14. Marty, Ballcells-Capellades, *Video Activity Analysis* (Barcelona, Spain)
15. T. Yamamoto, *3-D Motion Analysis for Sports Video* (Hitachi, Japan)
16. U. Akdemir, *Ontology for Activity Modeling* (Technical Staff, Siemens Corporate Research, Princeton, NJ. Went back to Turkey)

17. A. Trias, Processing Aerial Images (Engineer, Leidos Corporation, MD)
18. G. Rosenbush, Detection of Unattended Packages Using Attributed Grammars (Digital Signal Corporation, VA)
19. A. Ducao, Leidos Corporation, Columbia, MD.
20. Priyanka Vageeswaran, Blur and Illumination Invariant Face Recognition via Set Theoretic Characterization.
21. Ankit Jain, Watchlist-based Classification System, (Bloomberg, NY).
22. Alex Krishnan Cramer, NASA Goddard, Greenbelt, MD.

### III.C.3. Doctoral

1. Govind Sharma, August 1984, Modern 2-D Spectral Estimation Using Non-causal Models. (Professor, Indian Institute of Technology, Kanpur, India).
2. Paul Singer, May 1985, Machine Perception of Partially Specified Planar Shapes. (Retired, Senior Scientist, Raytheon, Electro-optical Data Systems Group, El Segundo, CA).
3. Hao Jinchu, December 1986, Image Restoration Algorithms Using 2-D Gaussian Markov Random Field Models. (Professor, Military College in Taiwan, R.O.C.).
4. Shankar Chatterjee, July 1987, Synthesis, Analysis and Segmentation of Natural Textures. (Multimedia Company, Hollywood, CA).
5. Robert T. Frankot, December 1987, Computational Vision Algorithms for SAR Imagery. (Senior Staff Engineer, Raytheon Company, Tucson, AZ).
6. Ted J. Broida, December 1987, Estimating the Kinematics and Structure of a Moving Object from a Sequence of Images. (Was a Scientist, Hughes Aircraft Company, Radar Systems Group, El Segundo, CA, and Deceased 08/96.).
7. Tal Simchony, December 1988, Parallel Deterministic and Stochastic Algorithms for Some Computer Vision Problems. (Chief Engineer, ECI Telecom Ltd., Israel).
8. Zhou Yi-Tong, December 1988, Artificial Neural Networks for Some Computer Vision Problems. (Consultant, San Diego, CA)
9. Richard R. Hansen, Jr., December 1988, Parametric Spectrum Estimation for Contaminated Random Fields. (Retired Chief Engineer, Electronic Combat Development Branch, Edwards Airforce Base, CA).
10. Anand Rangarajan, Jan. 1991, Representation and Recovery of Discontinuities in Some Early vision Problems. (Associate Professor, Department of Computer Science, Univ. of Florida, Gainesville).

