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September 1, 2014

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# A Education & Employment History

## A.1 Education

- Ph.D., Wayne State University Detroit, Michigan, 1986, Dissertation: Multi-resolution Edge Detection, Advisor: Arun Sood, Minor Area: Mathematics.
- M.S., Wayne State University Detroit, Michigan, 1982 (Major: Computer Engineering).
- E.D.E., A post graduate diploma, from Philips International Institute of Technological Studies, Eindhoven, The Netherlands, 1980. (Major: Speech Recognition).
- B.E., National College of Engineering & Technology, Karachi, Pakistan (Major: Electronics), 1979.

## A.2 Appointments

- September 2012–, Director, Center for Research in Computer Vision (CRCV), University of Central Florida
- The University Trustee Chair, May 2012–
- July 2008–August 2008, Guest Professor, Klagenfurt University, Klagenfurt, Austria.
- October 2007–present, Professor of Mathematics (Secondary Joint Appointment), University of Central Florida, Orlando.
- April 2005–present, Agere Chair Professor of Computer Science, University of Central Florida, Orlando.
- February 2005–August 2006, Assistant Vice President for Research, University of Central Florida, Orlando.
- May 1998–April 1999, Member Video Technology Research Staff, Information Systems Division, Harris Corporation, Melbourne, Florida.
- Fall 1998–present, Associate Faculty, Center for Electro Optics and Lasers (CREOL), UCF.
- August 1996–present, Professor, Computer Science, School of Computer Science, UCF.
- August 1991 to July 1996, Associate Professor, Computer Science, UCF.
- August 1986 to July 1991, Assistant Professor, Computer Science, UCF.

## B Honors

### B.1 Fellowships

- Fellow, AAAS (American Association of Advancement of Science), 2010.
- Fellow, SPIE (Society of Photographic Instrumentation Engineers), 2008.
- Fellow, IAPR (International Association of Pattern Recognition), 2006.
- Fellow, IEEE (Institute of Electrical and Electronic Engineers), 2003.

### B.2 Other Awards

- 2nd place in NHK Where is beauty? Grand Challenge at the ACM Multimedia 2013 conference.
- NGA Best Research Poster at NARP Symposium Award, 2013.
- University Distinguished Researcher award, 2012.
- College of Engineering & Computer Science Advisory Board Award For Faculty Excellence, 2011
- Scholarship of Teaching and Learning (SoTL) award, 2011.
- ACM Distinguished Speaker (DSP), 2008-.
- University Distinguished Researcher award, 2007.
- Sindhi Association of North American award, 2007.
- Pegasus Professor, 2006.
- UCF Millionaires' Club, 2005, 2006, 2009-2013.
- Agere Chair Professor, April 2005–
- Honorable mention, ICCV 2005 Where Am I? Challenge Problem.
- Nomination for the Best Paper award, ACM Conference on Multimedia, 2005, 2010.
- Research Incentive Award (**RIA**), 2003, 2009.
- Teaching Incentive Program (**TIP**) Award, 1996, 2003.
- IEEE Distinguished Visitors Program Speaker, 1997-2000.
- Engineering Achievement Award of Information Systems Division of Harris Corporation, 1999.

- IEEE Outstanding Engineering Educator Award, 1997.
- TOKTEN awards by UNDP, 1992, 1995, 2000.
- Philips International Institute Scholarship 1980.

## C Instruction

### C.1 Courses Taught

- Have taught **ten** different courses at the graduate and undergraduate level, introduced a new **honors** course (co-taught with a Mathematics Professor), and directed **numerous** independent studies of undergraduate and graduate students;
  - Have conducted **seven** short courses and tutorials in **five** different countries (Italy, US, Pakistan, Mexico, Taiwan) (<http://www.cs.ucf.edu/~vision/accv2000h-6.pdf>);
  - I have authored an unpublished book *Fundamental of Computer Vision*, which I use for my class and is also available on the web: <http://www.cs.ucf.edu/courses/cap6411/book.pdf>.
  - My pedagogical contributions are covered in **four** text books by popular authors: *Computer Vision: Algorithms and Applications*, Richard Szeliski; *Robot Vision*, Haralick and Shapiro; *Introductory Techniques for 3D Computer Vision*, Veri and Trucco; and *Computer Vision*, Shapiro and Stockman.
  - I have provided videos of my Computer Vision Lectures on youtube, which has received more than 250,000 views: [https://www.youtube.com/playlist?list=PLd3hlSJx\\_Imk\\_BPmB\\_H3AQjFKZS9XgZm](https://www.youtube.com/playlist?list=PLd3hlSJx_Imk_BPmB_H3AQjFKZS9XgZm)
1. CAP 6412 Advanced Computer Vision  
<http://www.cs.ucf.edu/courses/cap6412/>
  2. CAP 5415 Computer Vision  
<http://www.cs.ucf.edu/courses/cap6411/cap5415>
  3. CAP 6411 Computer Vision Systems  
[http://www.cs.ucf.edu/courses/cap6411/cap6411/fall102/cap6411\\_fall102.html](http://www.cs.ucf.edu/courses/cap6411/cap6411/fall102/cap6411_fall102.html)
  4. COT 6505 Numerical Optimization  
[http://www.cs.ucf.edu/courses/cap6411/cot6505/spring03/cot6505\\_sp03.html](http://www.cs.ucf.edu/courses/cap6411/cot6505/spring03/cot6505_sp03.html)
  5. CAP 3930H Computer Vision Guided Tour of Mathematics
  6. CAP 6938 Special Topics: Mathematical Tools for Computer Vision
  7. CAP 4932 Intro Robot Vision
  8. COT 4110 Numerical Calculus

9. COP 3400 Assembly Language
10. COP 3402 Systems Concepts and Programming

## **C.2 Post Doc and Student Supervision**

### **C.3 Post Doc Supervision**

1. Selen Pehlivan, Ph.D., Bilkent University, June-November 2013.
2. Imran Saleemi, Ph.D. UCF, May 2011-2014.
3. Shandong Wu, Ph.D. City University of Hong Kong, May 2009-April 2011. Currently at University of Pittsburgh, PA.
4. Arjun Nagendran, Ph.D. University of Manchester, February 2009-August 2010.
5. Aidtya Gupta, Ph.D. UCF, May 2008-March, 2010, Medical Image Analysis, Currently at UNC Medical School.
6. Youngrock Yoon, Ph.D. Purdue University, June 2006-December 2006, currently at USAF/DFEC Colorado.
7. June Xie, Ph.D. Hong Kong University, May 2006-2008, Medical Image Analysis, currently at GE Global Research.
8. Pingkun Yan, Ph.D. National University of Singapore, May 2005-2007, Medical Image Analysis, currently at Phillips Research.
9. Khurram Hassan Shafique, Ph.D. UCF, March 2005-April 2006, Computer Vision, currently at ObjectVideo, Reston, VA.
10. Alper Yilmaz, Ph.D. UCF, August 2004-May 2006, Video Analysis, currently Associate Professor at Ohio State University.

#### **C.3.1 Doctoral Dissertations Supervised to Completion**

1. Amir Roshan Zamir, “Visual Geo-spatial and Location-Aware Image Understanding”, May 2014, Currently at UCF.
2. Enrique G. Ortiz, “Taming Wild Face: Web-Scale, Open-Universe Face Identification In Still And Video Imagery”, May 2014, Currently at Sighthound, Orlando, FL.
3. Yang Yang, “Learning Hierarchical Representations For Video Analysis Using Deep Learning”, August, 2013, Currently at Qualcomm, San Diego, CA.
4. Berkan Solmaz, “Holistic Representations For Activities And Crow Behaviors”, August 2013, Currently at University of Pennsylvania, Philadelphia, PA.

5. Subhabrata Bhattacharya, "Recognition Of Complex Events In Open-Source Web-Scale Videos: Features, Intermediate Representations And Their Temporal Interactions", August, 2013, Currently at Columbia University, NYC.
6. Omar Oreifej, "Robust Subspace Estimation Using Low-Rank Optimization: Theory and Applications In Scene Reconstruction, Video Denoising, and ACTivity Recognition", May 2013, currently at University of California, Berkeley.
7. Kishore Reddy, "Action Recognition Using Particle Flow Fields", Ph.D., August, 2012, Currently at United Technologies Corporation, Hartford, CT.
8. Vladimir Reilly, "Detecting, Tracking, and Recognizing Activities in Aerial Video, Ph.D., Currently at United Technology Corporation, Connecticut. August, 2012; Currently at Harris Corporation, Melbourne, Florida.
9. Ramin Mehran, "Crowd Motion Analysis", Ph.D., graduation date December, 2011, Currently at Microsoft.
10. Imran Saleemi, "Patterns Of Motion: Discovery And Generalized Representation", Ph.D. graduation date May 2011, Currently at UCF.
11. Mikel Rodriguez, "Spatio-temporal maximum average correlation height templates in action recognition and video summarization", Ph.D., graduation date: August, 2010, currently at MITRE.
12. Arslan Basharat, "Modeling Scenes and Human Activities In Videos", Ph.D., graduation date: December 2009, Currently at Kitware, NY.
13. Jingen Liu, "Learning semantic features for visual recognition", Ph.D., graduation date: December 2009, Currently at SRI/Sarnoff.
14. Pavel Bebnko, Ph.D., "Visual inspection of rail road tracks", graduation date: December 2009, Currently Senior Vision Software Engineer at Madison Research Technologies - Madison Research Technologies.
15. Donald Bryant, "Analysis of Kolmogorov's Superposition Theorem and its implementation in applications with low and high dimensional data", Mathematics, graduation date August 2008. (Joint with Xin Li)
16. Saad Ali "Taming Crowded Visual Scenes", Ph.D., graduation date: May 2008; currently at Currently at Sarnoff Corporation, Princeton, NJ.
17. Saad Masood Khan, Ph.D., "Exploiting Multi-view Data for Image-based Tracking Reconstruction, Recognition", graduation date: May 2008; currently at Sarnoff Corporation, Princeton, NJ.
18. Aleksey Gritsay, "View invariant Video Alignment", Ph.D., graduation date: August 2007, Currently at Sernium, VA.



19. Asad Hakeem, “Learning, Detection, Representation, Indexing and Retrieval of Multi-Agent Events in Videos”, Ph.D., starting date: graduation date: May 2007; currently at ObjectVideo, Reston, Virginia.
20. Yun Zhai, “Video Content Exploitation by Structuring, Linking and Attention Detection”, graduation date: August 2006; currently at IBM TJ Watson, NY.
21. Yaser Shaikh, “Object association across multiple moving cameras in planar scenes”, Ph.D., graduation date: May 2006; currently at CMU.
22. Paul Smith, “Multiple Level of Zooms for Activity Recognition”, Ph.D., graduation date: December 2005, currently at Northrop Grumman, Herndon, VA. (joint with Niels Lobo)
23. Omar Javed, “Scene Monitoring With a Forest of Cooperative Sensors ”, Ph.D., graduation date: May, 2005, currently at Sarnoff Corporation, Princeton, NJ.
24. Jiangjian Xiao, “View Morphing”, Ph.D., graduation date: December 2004; currently at Sarnoff Corporation, Chinese Academy of Sciences, Ningbo China.
25. Alper Yilmaz, “Object Tracking and Activity Recognition in Video Acquired Using Mobile Cameras”, Ph.D., graduation date: July, 2004, currently at Ohio State University.
26. Zeeshan Rasheed, “Video Categorization”, Ph.D., graduation date: December 2003, currently at Object Video, Reston, VA, USA.
27. Cen Rao, “View Invariant Representation and Recognition of Human Action”, Ph.D., graduation date: May 2003, currently at ESP.
28. Sohaib Khan, “Visual Tracking of People and Object-Based Video Segmentation”, Ph.D., graduation date: August 2002, currently Associate Professor and department head at Lahore University of Management and Sciences, Lahore, Pakistan.
29. Yu Tian, Topic: Estimating Motion and Shape of Multiple Objects from Image Sequences, Graduation Date: June 1997, Apple Micro Computers, CA.
30. Ping-Sing Tsai, Topic: Shape From Shading, Graduation Date: July 1995, currently Assistant Professor, Department of Computer Science The University of Texas - Pan American.
31. Ruo Zhang, Topic: Shape From Photomotion, Graduation Date: January 1995, Research Scientist, SAIC, Orlando, FL.
32. Krishnan Rangarajan, Topic: Motion Trajectories, Graduation Date: May 1990, Professor Dayananda Sagar College of Engineering Bangalore, India.
33. Donna Williams, Topic: Edge Contours, Graduation Date: August 1989, Associate Professor, Computer Science and Mathematics, Stetson University, DeLand FL.