11. Gason Young, May 1991, 3-D Motion Estimation Using a Sequence Binocular of Noisy Images. (Thomson Electronics, CA).
12. V. Venkateswar, May 1991, Hierarchical Representation, Matching and Search for Some Computer Vision Problems. Was in Texas Instruments. (Co-Founder of a small company in Bay area).
13. E.J.M. Rignot, May 1991, Segmentation of Multifrequency and Polarmetric Synthetic Aperture Radar Data. (Senior Member, Technical Staff, Jet Propulsion Laboratory, Pasadena, CA.)
14. Q. Zheng, August 1991, Robust Algorithms for Estimation of Illuminant and Shape from Shading. (Director, IVU, Leidos, Columbia, MD).
15. B.S. Manjunath, August 1991, Perceptual Grouping and Segmentation Using Neural Networks. (Professor, Department of Electrical and Computer Engineering, University of California, Santa Barbara, CA).
16. S. Chandrashekar, 1991, 3-D Motion Estimation and Passive Navigation Using a Long Sequence. (Free-lance writer)
17. T.H. Wu, 1993, Estimation of Motion and Structure Using Long Sequences of Noisy Images. (Prodigy, New York).
18. P. Burlina, 1994, Time-to Collision Estimation and Navigation Using Long Sequences. (Technical Staff, Applied Physics Laboratory, MD)
19. O.J. Kwon, 1994, Region Based Coding of Images. (Technical Staff, Samsung Corporation, Korea).
20. S.Z. Der, March 1995, Automatic Target Recognition Using Passive Infrared and Laser Radar Sensors. (The Aerospace Corporation. Washington, D.C)
21. S. Krishnamachari, June 1995, Hierarchical Markov Random Field Models for Image Analysis. (Start up Company, Atlanta, Georgia).
22. Y.S. Yao, September 1995, Electronic Stabilization and Feature Tracking in Long Image Sequences. (Technical Staff, Pacific Bell, San Francisco, CA).
23. H.C. Liu, September 1995, A General Motion Model and Spatio temporal Filters for 3-D Motion Interpretations. (Technical Staff, ETAK Company, Palo Alto, CA)
24. C.L. Lin, Dec. 1995 Model Supported Exploitation of Aerial Images, (Technical Staff, Microsoft Corporation, Seattle, WA) Ph.D. in Computer Science.
25. K. Etemad, May 1996, Multiscale Discriminant Analysis and Recognition of Signals and Images (Technical Staff, Hughes Network Systems, Germantown, MD).
26. C. Morimoto, March 1997, Electronic Image Stabilization, (Associate Professor, Univ. of Sao Paulo, Brazil). Ph.D. in Computer Science.

27. S. Kuttikad, Dec. 1997, Site Models for SAR Image Exploitation. (Technical Staff, ETAK Company, Palo Alto, CA).
28. W. Phillips, March 1998, SAR Image Exploitation (Chief Scientist, Northrop-Grumman, Baltimore, MD).
29. S. Srinivasan, Dec. 1998, Structure from Motion (Technical Staff, Microsoft Corporation, Shanghai, China).
30. R. Meth, Dec. 1998, SAR Feature Extraction and Target Classification. (IARPA, MD).
31. V. Madhav Govindu, Nov. 1999, Probabilistic Models for Motion Estimation (Assistant. Professor, Electrical Engg. Dept., Indian Inst. of Science, Bangalore, India).
32. M. Srinivasan, August 1999, Video Compression (formerly Flavian, currently with a start up)
33. W Zhao, Dec. 1999, Robust Face Recognition (Technical Staff, Intuit, CA).
34. B. Li, July 2000, Human and Object Verification in Video (Professor, Computer Science Dept, Arizona State University).
35. A. Banerjee, August 2000, Target Detection in Foliage (Technical Staff, Applied Physics Laboratory, MD).
36. H. Moon, August 2001, Shape -Encoded Particle Filtering for Object Detection and Tracking, (Member of Technical Staff, Hughes Research lab, Calabasas, CA).
37. G. Qian, Dec.2001, Robust Methods for Structure From Motion Using Video Sequences, (ObjectVideo, VA).
38. Y. Wexler, December 2000, Projective Geometric Techniques for Video Analysis, (Research Staff, OrCam, Israel) Ph.D. in Computer Science.
39. A. Roy Chowdhury, June 2002, Structure from motion, (Professor, EE, UC Riverside, CA.)
40. Huying Liu, August 2003, Hierarchical Structure and Movement Estimation, (Member of Technical Staff, DRS, VA) Ph.D. in Computer Science
41. Amit Kale, Nov. 2003, Gait-Based Human Identification, (Siemens Medical Systems, Bangalore, India)
42. V. Parameswaran, April 2004, View Invariants for Activity Modeling and Recognition, (Microsoft Research, Redmond, WA) Ph.D. in Computer Science.
43. Shaohua Kevin Zhou, July 2004 Unconstrained Face Recognition, (Group Leader, Siemens Corporate Research, Princeton, NJ)
44. N. Vaswani, July 2004, Change Detection in Partially Observed Dynamical Systems with Applications in Activity Recognition, (Associate Professor, ECE, Iowa State University)



45. Amit Agrawal, May 2006, (Lab126, Amazon, CA)
46. Jian Li, Dec. 2006, (Technology Associate, Goldman Sachs, New York, NY)
47. Yang Ran, August 2006, (Startup, CA)
48. N. Cuntoor, May 2007, Activity modeling and Recognition, (IAI, Rockville, MD)
49. Seong-Wook Joo, May 2007, Multiobject tracking, event detection and activity modeling, (Google, Mountain View, CA). Ph.D. in Computer Science.
50. Joshua Broadwater, May 2007, Anomaly detection in hyperspectral images, (JHU Applied Physics Laboratory, MD)
51. Feng Guo, August 2007, (Member of technical Staff, Google, Mountain View, CA). Ph.D. in Computer Science.
52. Zhangeng Yue, August 2007, (CTO in a company in China)
53. Aravind Sundaresan, Dec. 2007, (Member of the Staff, SRI International Inc, Menlo Park, CA)
54. Gaurav Aggarwal, Feb. 2008, Illumination-invariant face recognition, (Yahoo, Bangalore, India). Ph.D. in Computer Science.
55. Ashok Veeraraghavan, Aug. 2008, (Assistant Professor, ECE, Rice University)
56. Narayanan Ramanathan, Dec. 2008, Face recognition across aging, (ObjectVideo, VA)
57. Dalton Rosario, Semi-parametric statistical methods for target detection, August 2008, ARL. (Applied Mathematics)
58. Wu Hao, August 2009, Robust methods for visual tracking and model alignment, (Member of Staff, Xerox Corporation, Rochester, NY)
59. Aswin Sankaranarayanan, Sept. 2009, Efficient inference in multi-camera systems, (Assistant Professor, ECE department, CMU, Pittsburgh, PA)
60. Pavan Turaga, October 2009, Statistical and geometric modeling of spatio-temporal patterns for video understanding, (Assistant Professor, Media arts and ECE, Arizona State University)
61. Jie Shao, December 2009, Object tracking and mensuration in surveillance videos, Member of Staff, (Google, Inc., Mountain View, CA)
62. Soma Biswas, Dec. 2009, Statistical/Geometric techniques for object representation and recognition, (Assistant Professor, Electrical Engg., Indian Inst. Of Science, Bangalore, India)
63. Mahesh Ramachandran, May 2010, Video Processing with Additional Information, (Member of Technical Staff, Google, Mountain View, CA)

64. Vishal Patel, August 2010, Sparse and Redundant Representations for Inverse Problems and Recognition, (Assistant Professor, ECE, Rutgers, The State University of New Jersey)
65. Mohamed F. Abdelkader, August 2010, Activity Representation from video Using Statistical Models on Shape Manifolds, (Asst. Professor, Suez-Canal University, Egypt).
66. Ruonan Li, August 2011, Segmentation, Recognition and Alignment of Collaborative Group Motion, (Post doctoral researcher, Harvard University, Boston, MA)
67. Raghuram Gopalan, August 2011, Model-driven and Data-driven Approaches for some Object Recognition Problems, (Member of Technical Staff, AT&T, CA)
68. Kaushik Mitra, August 2011, Statistical Models and Optimization Algorithms for H-dimensional Computer Vision Problems, (Assistant Professor, Electrical Engineering Department, Indian Institute of Technology, Madras at Chennai, India)
69. Dikpal Reddy, August 2011, Sparse Acquisition and Reconstruction for Some Computer Vision Problems, (Member of Technical Staff, Tinz Optics, Palo Alto, CA)
70. Ming Yu Liu, Dec. 2011, Discrete Optimization Methods for Image Segmentation and Matching, (NVIDIA), CA.
71. Nitesh Shroff, August 2012, Efficient Sensing, Summarization and Classification of Videos, (Member of Technical Staff, Tinz Optics, Palo Alto, CA)
72. Qiang Qiu, January 2013, Sparse Dictionary Learning and Domain Adaptation for Face and Action Recognition, (Assistant Research Scientist, Duke University, Durham, NC). Ph.D. in Computer Science.
73. Jaishankar K Pillai, March 2013, Learning Visual Classifiers from Limited Labeled Images, (Member of Technical Staff, Google, Mountain View, CA).
74. Sima Taheri, August 2013, Subspace Representations for Robust Face and Facial Expression Recognition, (Member of Technical Staff, Digital Signal Corporation, Chantilly, VA).Ph.D. in Computer Science.
75. Hien Nguyen, August 2013, Non-linear and Sparse Representations for Multi-modal Recognition, (Assistant Professor, Department of Electrical Engineering, University of Houston, TX).
76. Yi-Chen Chen, August 2013, Discriminative Learning and Recognition using Dictionaries, (Returned to Taiwan).
77. Tao Wu, August 2013, Dictionaries and Manifolds for Face recognition across Illumination, Aging and Quantization, (Member of Technical Staff, Google, Inc, Mountain View, CA)
78. Nazre Batool, Dec. 2013, Modeling and Analysis of Wrinkles on Aging Human Faces”, (Post doc, INRIA, Sophia-Antipolis, France).
79. Dave Shaw, August 2014, Regularization Methods for High-dimensional Inference, (Post doc, CMU, Pittsburgh, PA). Ph.D. in Applied Mathematics and Scientific Computing.