### **C.3.2 Currently Advising Doctoral Dissertation**

1. Harron Idress, “Visual Crowd Analysis”, starting date Spring 2009.
2. Soumyabrata Dey, “fMRI Image Analysis”, starting date Fall 2009.
3. Guang Shu, “Tracking in Dense Crowds”, starting date Fall 2009.
4. Salman Khokhar, “Wide Area Surveillance”, starting date Fall 2010.
5. Gonzalo Vaca, “Geolocalization”, starting date Fall 2010.
6. Afshin Dehghan, “Tracking by Detection”, starting date Fall 2010.
7. Shayan Modiri Assari, “Global Motion Descriptor”, starting date Fall 2011.
8. Oliver Nina, “ Scene Text Detection”, starting date Fall 2011.
9. Nasim Souly, “Visual Saliency Detection in Video, starting date Fall 2011.
10. Waqas Sultani, “Armed Person Detection”, starting date Fall 2011.
11. Yicong Tian, “Recognizing Events in Crowded Scenes”, starting date Fall 2011.
12. Khurram Soomro, “Analysis of Soccer Videos”, starting date Fall 2011.
13. Dong Zhang, “Video Segmentation”, starting date Fall 2011.
14. Rui Hou, “Action Recognition”, starting date, Fall 2012.
15. Sarfaraz Husein, “Medical Imaging”, starting date, Fall 2012.
16. Behnaz Nojavan, “Social Understanding of Movies”, starting date, Fall 2012.
17. Mahdi Kalayeh, “Relevant Vector Machine”, starting date, Fall 2012.
18. Shervin Ardeshir, “Geo-Spatial Localization”, starting date Spring 2013.
19. Amir Mazahari, “Ego-Centric Computer Vision”, starting date Fall 2013.
20. Aidean Sharghi, “Computational Photography”, starting date Fall 2013.
21. Somayeh Keshavarz, “Event Recognition”, starting date Fall 2013.
22. Yang Zhang, “Attribute Classification”, starting date Spring 2014.

### **C.3.3 Masters Theses Supervised**

1. Phillip Berkowitz, M.S., Automatic Target Recognition, Graduation date: August 2009, currently at DRS, Washington.
2. Ryan Faircloth, M.S., "Combining Audio and video tempo analysis for dance detection", Graduation date: August 2008, currently at NAVAIR, Orlando, FL.
3. Yusuf Aytar, "Semantic Video Retrieval using High-level Context", graduation date: May 2008; currently at Oxford University.
4. Eric John, area: Biomedical Image Analysis, Starting date January 2006, Graduation date: August 2007, PBS&J in Orlando.
5. Li Nan, area: Detecting Stepwise Moving Objects From Spatiotemporal Projections", July 2000, currently at Intel, Phoenix, Arizona.
6. Avinash Seethara, area: Advanced Vehicle Control Systems-A Computer Vision Perspective, Graduation Date: April 1998, currently at Intel, Folsom, CA.
7. Calin Cojocariu, area: Registration of MR and CT Data, Graduation Date: May 1997, Austin, TX.
8. Shawn Dettmer, area: Visual Lipreading, Graduation Date: May 1997, Oracle, Orlando, FL.
9. Kathalene Gray Bridges, area: Multi-Sensor Fusion for Generating Line Maps for 3-D Objects, Graduate Date: December 1994, Lockheed-Martin.
10. Claudette Cedras, area: Motion-Based Recognition, Graduation Date: May 1993, University of Laval, Canada.
11. Jim Cryer, area: Combining Stereo and Shading, Graduation Date: April 1993.
12. Kristine Gould, area: Knowledge Based Crystal Growth, Graduation Date: August 1990, currently at GE Medical Systems.
13. Jay Hackett, area: Multisensor Fusion, Graduation Date: August 1989, currently at Harris Corporation, Melbourne, FL.

### **C.3.4 B.S. (Honors in The Major) Supervised**

1. David Thomas, "Recognition of Predicted Time Series using Chaotic and Geometric Features", August 2010, currently at SAIC.
2. Brandyn White, "Using FPGAs to Perform Embedded Image Registration", Graduation date, May 2009; currently Ph.D. student at University of Maryland.
3. Vladimir Reilly, "Human Detection", Honors in the Major B.S, Graduation date: May 2006, currently Ph.D. student SEECs, UCF.

4. Alfred K. Levy III, "Object Tracking in Low-Frame-Rate Video Sequences", Honors in the Major B.S., graduation date: May 2004, currently at Harris Corporation.
5. Ankur Datta, "Gait Based Recognition", Honors in the Major B.S., graduation date: May 2004, admitted to CMU, received three-year NSF fellowship (\$30,000 per year). Currently at IBM.
6. Rusty Philips, "Implementation of Vision Algorithms in FPGAs", Honors in the Major B.S., graduation date: August 2001.
7. Chris Ingrassia, topic: "Tracking and Recognition of Coronary Arteries Angiograms", Graduation Date December, 1998, currently at NYU.
8. Doug Ayers, topic: "Monitoring Human Behavior in An Office Environment", Graduation Date: April, 1998, SAIC.
9. Anna Ortega, topic: "From Shape from Shading to Recognition", Graduation Date: August, 1994.
10. James Davis, topic: "Recognizing Hand Gestures", Graduation Date: May 1994, Assistant Professor Ohio State University.
11. Matt Lavoie: topic: "Object recognition using multiple sensors", Graduation Date: May 1991.

### **C.3.5 Non-UCF Students Supervision**

1. Jacob Buhl, "Qualitative geometric scene understanding using planar surfaces in multiple views", Aalborg University, M.S., Summer 2011.
2. Marco Zini, "New Particle Based Approaches to People Tracking in Crowded Scenes", University of Modena and Reggio Emilia, Italy, M.S., 2010.
3. Humera Noor, "Automatic Target Recognition Using View Morphing", Ph.D., 2007, NED University, Karachi, Pakistan.
4. Javed Sheikh, "Visual Tracking", Ph.D., 2008, Military College of Signals, Islamabad, Pakistan.
5. Sohail Sattar, "optical Character Recognition", NED University, Karachi, Pakistan.

### **C.3.6 Member Ph.D. Committees**

1. Teutsch, Michael, Karlsruhe Institute of Technology, Ph.D., 2014.
2. Slawomir BAK, "Human Re-Identification through Video Camera Network", Ph.D., University of Nice Sophia-Antipolis, July 5, 2012.

3. Zhahid Riaz, “Visual Interpretation of Human Body Language for Interactive Scenarios”, Institut für Informatik Technische Universität München, Germany, 2011.
4. Yifan Shi, “Representing and Recognizing Temporal Sequences”, Georgia Tech, Graduation date: July 2006.
5. Faisal I. Bashir, “MotionSearch: Object Motion Trajectory-Based Video Search and Classification System”, University of Illinois Chicago, Graduation date: March 2006.
6. Hongsheng Zhang, “structure & motion from stereo”, University of Miami, Graduation date: November 2005.

## D Research, Creative & Other Scholarly Activities

### D.1 Publications

#### Impact

- **H-index: 75, Total Citations: 25177.**

#### D.1.1 Books

1. O. Oreifej, M. Shah, “Robust Subspace Estimation Using Low-Rank Optimization: Theory and Applications”, Springer, 2014.
2. S. Ali, K. Nishino, D. Manocha, ; M. Shah, “Modeling, Simulation and Visual Analysis of Crowds: A Multidisciplinary Perspective”, Springer, 2013.
3. Omar Javed, and Shah, Mubarak, “Automated Multi-Camera Surveillance: Algorithms and Practice”, Springer, September 2008.
4. “Video Registration”, Editors: Mubarak Shah and Rakesh Kumar, Kluwer Academic Publishers, 2003.
5. “Motion-Based Recognition”, Editors: Mubarak Shah and Ramesh Jain, Kluwer Academic Publishers, 1997.

#### D.1.2 Book Chapters

1. Subhabrata Bhattacharya, Haroon Idrees, Imran Saleemi, Saad Ali, and Mubarak Shah, “Moving Object Detection and Tracking in Forward Looking Infra-Red Aerial imagery”, Machine Vision Beyond Visible Spectrum, Springer-Verlag, Editors: Riad I. Hammoud, Guoliang Fan, Robert W. McMillan, Katsushi Ikeuchi, 2010.
2. Yaser Sheikh, Omar Javed and Mubarak Shah, “Object Association Across Multiple Cameras”, in Multi-camera Networks: Concepts and Applications”, Elsevier, editors Hamid Aghajan and Andrea Cavallaro, 2009.

3. Abhijit Mahalanobis, Mubarak Shah, Alan van Nevel, “Information Processing across Distributed and Netted Systems for Security and Surveillance”, Optical Imaging, Photonics, Sensors, and Systems for Homeland Security edited by Bahram Javidi, Springer, 2004.
4. Yaser Sheikh, Sohaib Khan, and Mubarak Shah, “Feature-based Georegistration of Aerial Images”, GeoSensor Networks, Anthony Stefanidis and Silvia Nittel (editors): CRC Press, 2004.
5. Zeeshan Rasheed and Mubarak Shah, “Video Categorization using Semantics and Semiotics”, Video Mining Techniques, Editors: Azriel Rosenfeld, Daniel DeMenthon, and David Doermann, Kluwer Academic Publishers, 2003.
6. Mubarak Shah and Rakesh Kumar, “Video Registration: A Perspective”, Video Registration, Kluwer Academic Publishers, 2003.
7. Mubarak Shah, “Introduction: Video Registration Panel”, Video Registration, Kluwer Academic Publishers, 2003.
8. Y. Sheikh, S. Khan, M. Shah and R. Cannata, “Geodetic Alignment of Aerial Video Frames”, In Video Registration, Video Computing Series, KLUWER Academic Publisher, 2003.
9. Mubarak Shah and Ramesh Jain, “Visual Recognition of Activities, Gestures, Facial Expressions and Speech: An Introduction and A Perspective”, in **Motion-Based Recognition**, Kluwer Academic Publishers, 1997.
10. Li Nan, Shawn Dettmer, and Mubarak Shah, “Lipreading Using Spatiotemporal Eigen Decomposition”, in **Motion-Based Recognition**, Kluwer Academic Publishers, 1997.
11. Kristine Gould, Krishnan Rangarajan, and Mubarak Shah, “Detection and Representation of Events in Motion Trajectories ”, chapter in **Advances in Image Analysis**, editors: Y. Mahdavi, and Gonzalez, R., SIPE Optical Engineering Press, 1992.
12. Jay Hackett and Mubarak Shah, “Multisensor Fusion: A perspective”, chapter in **Trends in Optical Engineering**, 1993.

### D.1.3 Journal Papers

#### *In Print*

1. Soumyabrata Dey, A. Ravishankar Rao, Mubarak Shah “Attributed graph distance measure for automatic detection of Attention Deficit Hyperactive Disordered subjects”, Frontiers in Neural Circuits, 2014.
2. Amir Roshan Zamir, and Mubarak Shah, “Image Geo-localization Based on Multiple Nearest Neighbor Feature Matching Using Generalized Graphs”, IEEE Transactions on Pattern Analysis and Machine Intelligence, Volume PP, Issue 99, Pages 1-1, 2014.

3. Subhabrata Bhattacharya, Ramin Mehran, Rahul Sukthankar, Mubarak Shah, "Classification of Cinematographic Shots using Lie Algebra and its Application to Complex Event Recognition", IEEE Transactions on Multimedia, Volume PP, No. 99, Page 1, January 2014.
4. Haroon Idrees, Nolan Warner, and Mubarak Shah, "Tracking in dense crowds using prominence and neighborhood motion concurrence", Image and Vision Computing, Volume 32, Issue 1, Pages 14-26, January 2014.
5. Arnold W. M. Smeulders, Dung M. Chu, Rita Cucchiara, Simone Calderara, Afshin Deghghan and, and Mubarak Shah, "Visual Tracking: an Experimental Survey", IEEE Transaction on Pattern Analysis and Machine Intelligence, 2013.
6. Salman Khokhar, Imran Saleemi, and Mubarak Shah, "Multi-agent event recognition by preservation of spatiotemporal relationships between probabilistic models", Image and Vision Computing, Volume 31, Issue 9, Pages 603-615, September 2013.
7. Imran Saleemi, and Mubarak Shah, "Multiframe Many-Many Point Correspondence for Vehicle Tracking in High Density Wide Area Aerial Videos", International Journal of Computer Vision, 2013.
8. Soumyabrata Dey, A. Ravishankar Rao, and Mubarak Shah, "Exploiting the brains network structure in identifying ADHD subjects", Frontiers in Systems Neuroscience, November 16th, 2012.
9. Yang Yang, Imran Saleemi, and Mubarak Shah, "Discovering Motion Primitives for Unsupervised Grouping and One-Shote Learning of Human Actions, Gestures, and Expressions", IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), Vol. PP, No. 99, 2012, pp. 1-14.
10. Yu-Gang Jiang, Subhabrata Bhattacharya, Shih-Fu Chang, and Mubarak Shah, "High-level event recognition in unconstrained videos", International Journal for Multimedia Information Retrieval, November 2012.
11. Vladimir Reilly, Berkan Solmaz and Mubarak Shah, "Shadow Casting Out Of Plane (SCOOP) Candidates for Human and Vehicle Detection in Aerial Imagery", International Journal of Computer Vision, October, 12, 2012.
12. Kishore K. Reddy and Mubarak Shah "Recognizing 50 Human Action Categories of Web Videos", Machine Vision and Applications (MVA), November 16, 2012.
13. Berkan Solmaz, Shayan Modiri Assari and Mubarak Shah, "Classifying Web Videos using a Global Video Descriptor", Machine Vision and Applications (MVA), September 26, 2012.
14. Berkan Solmaz Brian E. Moore, and Mubarak Shah, Identifying Behaviours in Crowd Scenes Using Stability Analysis for Dynamical Systems, IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), Vol. 34, Issue 10, October 2012, pp. 2064-2070.

15. Hamid Izadinia, Imran Saleemi, Mubarak Shah, "Multimodal Analysis for Identification and Segmentation of Moving-Sounding Objects", *IEEE Transactions on Multimedia*, Vol. 15, No. 2, February 2013, pp. 378-390.
16. Omar Oreifej, Xin Li and Mubarak Shah, "Simultaneous Video Stabilization and Moving Object Detection in Turbulence", *IEEE Transactions on PAMI*, Vol. 35, No. 2, February 2013, pp. 450-462.
17. Brian E. Moore, Saad Ali , Ramin Mehran, and Mubarak Shah, "Visual Crowd Surveillance through a Hydrodynamics Lens", *Communication of ACM*, December 2011, vol. 54, no. 12, pp 64-73.
18. Jingen Liu, Yang Yang; Imran Saleemi, and Mubarak Shah, "Learning Semantic Features for Action Recognition via Diffusion Maps", *Computer Vision and Image Understanding*, Volume 116, Issue 3, March 2012, Pages 361-377.
19. Subhabrata Bhattacharya, Rahul Sukthankar and Mubarak Shah, "A holistic approach to aesthetic enhancement of photographs", *ACM Transactions on Multimedia Computing, Communications, and Applications (TOMCCAP)*, Volume 75, Issue 1, October 2011.
20. Kingsley Osuala, Kathleen Telusma, Saad M. Khan, Shandon Wu, Mubarak Shah, Candice Baker, Sabikha Alam, Ibrahim Abukenda, Aura Fuentes, Hani B. Seifein, Steven N. Ebert, "Distinctive Left-Sided Distribution of Adrenergic-Derived Cells in the Adult Mouse Heart", *PLoS One*, Volume 6, Issue 7, July 2011.
21. Saad Ali and Mubarak Shah, "Human Action Recognition in Videos Using Kinematic Features and Multiple Instance Learning", *IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI)*, Volume 32 , Issue 2, Pages: 288-303, February 2010.  
(#1 Ranked title in both Electrical Engineering & Artificial Intelligence according to the 2008 Journal Citations Report by Thomson-ISI.)
22. Alexei Gritai, Yaser Sheikh, Cen Rao, and Mubarak Shah, "Matching Trajectories of Anatomical Landmarks under Viewpoint Anthropometric, and Temporal Transforms" *International Journal of Computer Vision (IJCV)*, Volume 84 , Issue 3, Pages: 325 - 343, September 2009.
23. Imran Saleemi, Khurram Shafique, and Mubarak Shah "Probabilistic Modeling of Scene Dynamics for Applications in Visual Surveillance", *IEEE Transactions on PAMI*, vol. 31 no. 8, August 2009, pp. 1472-1485.  
(#1 Ranked title in both Electrical Engineering & Artificial Intelligence according to the 2008 Journal Citations Report by Thomson-ISI.)
24. Pingkun Yan, Ashraf A. Kassim, Weijia Shen, and Mubarak Shah, "Modeling Interaction for Segmentation of Neighboring Structures", *IEEE Trans. Information Technology in Bio Medicine*, Volume 13, Number 2, pp 252-262, March 2009.



25. Saad Masood Khan and Mubarak Shah, "Tracking Multiple Occluding People by Localizing on Multiple Scene Planes", IEEE Transactions on PAMI, Volume 31, Number 3, pp 505-519, March 2009.  
(#1 Ranked title in both Electrical Engineering & Artificial Intelligence according to the 2008 Journal Citations Report by Thomson-ISI.)
26. Jun Xie, Shahid Khan, and Mubarak Shah, "Automatic Tracking of Escherichia Coli In Phase-Contrast Microscopy Video", IEEE Trans. on Biomedical Engineering, FEBRUARY 2009 VOLUME 56 NUMBER 2, pages 390-399.
27. J. Xie, P.-A. Heng and Mubarak Shah, "Image Diffusion Using Saliency Bilateral Filter", IEEE Transactions on Information Technology in Biomedicine, Volume 12, Number 6, 768-771, 2008.
28. Jun Xie, Pheng-Ann Heng, and Mubarak Shah, "A Shape Matching Approach Using Skeletal Features and Context Descriptor", Pattern Recognition, Volume 41, Issue 5, May 2008, Pages 1756-1767.
29. Pavel Babenko and Mubarak Shah, "MinGPU: a minimum GPU library for computer vision", Journal of Real-Time Image Processing, (2008) 3:255-268.
30. Yaser Sheikh, and Mubarak Shah, "Trajectory Association Across Multiple Airborne Cameras", IEEE Transactions on PAMI, Volume 30, No 2, pp 361-367, February 2008.  
(#1 Ranked title in both Electrical Engineering & Artificial Intelligence according to the 2008 Journal Citations Report by Thomson-ISI.)
31. Arslan Basharat Yun Zhai and Mubarak Shah, "Content Based Video Matching Using Spatiotemporal Volumes", Computer Vision and Image Understanding, Volume 110, Issue 3, June 2008, Pages 360-377.
32. Alper Yilmaz and Mubarak Shah, "A Differential Geometric Approach To Representing the Human Actions", Computer Vision and Image Understanding journal, Vol. 109 No. 3, pp.335-351 2008.
33. Omar Javed, Khurram Shafique, Zeeshan Rasheed and Mubarak Shah, "Modeling inter-camera spacetime and appearance relationships for tracking across non-overlapping views", Computer Vision and Image Understanding, Volume 109, Issue 2, February 2008, Pages 146-162.
34. Pingkun Yan, Xiaobo Zhou, Mubarak Shah, and Stephen T.C. Wong, "Automatic Segmentation of High Throughput RNAi Fluorescent Cellular Images", IEEE Trans. Information Technology in Biomedicine, Volume 12, Number 1, January 2008.
35. Javed Ahmed, M. N. Jafri, Muhammad Akbar and Mubarak Shah, "Real-Time Edge-Enhanced Dynamic Correlation and Predictive Open-Loop Car-Following Control for Robust Tracking", Machine Vision and Applications Journal, Volume 19 Number 1, pp 1-26, January 2008

36. Paul Smith, Niels da Vitoria, and Mubarak Shah, "Resolving Hand Over Face Occlusion", *Image and Vision Computing*, Volume 25, Issue 9, 1 September 2007, Pages 1432-1448.
37. Asad Hakeem and Mubarak Shah, "Learning Detection and Representation of Multi-Agent Events in Videos", *Artificial Intelligence journal*, 171 (2007) 586605, June 2007.
38. Orkun Alatas, Pingkun Yan and Mubarak Shah, "Spatiotemporal Regularity Flow (SPREF): Its Estimation and Applications", *IEEE Transactions on Circuits and Systems for Video Technology*, Vol. 17, No. 5, May 2007, pp. 584-589.
39. Omar Javed, Khurram Shafique and Mubarak Shah, "Automated Surveillance in Realistic Scenarios", *IEEE MultiMedia*, January/March 2007.
40. Alper Yilmaz, Omar Javed and Mubarak Shah, "Object Tracking: A Survey", *ACM Computing Surveys*, December 2006.
41. Alper Yilmaz and Mubarak Shah, "Matching actions in presence of camera motion", *Computer Vision and Image Understanding* Vol. 104 (2006), pp. 221231.
42. Yun Zhai and Mubarak Shah, "Video Scene Segmentation Using Markov Chain Monte Carlo", *IEEE Transaction on Multimedia*, Vol.8, issue 4 (Aug 2006), pp.686-697.
43. Xiaochun Cao, Jiangjian Xiao, Hassan Foroosh, and Mubarak Shah, "Self-Calibration from Turn-Table Sequences in the Presence of Zoom and Focus", *Computer Vision and Image Understanding* 102 (2006) 227-237.
44. Eraldo Ribeiro and Mubarak Shah, "Computer Vision for Nanoscale Imaging", *Machine Vision and Applications Journal*, Vol. 17, Issue 3 (July 2006), pp. 147 - 162.
45. Orkun Alatas, Omar Javed and Mubarak Shah, "Video Compression Using Spatiotemporal Regularity Flow", *IEEE Transactions on Image Processing*, Vol. 15, No. 12, pp. 3812-3823, December 2006.
46. Lisa Spencer and Mubarak Shah, "Determining Scale and Sea State from Water Video", *IEEE Transactions on Image Processing*, Vol. 15, No. 6, 2006.
47. Paul Smith; Mubarak Shah; Niels Lobo, "Integrating Multiple Levels of Zoom to Enable Activity Recognition", *Computer Vision and Image Understanding*, Vol. 103, Issue 1 (July 2006), pp.33-51.
48. Arslan Basharat, Asaad Hakeem, Mubarak Shah, and Abhijit Mahanalobis "Automatic Target Detection and Recognition in Video Sensor Network with Stationary and Mobile Nodes", *OE Magazine*, Member Publication of SPIE, November Issue, 2005.
49. Xiaochun Cao, Yuping Shen, Mubarak Shah, Hassan Foroosh, "Single view compositing with shadows", *Visual Computer*, Volume 21, Numbers 8-10 Date: September 2005 (639 - 648)