80. Huy Tho Ho, August 2014, Face Recognition and Facial Semantic Analysis from Unconstrained Visual Data (Apple, Cupertino, CA).
81. Sumit Shekhar, August 2014, Sparse Methods for Robust and Efficient Visual Recognition, (Adobe, Bangalore, India).
82. Garrett Warnell, August 2014, Adaptive Sensing and Processing for Some Computer Vision Problems, (Army Research laboratory, Adelphi, MD).
83. Ming Du, Dec. 2014, Recognition of Faces from Single and Multi-View Videos, (A9, Palo Alto, CA).
84. Ashish Srivastava, Dec. 2014, Sparse Representation, Discriminative Dictionaries and Projections for Visual Classification, (Apple, Cupertino, CA).
85. Jie Ni, May 2015, Restoration and Domain Adaptation for Unconstrained Face Recognition. (Member of Technical Staff, SONY, CA)
86. Kaustav Nandy, May 2015, Segmentation and Informatics in Multi-dimensions; Fluorescence Optical Microscopy Images, (Scientist, Leidos Corporation, Frederick, MD).
87. Jingjing Zheng, Dec. 2015, Domain Transfer Learning for Object and Action Recognition, (GE Global, Schenectady, NY)
88. Xavier Gibert Serra, May. 2016 (Successfully defended on 11/18/2015, Anomaly Detection in Noisy Images, (Google, Mountain View, CA).
89. Kota Hara, August 2016, Deep Neural Networks and regression Models for Object Detection and Pose estimation, (Apple, Cupertino, CA).
90. Raviteja Vemulapalli, August 2016, Geometric Representations and Deep Gaussian Conditional random Field networks for Computer Vision, August 2016, (Google Research, Seattle, WA).

#### **III.C.4. Post-doctoral**

I have supervised the following post-doctoral researchers.

Q. Zheng, P. Burlina, C. Shekhar, H. Shekarforoosh, V. Kruger, G. Qian, A. Roy Chowdhury, Pavan Turaga, V. Cevher, V.M. Patel and A. Azadeh.

#### **III.D. Mentorship**

##### **III.D.1. Junior Faculty**

Over the years, I have advised a few junior faculty members.

#### **III.E. Advising: Other than Research Direction**

### III.E.1. Undergraduate

Serve as an advisor to a few undergraduate students.

### III.E.5. Other Advising Activities

Faculty advisor, Student Council of India, University of Maryland, College Park, MD.

## IV. Service and Outreach

### IV.A. Editorships, Editorial Boards, and Reviewing Activities

*Include participation for journals and other learned publications (print and electronic).*

#### IV.A.1. Editorships

##### **Co-Editor-in-Chief**

*Computer Vision, Graphics and Image Processing: Graphics Models and Image Processing, Academic Press, 1989-1996*