50. Yun Zhai, Zeeshan Rasheed and Mubarak Shah, "Semantic Classification of Movie Scenes Using Finite State Machines", IEE Proceedings on Vision, Image and Signal Processing (VIS), Vol.152, issue 6 (Dec 2005), pp.896-901.
51. Yaser Sheikh and Mubarak Shah, "Bayesian Modelling of Dynamic Scenes for Object Detection", IEEE Transactions on PAMI, October 2005.  
(Ranked #1 journal among 208 Electrical Engineering Titles, and #5 among 347 CS titles)
52. Jiangjian Xiao and Mubarak Shah, "Motion Layer Extraction in the Presence of Occlusion using Graph Cuts", IEEE Transactions on PAMI, September 2005.  
(Ranked #1 journal among 208 Electrical Engineering Titles, and #5 among 347 CS titles)
53. Jiangjian Xiao and Mubarak Shah, "Layer-Based Video Registration", Machine Vision Applications, Volume 16, Number, pp 75-84, February 2005.
54. Zeeshan Rasheed and Mubarak Shah, "Scene Segmentation of Hollywood Movies and TV Shows", IEEE Transactions on Multi-media, December 2005.
55. Khurram Shafique and Mubarak Shah "A Non-Iterative Greedy Algorithm for Multi-frame Point Correspondence", IEEE Transactions on PAMI, January 2005.  
(Ranked #1 journal among 208 Electrical Engineering Titles, and #5 among 347 CS titles)
56. Alper Yilmaz, Xin Li, and Mubarak Shah, "C-BOT: Contour Based Non-rigid Object Tracking Using Mobile Cameras", IEEE Transactions on PAMI, November 2004 - Vol. 26, No. 11.  
(Ranked #1 journal among 208 Electrical Engineering Titles, and #5 among 347 CS titles)
57. Jiangjian Xiao and Mubarak Shah, "Tri-view morphing", Computer Vision Image Understanding, Volume 96, Issue 3 , Pages 345-366, December 2004.
58. Zeeshan Rasheed, Yaser Sheikh, Mubarak Shah "On the Use of Computable Video Features for Film Classification", IEEE Transactions on Circuit and Systems for Video Technology, June 2004.
59. Andrew Wu & Mubarak Shah and N. da Vitoria Lobo, "A Virtual 3D Blackboard: 3D Finger Tracking using a Single Camera", Applied Optics, Vol. 43 Issue 2 Page 379, January 2004.
60. Paul Smith, Lobo, N. d. V.; Shah, M., "Determining Driver Alertness with One Camera", IEEE Transactions on Intelligent Transportation Systems, Volume: 4, Issue: 4, Page(s): 205- 218, December 2003.

61. Sohaib Khan and Mubarak Shah, "Consistent Labeling of Tracked Objects in Multiple Cameras with Overlapping Fields of View", IEEE Transactions on PAMI, Vol. 25, No. 10, October, 2003.  
**(Ranked #1 journal among 208 Electrical Engineering Titles, and #5 among 347 CS titles)**
62. Mubarak Shah, "Understanding Human Behavior From Motion Imagery", Machine Vision and Applications journal, Volume 14, pp 210-214, September, 2003.
63. Alper Yilmaz, Khurram Shafique and Mubarak Shah, "Target-Tracking in FLIR Imagery Using Mean-Shift and Global Motion", Image and Vision Computing (invited paper), Vol. 21, Issue 7, pp. 623-635, July 2003.
64. G. Bebis. D. Egbert, and M. Shah, "Review of Computer Vision Education", IEEE Transactions on Education, vol. 46, no. 1, pp. 2-21, February 2003.
65. Cen Rao, Alper Yilmaz and Mubarak Shah, "View Invariant Representation and Recognition of Actions," Int. Journal of Computer Vision, pp 203-226, Volume 50, no 2, November 2002.
66. Mubarak Shah, "The Changing Shape of Computer Vision in the Twenty First Century", Int. Journal of Computer Vision, pp 103-110, Volume 50, no 2, November 2002.
67. Mubarak Shah and Kevin Bowyer, "Mentoring Undergraduate Students in Computer Vision Research", IEEE Transactions on Education, Volume 44, Number 3, pp 252–257, August 2001.
68. Wallick, M. N.; Lobo, N. d. V.; Shah, M. "A computer Vision Framework for Analyzing Overhead and Computer Projections from Video of Lectures", ISCA (International Society of Computers and their Applications) Journal, Volume 8, No. 2, June 2001 pages 89-100.
69. Doug Ayers and Mubarak Shah, "Monitoring Human Behavior from Video Taken in an Office Environment", Image and Vision Computing, Volume 19, Issue 12, 1 October 2001 pp 833-846.
70. Omar Javed, Zeeshan Rasheed, Mubarak Shah, "Visual Content Based Segmentation of Talk & Game Shows", International Journal of Computers and Applications (Acta Press), June 2002.
71. Walter Phillips III, Mubarak Shah and Niels da Vitoria Lobo, "Flame Recognition in Video", Pattern Recognition Letters, vol. 23 (1-3), January 2002, pp 319-327.
72. Ruo Zhang, Ping-Sing Tsai, James Cryer and Mubarak Shah, "Shape from Shading: A Survey", IEEE Transactions on PAMI, Volume 21, Number 08, August, 1999, pp 690–706.  
**(Ranked #1 journal among 208 Electrical Engineering Titles, and #5 among 347 CS titles)**

73. Ruo Zhang and Mubarak Shah, "Shape from Intensity Gradient", *IEEE Transaction on Systems, Man and Cybernetics, PART A*, May 1999, pp 318–325.
74. James Davis and Mubarak Shah, "Toward 3-D Gesture Recognition", *Pattern Recognition and Artificial Intelligence* journal, Volumr 13, No. 3, May 1999, pp 381–393.
75. G. Bebis, M. Gerogiopoulos, N. Lobo and M. Shah, "Indexing Based on Algebraic Functions of Views", *Computer Vision and Image Understanding*, vol. 72, no. 3, pp. 360-378, 1998.
76. A. Ortega and M. Shah, "From Shape from Shading to Object Recognition", *International Journal of Artificial Intelligence and Pattern recognition*, Volume 7, No. 12, November, 1998 pp 969-984.
77. Piotr Windyga, Mubarak Shah, *et al*, "Three-dimensional reconstruction of the coronary arteries using a priori knowledge", *Medical & Biological Engineering & Computing*, vol 36, No. 2, March 1998, pp 158-164.
78. Ping-Sing Tsai and Mubarak Shah, "Shape from Shading with Variable Albedo", *Optical Engineering*, pp 121-1220, April 1998.
79. Yu Tian and Mubarak Shah, "Recovering 3D Motion and Structure using Adaptive Hough Transform", *IEEE Transactions on PAMI*, Vol19, N0. 10, October 1997, pp 1178–1183.  
**(Ranked #1 journal among 208 Electrical Engineering Titles, and #5 among 347 CS titles)**
80. G. Bebis, M. Georgiopoulos, N. da Vitoria Lobo, and Mubarak Shah, " Learning affine transformations", *Pattern Recognition*, Volume 32, 1997, pp 1783–1799.
81. Ruo Zhang and Mubarak Shah, "Iterative Shape Recovery From Multiple Images", *Image and Vision Computing*, Volume 15 (1997), 801-814, November 1997.
82. Ruo Zhang, Ping-Sing Tsai and Mubarak Shah, " Photomtion", *CVGIP: Image Understanding*, Vol. 63, No. 2, pp 221-231, March 1996.
83. James Cryer, Ping-Sing Tsai and Mubarak Shah, " Combining Stereo and Shading", *Pattern Recognition*, Volume 28, No. 7, pp 1033-1043, July 1995.
84. Yu Tian and Mubarak Shah, "Motion Estimation and Segmentation", *Machine Vision and Applications*, vol 9, pp 32–42, 1995.
85. Claudette Cédras and Mubarak Shah, "Motion Based Recognition: A Survey", *Image and Vision Computing*, Volume 13, No. 2, pages 129-155, March 1995.
86. Ping-Sing Tsai and Mubarak Shah, "Shape from shading using linear approximation", *Image and Vision Computing*, Vol. 12, No. 8, October 1994, pp 487-498.

87. Ping-Sing Tsai, Mubarak Shah, Katharine Keiter, and Takis Kasparis, "Cyclic Motion Detection for Motion Based Recognition", *Pattern Recognition*, Vol. 27, No. 12, 1994.
88. James Davis and Mubarak Shah, "Visual Gesture Recognition", *Vision, Image and Signal Processing*, Vol 141, No. 2, April 1994.
89. Mubarak Shah, Krishnan Rangarajan, and Ping-Sing Tsai, "Motion Trajectories", *IEEE Transaction on Systems, Man and Cybernetics*, Vol. 23, No. 4, August 1993, pp 1138-1150.
90. Donna Williams, and Mubarak Shah, "Normalized Edge Detection", *CVGIP: Graphical Models and Image Processing*, Vol. 55, No. 4, July, 1993, pp 311-318.
91. Krishnan Rangarajan, Bill Allen, and Mubarak Shah, "Matching Motion Trajectories", *Pattern Recognition*, Vol. 26, No. 4, pp 595-610, April, 1993.
92. Krishnan Rangarajan, and Mubarak Shah, "Interpretation of Motion Trajectories Using Focus of Expansion", *IEEE Transaction on PAMI*, Vol. 14, No. 12, December 1992.  
**(Ranked #1 journal among 208 Electrical Engineering Titles, and #5 among 347 CS titles)**
93. Hckett, J., Lavoie, M. and Shah, M. "Three Dimensional Object Recognition Using Multiple Sensors", *Journal of Information and Science and Technology*, Vol. 2, No.1, October 1992.
94. Donna Williams, and Mubarak Shah, "A Fast Algorithm for Active Contours and Curvature Estimation", *Computer Vision, Graphics and Image Processing*, Vol 55, No.1, January 1992, pp 14-26.
95. Krishnan Rangarajan, and Mubarak Shah, "Establishing Motion Correspondence", *CVGIP: Image Understanding*, July 1991, pp 56-73.
96. Donna Williams, and Mubarak Shah, "Edge Contours Using Multiple Scales", *Computer Vision, Graphics and Image Processing*, September 1990, Volume 51, pp 256-274.
97. Jay Hackett, and Mubarak Shah, "Segmentation using range and intensity data", *Optical Engineering*, Vol. 28, No. 6, pp 667-674, June 1989.
98. Krishnan Rangarajan, Mubarak Shah, and David Van Brackle, "Optimal Corner Detector", *Computer Vision, Graphics and Image Processing*, vol 48, pp 230-245, November 1989.
99. Ranganathan, N. and Shah, M.A., "A VLSI Architecture for Scale-Space", *Computer Vision, Graphics and Image Processing*, Vol. 43, pp 178-204, August 1988.
100. Shah, M., Sood, A. and Jain, R., "Pulse and Staircase Edge Models" *Computer Vision, Graphics and Image Processing*, Volume 34, pp 321-343, June 1986.

101. Shah, M. and Jain, R., “Detecting Time Varying Corners” *Computer Vision, Graphics and Image Processing*, Volume 28, pp 345-355, December 1984.

#### D.1.4 Conference Papers

1. Rui Hou, Amir Roshan Zamir, Rahul Sukthankar, Mubarak Shah, “DaMN - Discriminative and Mutually Nearest: Exploiting Pairwise Category Proximity for Video Action Recognition”, ECCV 2014, Zurich, Switzerland, September 6-12, 2014.
2. Shervin Ardeshir, Amir Roshan Zamir, Alejandro Torroella, Mubarak Shah, “GIS-Assisted Object Detection and Geospatial Localization”, ECCV 2014, Zurich, Switzerland, September 6-12, 2014.
3. Dong Zhang, Omar Javed, Mubarak Shah, “Video Object Co-Segmentation by Regulated Maximum Weight Cliques”, ECCV 2014, Zurich, Switzerland, September 6-12, 2014.
4. Amir Roshan Zamir, Shervin Ardeshir, Mubarak Shah, “Robust Refinement of GPS-Tags Using Random Walks with an Adaptive Damping”, CVPR 2014, Columbus, Ohio, June 23-28, 2014.
5. Shayan Modiri Assari, Amir Roshan Zamir, Mubarak Shah, “Video Classification Based on Generalized Maximum Co-occurrence Cliques”, CVPR 2014, Columbus, Ohio, June 23-28, 2014.
6. Subhabrata Bhattacharya, Mahdi M. Kalayeh, Rahul Sukthankar, Mubarak Shah, “Recognition of Complex Events exploiting Temporal Dynamics between Underlying Concepts”, CVPR 2014, Columbus, Ohio, June 23-28, 2014 (Oral).
7. Afshin Dehghan, Haroon Idrees, Mubarak Shah, “From Human-Annotated to Machine-Discovered Concepts using Consensus Regularization”, CVPR 2014, Columbus, Ohio, June 23-28, 2014.
8. Afshin Dehghan, Enrique G. Ortiz, Ruben Villegas, Mubarak Shah, “Who Do I Look Like? Determining Parent-Offspring Resemblance via Genetic Features”, CVPR 2014, Columbus, Ohio, June 23-28, 2014.
9. Mahdi M. Kalayeh, Haroon Idrees, Mubarak Shah, “NMF-KNN: Image Annotation using Weighted Multi-View Non-Negative Matrix Factorization”, CVPR 2014, Columbus, Ohio, June 23-28, 2014.
10. Amir Roshan Zamir, Afshin Dehghan, Mubarak Shah, “Visual Business Recognition - A Multimodal Approach”, ACM Multimedia 2013, Barcelona, Spain, November 2013.
11. Subhabrata Bhattacharya, Behnaz Nojavanasghari, Tao Chen, Dong Liu, Shih-Fu Chang, and, Mubarak Shah, “Towards a Comprehensive Computational Model for Aesthetic Assessment of Videos”, ACM Multimedia 2013 Grand Challenge, Barcelona, Spain, November 2013.

12. Guang Shu, Afshin Dehghan, Mubarak Shah, “Improving an Object Detector and Extracting Regions using Superpixels”, Computer Vision and Pattern Recognition 2013, Portland, Oregon, June 23-28, 2013.
13. Yang Yang, Guang Shu, Mubarak Shah, “Semi-supervised Learning of Feature Hierarchies for Object Detection in a Video”, Computer Vision and Pattern Recognition 2013, Portland, Oregon, June 23-28, 2013.
14. Yicong Tian, Rahul Sukthankar, Mubarak Shah, “Spatiotemporal Deformable Part Models for Action Detection”, Computer Vision and Pattern Recognition 2013, Portland, Oregon, June 23-28, 2013.
15. Haroon Idrees, Imran Saleemi, Cody Seibert, Mubarak Shah, “Multi-Source Multi-Scale Counting in Extremely Dense Crowd Images”, Computer Vision and Pattern Recognition 2013, Portland, Oregon, June 23-28, 2013.
16. Dong Zhang, Omar Javed, Mubarak Shah, “Video Object Segmentation through Spatially Accurate and Temporally Dense Extraction of Primary Object Regions”, Computer Vision and Pattern Recognition 2013, Portland, Oregon, June 23-28, 2013. (Oral)
17. Enrique G. Ortiz, Alan Wright, Mubarak Shah, “Face Recognition in Movie Trailers via Mean Sequence Sparse Representation-based Classification”, Computer Vision and Pattern Recognition 2013, Portland, Oregon, June 23-28, 2013.
18. Haroon Idrees, Imran Saleemi and Mubarak Shah, “Statistical Inference of motion in the Invisible”, European Conference on Computer Vision 2012, Florence, Italy, October 7-13, 2012.
19. Soumyabrata Dey, Vladimir Reilly, Imran Saleemi and Mubarak Shah, “Detection of Independently Moving Objects in Non-planar Scenes via Multi-Frame Monocular Epipolar Constraint”, European Conference on Computer Vision 2012, Florence, Italy, October 7-13, 2012.
20. Hamid Izadinia and Mubarak Shah, “Recognizing Complex Events using Large Margin Joint Low-Level Event Model”, European Conference on Computer Vision 2012, Florence, Italy, October 7-13, 2012.
21. Hamid Izadinia, Imran Saleemi, Wenhui Li and Mubarak Shah, “(MP)2T: Multiple People Multiple Parts Tracker”, European Conference on Computer Vision 2012, Florence, Italy, October 7-13, 2012.
22. Amir Roshan Zamir, Afshin Dehghan and Mubarak Shah, “GMCP-Tracker: Global Multi-object Tracking Using Generalized Minimum Clique Graphs”, European Conference on Computer Vision 2012, Florence, Italy, October 7-13, 2012.
23. Yang Yang and Mubarak Shah, “Complex Events Detection using Data-driven Concepts”, European Conference on Computer Vision 2012, Florence, Italy, October 7-13, 2012.



24. Guang Shu<sup>1</sup>, Afshin Dehghan<sup>1</sup>, Omar Oreifej<sup>1</sup>, Emily Hand, Mubarak Shah, “Part-based Multiple-Person Tracking with Partial Occlusion Handling”, IEEE Conference on Computer Vision and Pattern Recognition, 2012.
25. Gonzalo Vaca-Castano, Amir Roshan Zamir and Mubarak Shah, “City Scale Geospatial Trajectory Estimation of a Moving Camera”, IEEE Conference on Computer Vision and Pattern Recognition, 2012.
26. Kishore K. Reddy, Berkan Solmaz, Pingkun Yan, Nicholas G. Avgeropoulos, David J. Rippe and Mubarak Shah, “Confidence Guided Enhancing Brain Tumor Segmentation in Multi-Parametric MRI”, International Symposium on Biomedical Imaging (ISBI), April 2012.
27. Corey McCall, Kishore Reddy and Mubarak Shah, “Macro-Class Selection for Hierarchical K-NN Classification of Inertial Sensor Data”, Second International Conference on Pervasive and Embedded Computing and Communication Systems, PECCS 2012, February 24-26, 2012, Rome, Italy.
28. Berkan Solmaz, Soumyabrata Dey, Ravishankar Rao, Mubarak Shah, “ADHD classification using bag of words approach on network features”, SPIE Medical Imaging Conference, San Diego, 4 - 9 February 2012.
29. Salman Khokhar, Imran Saleemi, and Mubarak Shah, “Statistical Event Representation and Similarity Invariant Classification by KL Divergence Minimization”, International Conference on Computer Vision (ICCV), 2011.
30. Shandong Wu, Omar Oreifej, and Mubarak Shah, “Action Recognition in Videos Acquired by a Moving Camera Using Motion Decomposition of Lagrangian Particle Trajectories”, International Conference on Computer Vision (ICCV), 2011.
31. Jingen Liu, Mubarak Shah, Benjamin Kuipers, and Silvio Savarese, “Cross-View Action Recognition via View Knowledge Transfer”, IEEE Conference on Computer Vision and Pattern Recognition 2011, Colorado Springs, CO, USA, June 21-25, 2011. (**Oral, acceptance rate 3.5%**)
32. Sangmin Oh, Anthony Hoogs, Amitha Perera, Naresh Cuntoor, Chia-Chih Chen, Jong Taek Lee, Saurajit Mukherjee, J. K. Aggarwal, Hyungtae Lee, Larry Davis, Eran Swears, Xioyang Wang, Qiang Ji, Kishore Reddy, Mubarak Shah, Carl Vondrick, Hamed Pirsiavash, Deva Ramanan, Jenny Yuen, Antonio Torralba, Bi Song, Anesco Fong, Amit Roy-Chowdhury, and Mita Desai, “A Large-scale Benchmark Dataset for Event Recognition in Surveillance Video”, IEEE Conference on Computer Vision and Pattern Recognition 2011, Colorado Springs, CO, USA, June 21-25, 2011.
33. Omar Oreifej, Guang Shu, Teresa Pace, and Mubarak Shah, “A Two-Stage Reconstruction Approach for Seeing Through Water”, IEEE Conference on Computer Vision and Pattern Recognition 2011, Colorado Springs, CO, USA, June 21-25, 2011.