##### **Editor-in-Chief**

*IEEE Transactions on Pattern Analysis and Machine Intelligence, 2001-2004.*

##### **Co - Guest Editor of Special Issues**

1. IEEE Transactions on Image Processing Special Issue on Applications of Artificial Neural Networks to Image Processing, August 1998, with K. Fukushima, A.K. Katsaggelos, S.Y. Kung, Y. LeCun, N. Nasrabadi and T. Poggio.
2. International Journal of Computer Vision, Special Issue Based on Best Papers from CVPR 2004, with A. Bobick and L.S. Davis.
3. Proceedings of the IEEE, Special Issue on Biometrics, Nov. 2007, with P. J. Phillips and D. Reynolds.
4. IEEE Transactions on Image Processing, Special issue on Distributed Camera Networks: Sensing, Processing, Communication and Computing, Oct. 2010 with W. Heinzelman, J. Konrad, D. Schonfeld and M. Wolf.
5. International Journal of Computer Vision, Special Issue on Stochastic Image Grammars, June 2011, with S. Todorovic.
6. IEEE Transactions on Circuits and Systems for Video Technology, Special Issue on Video Analysis on Resource-Limited Systems, Oct. 2011, with A. Cavallaro, Y. Wu, C. Shan, Y. Fu and K. Pulli, 2011.
7. IEEE Journal of Special Topics in Signal Processing, Special Issue on Anomalous Pattern Discovery for Spatial, Temporal, Networked, and High-Dimensional Signals, Feb. 2013, with Al Hero, Robert Nowak, Venkatesh Saligrama and Venu Veeravalli,

8. IEEE Trans. on Information Forensics and Security, Special Issue on Intelligent Video Surveillance for Public Security & Personal Privacy, Oct. 2013, with Noboru Babaguchi, Andrea Cavallaro, Frederic Dufaux and Liang Wang.
9. Computer Vision and Image Understanding, Special issue in honor of Prof. Jake Aggarwal, 2012, with Baba Vemuri.
10. International Journal of computer Vision, Special issue on Domain Adaptation, 2014, with Xu Dong, Hal Daume and Trevor Darrell.

#### IV.A.2. Editorial Boards

##### Associate Editor

*IEEE Transactions on Acoustics, Speech, and Signal Processing, 1987-1989*

*IEEE Transactions on Neural Networks, 1991-1992*

*IEEE Transactions on Image Processing, 1992-1994*

*IEEE Transactions on Pattern Analysis and Machine Intelligence, 1996-1999*

*Computer Vision and Image Understanding, 2011-2013.*

*Image and Vision Computing, 2011 –*

*SIAM Jl. Of Imaging Science, 2013 –*

#### IV.A.3. Reviewing Activities for Journals and Presses

*IEEE Transactions on Information Theory, Pattern Analysis and Intelligence, Signal Processing, Biomedical Engineering, Geoscience and Remote Sensing, Neural Networks, Image Processing, Information Security and Forensics, Systems, Man, Cybernetics, and Circuits and Systems, Proceedings of the IEEE, Computer Vision Graphics and Image Processing, Automatica, Intl. Jl. of Computer Vision, Signal Processing, Image and Vision Computing, SIAM Journal of Imaging Science*

#### IV.A.4. Reviewing Activities for Agencies and Foundations

##### Reviewer

For research proposals submitted to: *AFOSR, ARO, NSF and NASA*

#### IV.A.5. Reviewing Activities for Conferences

1. *IEEE Intl. Conf. on Acoustics, Speech and Signal Processing, 1987 – 2016*
2. *IEEE Intl. Conf. on Image Processing, CIP, 1994-2015.*
3. *IEEE Computer Society Workshop on Visual Motion, 1989, 1991, 2002.*
4. *IEEE Computer Society Conference on Computer Vision and Pattern Recognition, 1989, 1991, 1992, 1997, 1999, 2000, 2002-2015.*
5. *International Conf. on Computer Vision, 2001 – 2015*