34. Subhabrata Bhattacharya, Rahul Sukthankar, Rong Jin, and Mubarak Shah, “A Probabilistic Representation for Efficient Large Scale Visual Recognition Tasks”, IEEE Conference on Computer Vision and Pattern Recognition 2011, Colorado Springs, CO, USA, June 21-25, 2011.
35. Omar Oreifej, Niels Lobo, and Mubarak Shah, “UAV Navigation in Planar Scenes”, International Conference on Robotics and Automation, 2011.
36. Subhabrata Bhattacharya, Rahul Sukthankar, and Mubarak Shah, “A Framework for Photo-Quality Assessment and Enhancement based on Visual Aesthetics”, ACM Conference on Multimedia, 2010. (Full paper) (**Acceptance rate 23%**) (Nominated for the Best Paper Award)
37. Ramin Mehran, Brian Moore, Mubarak Shah, “A Streakline Representation of Flow in Crowded Scenes”, European Conference on Computer Vision (ECCV), Crete, Greece, 2010.
38. Amir Roshan Zamir and Mubarak Shah, “Accurate Image Localization Based on Google Maps Street View”, European Conference on Computer Vision (ECCV), Crete, Greece, 2010. (Received ECCV travel grant for this paper)
39. Vladimir Reilly, Berkan Solmaz, Mubarak Shah, “Geometric Constraints for Human Detection in Aerial Imagery”, European Conference on Computer Vision (ECCV), Crete, Greece, 2010.
40. Vladimir Reilly, Haroon Idrees, Mubarak Shah, “Detection and Tracking of Large Number of Targets in Wide Area Surveillance”, European Conference on Computer Vision (ECCV), Crete, Greece, 2010.
41. Omar Oreifej, Ramin Mehran, and Mubarak Shah, “Human Identity Recognition in Aerial Images”, IEEE Conference on Computer Vision and Pattern Recognition 2010, San Francisco, CA.
42. Imran Saleemi, Lance Hartung, and Mubarak Shah, “Scene Understanding by Statistical Modeling of Motion Patterns”, IEEE Conference on Computer Vision and Pattern Recognition 2010, San Francisco, CA.
43. Shandong Wu, Brian Moore, and Mubarak Shah, “Chaotic Invariants of Lagrangian Particle Trajectories for Anomaly Detection in Crowded Scenes”, IEEE Conference on Computer Vision and Pattern Recognition 2010, San Francisco, CA.
44. Yang Yang, Jingen Liu, and Mubarak Shah, “Video Scene Understanding Using Multiple Scales”, International Conference on Computer Vision (ICCV), 2009. (**Acceptance rate 23%**)
45. Kishore Reddy, Jingen Liu, and Mubarak Shah, “Incremental Action Recognition Using Feature-Tree”, International Conference on Computer Vision (ICCV), 2009. (**Acceptance rate 23%**)

46. Arslan Basharat and Mubarak Shah, "Time Series Prediction by Chaotic Modeling of Nonlinear Dynamical Systems", International Conference on Computer Vision (ICCV), 2009. (**Acceptance rate 23%**)
47. Jingen Liu, Jiebo Luo, and Mubarak Shah, "Recognizing Realistic Actions from Videos "in the Wild", CVPR 2009, June 2009. (**Oral Acceptance rate 4%**)
48. Jingen Liu, Yang Yang, and Mubarak Shah, "Learning Semantic Visual Vocabularies Using Diffusion Distance", CVPR 2009, June 2009. (**Acceptance rate 26%**)
49. Ramin Mehran, Alexis Oyama, and Mubarak Shah, "Abnormal Crowd Behavior Detection using Social Force Model", CVPR 2009, June 2009. (**Acceptance rate 26%**)
50. Jingen Liu, Jiebo Luo, and Mubarak Shah, "Action Recognition in Unconstrained Amateur Videos", International Conference on Acoustics, Speech, and Signal Processing, April 19-24, 2009, Taipei, Taiwan.
51. Arslan Basharat, Alexi Grati and Mubarak Shah, "Geometric Constraints on 2D Action Models for Tracking Human Body", International Conference on Pattern Recognition, December 2008. (**Oral, Acceptance rate 18%**)
52. Min Hu, Saad Ali, and Mubarak Shah, "Learning Motion Patterns in Crowded Scenes Using Motion Flow Field ", International Conference on Pattern Recognition, December 2008. (**Oral, Acceptance rate 18%**)
53. Min Hu, Saad Ali, and Mubarak Shah, "Detecting Global Motion Patterns in Complex Videos", International Conference on Pattern Recognition, December 2008.
54. Jun Xie, Min Hu, and Mubarak Shah, "An Object Recognition Framework Using Unfolding Warping", International Conference on Pattern Recognition, December 2008.
55. Saad Ali and Mubarak Shah, "Floor Fields for Tracking in High Density Crowded Scenes", European Conference on Computer Vision, October 12-18, 2008, Marseille, France. (**Oral, Acceptance rate 4.6%**)
56. Jun Xie, Shahid Khan, and Mubarak Shah, "Automatic Tracking of Escherichia Coli Bacteria", 11th International Conference on Medical Image Computing and Computer Assisted Intervention, MICCAI, September 6-10, New York City. 2008.
57. Arslan Basharat, Alexei Gritai, and Mubarak Shah, "Learning Object Motion Patterns for Anomaly Detection and Scene Model Feedback", CVPR 2008.
58. Jingen Liu and Mubarak Shah, "Learning Human actions via information maximization", CVPR 2008.
59. Jingen Liu, Saad Ali and Mubarak Shah, "Recognizing human action using multiple features", CVPR 2008.

60. Mikel Rodriguez, Javed Ahmed, Mubarak Shah, "Action MACH: A Spatio-temporal Maximum Average Correlation Height Filter for Action Recognition", CVPR 2008.
61. Yusuf Aytar, Mubarak Shah, Jiebo Luo, "Utilizing Semantic Word Similarity Measures for Video Retrieval", CVPR 2008.
62. Saad M. Khan and Mubarak Shah, "Reconstructing Non-stationary Articulated Objects in Monocular Video using Silhouette Information", CVPR 2008.
63. Pingkun Yan, Saad M. Khan and Mubarak Shah, "Learning 4D Action Feature Models for Arbitrary View Action Recognition", CVPR 2008.
64. Andrew Miller, Mubarak Shah, and Don Harper, "Landing a UAV on a Runway Using Image Registration, International Conference on Robotics & Automation, 2008.
65. Taylor Goodhart, Pingkun Yan, Mubarak Shah, "Action recognition using spatio-temporal regularity based features", International Conference on Acoustics, Speech and Signal Processing, March 28-April 4, 2008, Las Vegas.
66. Martin Schiavenato, Jacqueline Byers, Paul Scovanner, Piotr Windyga, and Mubarak Shah, "Is there a Primal Face of Pain? A methodology answer", Proceedings of the 29th Annual International Conference of the IEEE EMBS, Cit Internationale, Lyon, France, August 23-26, 2007.
67. Saad Ali, Arslan Basharat, and Mubarak Shah, "Chaotic Invariants for Human Action Recognition", International Conference on Computer Vision, October, 2007, Rio de Janeiro, Brazil.
68. Pingkun Yan, Saad M. Khan, and Mubarak Shah, "3D Model based Object Class Recognition in Arbitrary Views, IEEE International Conference on Computer Vision, October, 2007, Rio de Janeiro, Brazil.
69. Jingen Liu, "Scene Modelling Using Co-Clustering", IEEE International Conference on Computer Vision, October, 2007, Rio de Janeiro, Brazil.
70. Saad Masood Khan, Pingkun Yan, and Mubarak Shah, "A Homographic Framework for the Fusion of Multi-view Silhouettes", IEEE International Conference on Computer Vision, October, 2007, Rio de Janeiro, Brazil.
71. Paul Scovanner, Saad Ali, and Mubarak Shah, "A 3-Dimensional SIFT Descriptor and its Application to Action Recognition", ACM MM 2007, Augsburg, Germany.
72. Mikel D. Rodriguez, and Mubarak Shah, "Detecting and Segmenting Humans in Crowded Scenes", ACM MM 2007, Augsburg, Germany.
73. Javed Ahmed, Mubarak Shah, Andrew Miller, Don Harper, and M.N. Jafri, "A Vision-Based System for a UGV to Handle a Road Intersection", AAAI Twenty-Second Conference on Artificial Intelligence, Vancouver, British Columbia, 22-26 July 2007.

74. Vladimir Reilly, Saad Ali, and Mubarak Shah, "Motion and Appearance Contexts for Tracking and Re-Acquiring Targets in Aerial Video", IEEE Conference on Computer Vision and Pattern Recognition, June 2007. (**Acceptance rate 27%**)
75. Andrew Miller and Mubarak Shah "Foreground Segmentation in Surveillance Scenes Containing a Door", IEEE International Conference on Multimedia & Expo, Beijing, China 2007.
76. Brandyn White and Mubarak Shah "Automatically Tuning Background Subtraction Parameters Using Particle Swarm Optimization", IEEE International Conference on Multimedia & Expo, Beijing, China 2007.
77. Yusuf Aytar, Omer Bilal Orhan and Mubarak Shah "Improving Semantic Concept Detection and Retrieval Using Contextual Estimates", IEEE International Conference on Multimedia & Expo, Beijing, China 2007.
78. Yaser Sheikh, Xin Li, and Mubarak Shah, "Trajectory Association across Non-overlapping Moving Cameras in Planar Scenes", IEEE Conference on Computer Vision and Pattern Recognition, June 2007. (**Acceptance rate 27%**)
79. Alexi Grati, Yaser Sheikh, and Mubarak Shah, "On the Spacetime Geometry of Galilean Cameras", IEEE Conference on Computer Vision and Pattern Recognition, June 2007. (**Acceptance rate 27%**)
80. Asad Hakeem, Yaser Sheikh, and Mubarak Shah, "On the Direct Estimation of the Fundamental Matrix", IEEE Conference on Computer Vision and Pattern Recognition, June 2007. (**Acceptance rate 27%**)
81. Saad Ali, and Mubarak Shah, "A Lagrangian Particle Dynamics Approach for Crowd Flow Segmentation and Stability Analysis", IEEE Conference on Computer Vision and Pattern Recognition, June 2007. (**Acceptance rate 5%**)
82. Yun Zhai and Mubarak Shah, "Visual Attention Detection in Video Sequences Using Spatiotemporal Cues", ACM MM 2006, Santa Barbara, CA, USA. (**Acceptance rate 16%.**)
83. Humera Noor, Shahid H. Mirza, Yaser Sheikh, Amit Jain, "Mubarak Shah, Model Generation for Video based Object Recognition", ACM MM 2006, Santa Barbara, CA, USA.
84. Jun Xie, Pheng-Ann Heng, Simon S. M. Ho, Mubarak Shah, "Image Diffusion using Saliency Bilateral Filter", 9th MICCAI Conference, October 1-6, 2006, Copenhagen.
85. Asaad Hakeem, Roberto Vezzani, Rita Cucchiera, Mubarak Shah "Estimating Geospatial Trajectory of a Moving Camera", International Conference on Pattern Recognition", Hong Kong, August 23, 2006. (**Acceptance rate 15%.**)

86. Pingkun Yan and Mubarak Shah, "Segmentation of Neighboring Structures by Modeling Their Interaction," IEEE Computer Society Workshop on Mathematical Methods in Biomedical Image Analysis (MMBIA), New York, June 2006.
87. Yaser Sheikh, Niels Haering, and Mubarak Shah, "Shape from Dynamic Texture for Planes", IEEE Conference on Computer Vision and Pattern Recognition, New York, USA 2006.  
(**Acceptance rate 28%.**)
88. Jingen Liu, Yun Zhai, Mubarak Shah, "PEGASUS: An Information Mining System for TV News Videos", SPIE's Defense and Security Symposium 2006, 17 -21 April 2006.
89. Saad Ali and Mubarak Shah, "COCOA - Tracking in Aerial Imagery", SPIE Airborne Intelligence, Surveillance, Reconnaissance (ISR) Systems and Applications, Orlando, 2006.
90. Fahd Rafi, Saad M. Khan, Khurram Shafiq, Mubarak Shah, "Autonomous Target Following by Unmanned Aerial Vehicles", SPIE Defence and Security Symposium 2006, Orlando FL.
91. Alexei Gritai and Mubarak Shah, "Tracking of Human Body Joints Using Anthropometry", International Conference of Multimedia and Expo, Toronto, Canada, 2006.
92. Yun Zhai, Jingen Liu, Mubarak Shah, "Automatic Query Expansion In News Video Retrieval", International Conference of Multimedia and Expo, Toronto, Canada, 2006.
93. Saad M. Khan, Fahd Rafi, Mubarak Shah, "Where was the picture taken: Image Localization in Route Panoramas using Epipolar Geometry", International Conference of Multimedia and Expo, Toronto, Canada, 2006.
94. Saad M. Khan, Mubarak Shah, "A Multiview Approach to Tracking People in Crowded Scenes using a Planar Homography Constraint", European Conference of Computer Vision 2006.
95. Asaad Hakeem, Khurram Shafique, and Mubarak Shah "An Object based Video Coding Framework for Video Sequences Obtained From Static Cameras", ACM Multimedia 2005, Singapore, November 6-12.  
(**Acceptance rate 16%, nominated for Best Paper Award.**)
96. Yun Zhai, and Mubarak Shah, "Tracking News Stories Across Different Sources", ACM Multimedia 2005, Singapore, November 6-12.  
(**Acceptance rate 16%.**)
97. Saad M. Khan and Mubarak Shah, "Detecting Group Activities Using Rigidity of Formation", ACM Multimedia 2005, Singapore, November 6-12.
98. Yun Zhai, and Mubarak Shah, "Determining Structure in Continuously Recorded Videos", ACM Multimedia 2005, Singapore, November 6-12.

99. Yun Zhai and Mubarak Shah, "A General Framework for Temporal Video Scene Segmentation", IEEE International Conference on Computer Vision, 2005, Beijing, China, October 15-21.  
(**Acceptance Rate 20%**)
100. Paul Smith, Niels da Vitoria Lobo and Mubarak Shah, "Temporal Boost for Event Recognition", IEEE International Conference on Computer Vision, 2005, Beijing, China, October 15-21.  
(**Acceptance Rate 20%**)
101. Alper Yilmaz and Mubarak Shah, "Recognizing Human Actions in Videos Acquired by Uncalibrated Moving Cameras", IEEE International Conference on Computer Vision, 2005, Beijing, China, October 15-21.  
(**Acceptance Rate 20%**)
102. Saad Ali and Mubarak Shah, "A Supervised Learning Framework for Generic Object Detection in Images", IEEE International Conference on Computer Vision, 2005, Beijing, China, October 15-21. (**Acceptance Rate 20%**)
103. Yaser Sheikh and Mubarak Shah, "Object Tracking Across Multiple Independently Moving Cameras", IEEE International Conference on Computer Vision, 2005, Beijing, China, October 15-21.  
(**Acceptance Rate 20%**)
104. Yaser Sheikh and Mubarak Shah, "Exploring the Space of an Action for Human Action Recognition", IEEE International Conference on Computer Vision, 2005, Beijing, China, October 15-21.  
(**Acceptance Rate 20%**)
105. Orkun Alatas and Mubarak Shah, "Video Compression Using Structural Flow", International Conference on Image Processing, Genova, Italy, September 11-14, 2005.
106. Yun Zhai, Alper Yilmaz, and Mubarak Shah, "Story Segmentation in News Videos Using Visual and Text Cues", International Conference on Image and Video Retrieval 2005, CIVR2005, July 20-22, 2005, Singapore.
107. Asad Hakeem and Mubarak Shah, "Multiple Agent Event Detection and Representation in Videos", The Twentieth National Conference on Artificial Intelligence (AAAI), 2005.  
(**Acceptance Rate 18%**)
108. Saad Ali and Mubarak Shah, "Kernel PCA and Boosting: An Integrated Approach to Generic Object Detection", IEEE International Conference on Multimedia & Expo July 6-8, 2005, Amsterdam, The Netherlands.

109. Yun Zhai and Mubarak Shah, "Automatic Segmentation of Home Videos", IEEE International Conference on Multimedia & Expo July 6-8, 2005, Amsterdam, The Netherlands.  
(**Acceptance Rate 22%**)
110. Yaser Sheikh and Mubarak Shah, "Bayesian Object Detection in Dynamic Scenes", IEEE CVPR 2005, San Diego, June 20-26.  
(**Acceptance rate 6%**)
111. Omar Javed, Khurram Shafique and Mubarak Shah, "Appearance Modeling for Tracking in Multiple Non-overlapping Cameras", IEEE CVPR 2005, San Diego, June 20-26.  
(**Acceptance rate 6%**)
112. Alper Yilmaz and Mubarak Shah, "Actions As Objects: A Novel Action Representation", IEEE CVPR 2005, San Diego, June 20-26. (**acceptance rate 20%**)
113. Omar Javed, Saad Ali and Mubarak Shah, "Online Detection and Classification of Moving Objects Using Progressively Improving Detectors", IEEE CVPR 2005, San Diego, June 20-26.  
(**Acceptance rate 20%**)
114. Jiangjian Xiao and Mubarak Shah, "Accurate Motion Layer Segmentation and Matting", IEEE CVPR 2005, San Diego, June 20-26.  
(**Acceptance rate 20%**)
115. Xiaochun Cao and Mubarak Shah, "Camera Calibration and Light Source Orientation Estimation from Images with Shadows", IEEE CVPR 2005, San Diego, June 20-26.  
(**Acceptance rate 20%**)
116. D. Batz, M. Batz, N. Da Vitoria Lobo, M. Shah, "Visual System for Monitoring Medication Intake", in Procs. Canadian Conference on Computer and Robot Vision, May 2005, Victoria.
117. J. Garcia, N. Da Vitoria Lobo, M. Shah, J. Feinstein, "Finding Heads in Single Images", in Procs. Canadian Conference on Computer and Robot Vision, May 2005, Victoria.
118. Arslan Basharat, Necati Catbas and Mubarak Shah, "A Framework for Intelligent Sensor Network with Video Camera for Structural Health Monitoring of Bridges", PerCom 2005, Third International Conference on Pervasive Computing, Kauai Island, Hawaii, March 8-12, 2005.
119. Yunjun Zhang, Jiangjian Xiao and Mubarak Shah, "Motion Layer Based Object Removal", IEEE Workshop on Application of Computer Vision, 2005.
120. Jiangjian Xiao, Yunjun Zhang, and Mubarak Shah "Adaptive Region-Based Video Registration", IEEE Workshop on Motion and Video Computing, 2005



121. Xiaochun Cao and Mubarak Shah, "Shadow Construction in Object Transfer", IEEE Workshop on Application of Computer Vision, 2005.
122. Michael Wells, Niels da Vitoria Lobo, Mubarak Shah, "Automatic Visual Tracking for Analysis of Lifting", Irish Machine Vision and Image Processing Conference, Dublin, Ireland, Sept 1-3, 2004.
123. Alfred K. Levy III, Niels Da Vitoria Lobo, Mubarak Shah, "Object Tracking in Low Frame-Rate Video", Irish Machine Vision and Image Processing Conference, Dublin, Ireland, Sept 1-3, 2004.
124. Khurram Shafique and Mubarak Shah, "Estimation of the Radiometric Response Functions of a Color Camera from Differently Illuminated Image", IEEE International Conference on Image Processing, October 24-26, 2004, Singapore.
125. Lisa Spencer Mubarak Shah, "Water Video Analysis", IEEE International Conference on Image Processing, October 24-26, 2004, Singapore.
126. Omar Javed Mubarak Shah Dorin Comaniciu, "A Probabilistic Framework for Object Recognition in Video", IEEE International Conference on Image Processing, October 24-26, 2004, Singapore.
127. Yun Zhai, Zeeshan Rasheed, Mubarak Shah "Conversation Detection in Feature Film Using Finite State Machines", International Conference on Pattern Recognition, August 2004, Cambridge, England.
128. Alexei Gritai, Yaser Ajmal, Mubarak Shah, "On the use of Anthropometry in the Invariant Analysis of Human Action", International Conference on Pattern Recognition, August 2004, Cambridge, England.
129. Orkun Alatas, Omar Javed and Mubarak Shah, "Compressed Spatio-temporal Descriptors for Video Matching and Retrieval", International Conference on Pattern Recognition, August 2004, Cambridge, England.
130. Imran N. Junejo, Omar Javed, Mubarak Shah, "Multi Feature Path Modeling for Video Surveillance", International Conference on Pattern Recognition, August 2004, Cambridge, England.
131. Asaad Hakeem, Yaser Sheikh, and Mubarak Shah, "Ontology and Taxonomy Collaborated Framework for Meeting Classification", International Conference on Pattern Recognition, August 2004, Cambridge, England.
132. Yunjun Zhang, Jiangjian Xiao, Mubarak Shah, "Object Removal in Single Image", Proceedings of EUROGRAPHICS, August 30 - September 3, Grenoble, France, 2004.
133. Asaad Hakeem, Yaser Sheikh, and Mubarak Shah, "CASEE: A Hierarchical Event Representation for the Analysis of Videos", The Nineteenth National Conference on Artificial Intelligence (AAAI), July 25-29, 2004.  
(**Acceptance Rate 25%**)

134. Yun Zhai, Zeeshan Rasheed, Mubarak Shah “Conversation and Explosion Detection in Feature Film”, CIVR2004 International Conference on Image and Video Retrieval, Dublin, July 21-23, 2004
135. Jiangjian Xiao, Mubarak Shah, “Motion Layer Extraction in the Presence of Occlusion using Graph Cut”, Oral presentation, Proceedings of Computer Vision and Pattern Recognition, June 2004.  
(**Acceptance rate 6.5%**)
136. Paul Smith, Mubarak Shah, and Niels da Vitoria Lobo, “Integrating and Employing Multiple Levels of Zoom for Activity Recognition”, Proceedings of Computer Vision and Pattern Recognition, June 2004.  
(**Acceptance rate 20%**)
137. F. N. Catbas, M. Shah, J. Burkett and A. Bashart, “Challenges in Structural Health Monitoring”, 14th Int Workshop on Structural Control, Columbia University, New York, June 10-11, 2004.
138. Abhijit Mahalanobis, Jamie Cannon, S. Robert Stanfill, Robert Muise and Mubarak SHah, “Network Video Image Processing for Security, Surveillance, and Situational Awareness”, SPIE sensors, command, control, communications, and intelligence (c3i) technologies for homeland security and homeland defense Conference 12-16 April 2004.
139. Yaser Sheikh, Khurram Shafique and Yun and Mubarak Shah, Zhai, “Visual Monitoring of Railroad Grade Crossing”, SPIE sensors, command, control, communications, and intelligence (c3i) technologies for homeland security and homeland defense Conference 12-16 April 2004.
140. J. Xiao and M. Shah, “Automatic target recognition using multiview morphing”, SPIE Automatic Target Recognition XIV Conference, 12-16 April 2004.
141. Yaser Sheikh and Mubarak Shah, “Aligning Dissimilar Images Directly”, Asian Conference on Computer Vision, January, 2004.
142. Alper Yilmaz, Xin Li, and Mubarak Shah, “Object Contour Tracking”, Asian Conference on Computer Vision, January, 2004.
143. Lisa Spencer and Mubarak Shah, “Recovering Temporal Synchronization Between Non-Overlapping”, Asian Conference on Computer Vision, January, 2004.
144. Yaser Sheikh and Mubarak Shah, “An Accumulative Framework For The Alignment Of An Image Sequence”, Asian Conference on Computer Vision, January, 2004.
145. Jiangjian Xiao and Mubarak Shah, “From Images to Video: View Morphing of Three Images Vision”, Modeling, and Visualization 2003 (VMV2003), November 19-21, Munich, Germany, 2003.