6. *European Conf. on Computer Vision, 2006, 2008, 2010, 2012, 2014.*
7. *International Conference on Pattern Recognition, 1990, 1994-2014.*
8. *IEEE ASSP Society Conference on Multidimensional Signal Processing, 1989, 1993, 1998.*
9. *IEEE Signal Processing Society Workshop on Signal Processing and Neural Networks, Sept., 1991, 1993.*
10. *IEEE International Joint Conference on Neural Networks, 1990, 1991, 1992.*
11. *World Congress on Neural Networks, 1993.*
12. *Program Committee Member, AAI-97, IJCAI-97, AAI-2015*
13. *Program Committee Member, Indian Conf. on Graphics, Vision and Image Processing, 1998 – 2012.*
14. *Area Chair, CVPR 2008, CVPR 2009, ICCV 2007, ICCV 2011, ICCV 2015.*
15. *Member, DARPA ISAT Study Group 11/2009 – 11/2012*

#### IV.B. Committees, Professional & Campus Service

##### IV.B.1. Campus Service – Department

Graduate Service and Research Committee  
 Faculty Search Committee  
 Steering Committee, Salary Committee - UMIACS

##### IV.B.2. Campus Service – College

Appointment Promotion Committee

##### IV.B.3. Campus Service – University

Appointment Promotion Committee

##### IV.B.7. Leadership Roles in Meetings and Conferences

1. Panelist, Sessions on Image Models, First Second, Third, Fourth and Seventh Workshops on *Multidimensional Signal Processing*, New York, Oct. 1981, Lake Tahoe, 1983, Leasburg, Virginia, Oct. 1985, Lake Placid, 1991.
2. Program Committee Member, Indo-U.S. Workshop on Systems and Signal Processing, Bangalore, India, January 1988, November 1989.
3. **General Chairman**, IEEE Computer Society Conference on Computer Vision and Pattern Recognition, San Diego, CA, June 1989.

4. **General Chairman**, IEEE Computer Society Workshop on Artificial Intelligence for Computer Vision, San Diego, CA, June 1989.
5. **Technical Program Co-Chairman**, NSF Workshop on Markov Random Fields for Image Processing, Analysis and Computer Vision, San Diego, CA, June 9, 1989.
6. Discussion Leader, Tri-Services Workshop on Stochastic Image Modeling, 1992.
7. **Technical Program Chairman**, IEEE Workshop on Neural Networks for Signal Processing, Baltimore MD, 1993.
8. **Technical Program Chairman**, Second International Conference on Image Processing Crystal City, 1995.
9. Panelist, Human-Computer Interfaces, Intl. Conf. on Image Processing, Santa Barbara, Oct. 1997.
10. Panelist, 50 years of Image Processing, Intl. Conf. on Image Processing, Chicago, IL, Oct. 1998.
11. **Co-Technical Chair**, Fifth Conf. On Automatic Face and Gesture Washington D.C. 2002.
12. **General Chair**, Intl. Conf. On Multimedia and Expo, Baltimore, 2003.
13. **Co-Technical Chair**, IEEE Computer Society Conf. On Computer Vision and Pattern Recognition, Washington, D.C. 2004
14. **Co-General Chair**, IEEE International Conference on Image Processing, Oct. 2008.
15. **Co-General Chair**, IEEE Computer Society Conf. on Computer Vision and Pattern Recognition, Newport Beach, RI, June 2012.
16. **Co-General Chair**, IEEE Computer Society Conf. on Face and Gestures, Shanghai, April 2013.
17. **Co-General Chair**, First Intl. Conf. on Identity, Security and Behavioral Analysis, Hong Kong, March 2015.
18. **Co-General Chair**, IEEE Computer Society Conf. on Computer Vision and Patt. Recn., Puerto Rico, June 2017.
19. **Served on numerous technical committees for workshops held in conjunction with CVPR, ECCV and ICCV.**

#### IV.B.8. Other Non-University Committees, Memberships, Panels, etc.

1. *Member*, Technical Committee on Multidimensional Signal Processing, IEEE Acoust., Speech, Signal Processing, 1985 - 1997.
2. *Member*, Technical Committee on Pattern Analysis and Machine Intelligence, IEEE Computer Society, 1984-present
3. *Member*, Technical Committee on Neural Networks and Signal Processing, 1991-1997

4. *Member*, Technical Committee on Multimedia Signal Processing 1996-1999.
5. *NSF Panels* to select research initiation awards, carrier awards, regular awards, state, industry, university centers, SBIR awards and ITR awards.
6. *DARPA Panel on MSTAR Architecture, 1994, NSF/DARPA WTEC/JTEC Panel on Digital Libraries, 1997, DARPA ISAT Panel on Dynamic Databases, 1997, DARPA/ISO Panel on Continuous Tracking, 1998 and DARPA / IXO Panel, 2002, DARPA ISAT, member 2009 -2012.*
7. **Member, Board of Governors**, IEEE Signal Processing Society, 1996-1999, Multimedia Steering Committee, IEEE Signal Processing Society, 1999.
8. **Vice-President**, Awards, IEEE Signal Processing Society 2002-2004
9. **President**, IEEE Biometrics Council, 2008-2010
10. **Nominations Committee Chair**, IEEE Bioemtrics Council, 2011-2012.

#### IV.C. External Service and Consulting

##### IV.C.4. Entrepreneurial Activities

President and CEO, ImageCorp, Inc (1997-2004)

##### *IV.C.5. Consultancies (to local, state and federal agencies; companies; organizations)*

Consultant, SAIC, Leidos (2010 - )

Consultant, NIST, (1993-1996)

Consultant, LNK (1995)

#### IV.E. Media Contributions

##### IV.E.2. TV

Popular Science (Discovery Channel), Fox News T.V., BBC, Baltimore Sun, AP.

##### IV.E.3. Radio

##### IV.E.4. Digital Media

##### IV.E.5. Print Media

National Geographic, Nov. 2003.

#### **V. Awards, Honors and Recognition**

##### **V.1. Research Fellowships, Prizes and Awards**

- Fellow of IEEE (1992), IAPR (1996), OSA (2008), AAAS (2011), ACM (2013) and AAAI (2014).
- Recipient of National Scholarship awarded by Government of India during the period 1969-1975.
- Secured first rank in Bachelor of Engineering (Honors), University of Madras, Madras, India in 1975.



- Was presented the Jawaharlal Nehru Memorial award, by the Department of Education, Government of India, through Madras University, India in 1975.
- Was awarded a Gold medal and \$125 by the Old Boy's Association of College of Engineering, Guindy, Madras, India in 1975.
- NSF Presidential Young Investigator Award, 1985.
- Four NASA Certificates for SAR Segmentation Using Imaging Physics and Markov Random Fields (with E.J. Rignot).
- Best industry-related paper award, International Conf. on Pattern Recognition, The Hague, Netherlands, August 1992 (with Q. Zheng)
- Distinguished Research Faculty Fellow, University of Maryland, 1996-1998
- IEEE Signal Processing Society Technical Achievement Award, 2001.
- Minta Martin Professor of Engineering, 2005-Present.
- Co-author of Best student paper award, International Conference on Pattern Recognition, Hong Kong, August 2006 (with A. Sundaresan).
- Outstanding Innovator of the Year Award (Information Science), Office of Technology Commercialization, University of Maryland, 2007 (with A. Sundaresan)
- A.J. Clark School of Engineering Faculty Outstanding Research Award, 2007.
- Technical Achievement Award, IEEE Computer Society, 2008.
- IEEE Signal Processing Society Award, 2009 given at ICASSP, March 2010.
- Outstanding Electrical and Computer Engineer, Purdue University, September 2010.
- K.S. Fu Prize from the International Association of Pattern Recognition, November 2012.
- Distinguished Alumni, Indian Institute of Science, Bangalore, September 2016.
- Distinguished University Professor, University of Maryland, Sept. 2016 -

## V.2 Teaching Awards

- Excellence in Teaching Award, School of Engineering, University of Southern California, 1990.
- Distinguished Scholar-Teacher Award, University of Maryland, 2003.
- Distinguished Lecturer, IEEE Signal Processing Society, 2008-2010.
- Outstanding Mentor, UMD GEMSTONE program, 2009.
- Poole and Kent Teaching Award for Senior Faculty, Clark School of Engineering, 2011.

## V.3 Service Awards and Honors

- Meritorious Service Award, IEEE Computer Society, 2004.
- Meritorious Service Award, IEEE Signal Processing Society, 2008.