146. Cen Rao, Mubarak Shah and Tanveer Syeda-Mahmood, "Invariance in Motion Analysis of Videos", ACM Multimedia 2003, Nov 2-8, Berkeley, CA, USA.  
(**Acceptance rate 20%**)
147. Yaser Sheikh and Mubarak Shah, "Aligning dissimilar images directly", GeoSensor Networks (GSN03) Portland, Maine; October 9-11, 2003. (invited)
148. Rasheed, Z. and Shah M. "A Graph Theoretic Approach for Scene Detection in Produced Videos", Multimedia Information Retrieval Workshop 2003, in conjunction with the 26th annual ACM SIGIR conference on Information Retrieval, 1 Aug 2003, Toronto, Canada.
149. Javed O, Rasheed Z, Shafique K and Shah M, "Tracking Across Multiple Cameras With Disjoint Views", The Ninth IEEE International Conference on Computer Vision, Nice, France, October 2003.  
(**Acceptance rate 20%**)
150. Khurram Shafique and Mubarak Shah, "A Non-Iterative Greedy Algorithm for Multi-frame Point Correspondence", The Ninth IEEE International Conference on Computer Vision, Nice, France, October 2003.  
(**Acceptance rate 20%**)
151. Jiangjian Xiao and Mubarak Shah, "Two-FrameWide Baseline Matching", The Ninth IEEE International Conference on Computer Vision, Nice, France, October 2003.  
(**Acceptance rate 20%**)
152. Cen Rao, Alexei Gritai, Mubarak Shah, "View-invariant Alignment and Matching of Video Sequences", The Ninth IEEE International Conference on Computer Vision, Nice, France, October 2003.  
(**Acceptance rate 20%**)
153. Omar Javed and Mubarak Shah, "KNIGHTM: A Multi-Camera Surveillance System", ONDCP International Technology Symposium, 2003, July 7 to 12, Sand Diego. (invited)
154. Zeeshan Rasheed and Mubarak Shah, "Scene Detection In Hollywood Movies and TV Shows", IEEE Computer Vision and Pattern Recognition Conference, CVPR 2003, Madison, Wisconsin June 16-22, 2003.  
(**Acceptance rate 6%**)
155. Omar Javed, Zeeshan Rasheed, Orkun Alatas and Mubarak Shah, "M-Knight: A Real Time Surveillance System for Multiple Overlapping and Non-Overlapping Cameras", Invited paper in IEEE conference on Multimedia and Expo, Special Session on Multi-Camera Surveillance Systems, Baltimore, July 6-9, 2003.
156. Omar Javed, Khurram Shafique, and Mubarak Shah, "A Hierarchical Approach to Robust Background Subtraction using Color and Gradient Information", IEEE Workshop on Motion and Video Computing, December, 2002.

157. Jiang Jian Xiao, Cen Rao and Mubarak Shah, "View Interpolation for Dynamic Scenes", EUROGRAPHICS 2002, Saarbrcken, Germany, September 6-9, 2002.
158. A. Yilmaz and M. Shah, "Estimation of Arbitrary Albedo and Shape from Shading for Symmetric Objects", BMVC2002 - British Machine Vision Conference 2002, Cardif, UK, 2-5 Sept 2002.
159. Zeeshan Rasheed and Mubarak Shah, "Movie Genre Classification By Exploiting Audio-Visual Features Of Previews", International Conference on Pattern Recognition, August 11-15 2002 - Qubec City, Canada.
160. Jaime Dever, Niels da Vitoria Lobo, and Mubarak Shah, "Automatic Visual Recognition of Armed Robbery", International Conference on Pattern Recognition, August 11-15 2002 - Qubec City, Canada.
161. Alper Yilmaz, Khurram Shafique, Mubarak Shah, "Estimation of rigid and nonrigid motion using anatomical face model", International Conference on Pattern Recognition, August 11-15 2002 - Qubec City, Canada.
162. Ankur Datta, Mubarak Shah and Niels Da Vitoria Lobo, "Person-on-Person Violence Detection in Video Data", International Conference on Pattern Recognition, August 11-15 2002 - Qubec City, Canada.
163. Omar Javed and Mubarak Shah "Tracking And Object Classification For Automated Surveillance", European Conference on Computer Vision, Copenhagen, Denmark, May 28-31, 2002.
164. Sohaib Khan, Omar Javed, and Mubarak Shah, "Tracking in Uncalibrated Cameras with Overlapping Field of View", Second IEEE International Workshop on Performance Evaluation of Tracking and Surveillance, December 9, 2001 (in conjunction with IEEE CVPR'2001) Kauai, Hawaii, USA.
165. Ashish Myles, Niels da Vitoria Lobo, Mubarak Shah, "Wheelchair Detection in a Calibarated Environment", Asian Conference on Computer Vision, ACCV 2002, Melborne, Australia, Jan 2002.pp 706-712.
166. Richard Russo, Niels da Vitoria Lobo, Mubarak Shah, "A Computer Vision System for Monitoring Production of Fast Food", Asian Conference on Computer Vision, ACCV 2002, Melborne, Australia, Jan 2002.
167. Alper Yilmaz, Mubarak Shah, "Automatic Feature Detection and Pose Recovery for Faces", Asian Conference on Computer Vision, ACCV 2002, Melborne, Australia, Jan 2002.
168. Cen Rao, Mubarak Shah, "View Invariance in Action Recognition", IEEE Computer Vision and Pattern Recognition Conference, CVPR 2001, Kauai, Hawaii, Dec 11-13, 2001.

169. Sohaib Khan, Mubarak Shah, "Object Based Segmentation of Video Using Color, Motion and Spatial Information", IEEE Computer Vision and Pattern Recognition Conference, CVPR 2001, Kauai, Hawaii, Dec 11-13, 2001.
170. Sohaib Khan, Omar Javed, Zeeshan Rashedd, Mubarak Shah, "Human Tracking in Multiple Cameras", International Conference on Computer Vision, Vancouver, Canada, July 9-12, 2001.
171. Omar Javed, Zeeshan Rashedd, Mubarak Shah, "A Framework for Segmentation of Talk & Game Shows", International Conference on Computer Vision, Vancouver, Canada, July 9-12, 2001.
172. Alper Yilmaz, Khurram Hassan-Shafique, Mubarak Shah, Niels da Vitoria Lobo, "Target-Tracking in FLIR Imagery Using Mean-Shift and Global Motion Compensation" Workshop on Computer Vision Beyond the Visible Spectrum, with CVPR 2001, Kauai, Hawaii, Dec 14, 2001.
173. Wallick, M. N.; Lobo, N. d. V.; Shah, M. "A System for Placing Videotaped and Digital Lectures Online" To appear at IEEE 2001 International Symposium on Intelligent Multimedia, Video & Speech Processing (ISIMP). Hong Kong, May 2001.
174. Bracewell D.B., da Vitoria Lobo N., and Shah M, "Human identification through body measurements", *Proceedings of Computers and Their Applications, ISCA*, Seattle, WA, March 28-30, 2001, pp.383-386.
175. Omar Javed, Sohaib Khan, Zeeshan Rasheed, Mubarak Shah, "Camera Handoff: Tracking in Multiple Uncalibrated Stationary Cameras", IEEE Workshop on Human Motion, HUMO-2000, Austin, TX, Dec 7-8, 2000.
176. Cen Rao, Mubarak Shah, "A View-Invariant Representation of Human Action", International Conference on Control, Automation, Robotics and Vision, ICARCV 2000, Singapore, Dec 5th-8th, 2000.
177. Walter Phillips III, Mubarak Shah, Niels da Vitoria Lobo, "Flame Detection in Video", Workshop on Applications of Computer Vision, Plam Springs, CA, Dec 4th-6th, 2000
178. Alper Yilmaz, Mubarak Shah, "Shot Detection using Principle Coordinate System", IASTED Int'l Conf, Internet and Multimedia Systems and Applications, IMSA 2000, Las Vegas, Nov 20-23, 2000.
179. Omar Javed, Sohaib Khan, Zeeshan Rasheed, Mubarak Shah, "A Framework for Segmentation of Interview Videos", IASTED Int'l Conf, Internet and Multimedia Systems and Applications, IMSA 2000, Las Vegas, Nov 20-23, 2000.
180. Richard W. Cannata, Mubarak Shah, Steven G. Blask, John A. Van Workum, "Autonomous Video Registration Using Sensor Model Parameter Adjustments", Applied Imagery Pattern Recognition Workshop (AIPR) 2000, Cosmos Club, Washington D.C., Oct 16-18, 2000.

181. Mubarak Shah, "Understanding Video Sequences", 14th International Symposium on Computer and Information Sciences, ICSCIS XIV, October, 18-20, 1999, Kusdasi, Turkey.
182. Paul Smith, Mubarak Shah, and Niels da Vitoria Lobo, "Monitoring Head Eye Motion for Driver Alertness with One Camera", ICPR'2000 Fifteenth International Conference on Pattern Recognition, September 3-8, 2000, Barcelona, Spain.
183. Wallick M. N., Lobo N. d. V., Shah M., "Computer Vision Framework for Analyzing Projections from Video of Lectures", ISCA 9th International Conference for Intelligent Systems Louisville, KY, June 2000.
184. Andrew Wu, Mubarak Shah and Niels da Vitoria Lobo, "Virtual Blackboard", International Conference on Face and Gesture Recognition", France, March 2000.
185. Sohaib Khan and Mubarak Shah, "Tracking People in Presence of Occlusion", Asian Conference on Computer Vision, Taipei, Taiwan, January 2000.
186. Piotr Windyga, Chris Ingrassia and Mubarak Shah, "A non-linear filter for impulsive noise reduction", Proceedings of Joint Conference of Information Sciences, Durham, October, 1998.
187. Piotr Windyga and Mubarak Shah, "Multi-Profile Analyzer for Coronograms Segmentation", IEEE Medical Imaging Conference, Toronto, Canada, November 8-14, 1998.
188. Piotr Windyga and Mubarak Shah, "Automatic Profile-Based Border Detector for Cornoarograms", Proceedings of IASTED International Conference, Signal and Image Processing (SIP98), Oct 1998, pp 763-766.
189. Doug Ayers and Mubarak Shah, "Recognizing Human Actions in a Static Room", *4th IEEE Workshop on Applications of Computer Vision (WACV'98)*, October 19-21, 1998, Princeton, NJ.
190. Doug Ayers and Mubarak Shah, "Monitoring Human Behavior in An Office Environment", Interpretation of Visual Motion Workshop, CVPR-98, June 1998.
191. Jed Rose and Mubarak Shah, "Content-Based Image Retrieval Using Projections of Gradients", IEEE South East Conference, Orlando April 1998.
192. Shawn Dettmer, Avinash Seetharamaiah, Lin Wang and Mubarak Shah, "Model-Based Approach for Recognizing Human Activities From Video Sequences", Workshop on Recent Advances in Computer Vision, Karachi, Pakistan, January 1-2, 1998.
193. G. Bebis, M. Gerogiopoulos, N. Lobo and M. Shah, "Using Algebraic Functions of Views for Indexing-Based Object Recognition", International Conference on Computer Vision, Bombay, India, January 4-8, 1998.
194. Paul Prestopnik and Mubarak Shah, "Manipulating MR/CT Data With Hand Gestures", Sixth International Conference on Intelligent Systems, Boston, June 1997.

195. G. Bebis, M. Gerogiopoulos, N. Lobo and M. Shah, "Learning Affine Transformations of the Plane for Model-Based Object Recognition", *International Conference on Pattern Recognition*, Vienna, Austria August 25 - 30, 1996.
196. Li Nan, Shawn Dettmer, and Mubarak Shah, "Visual Lipreading Using Eigensequences", *International Workshop on Automatic Face and Gesture Recognition*, pp 30–34, Zurich, June 1995.
197. Yu Tian and Mubarak Shah, "Recovering 3D Motion and Structure of Multiple Objects Using Adaptive Hough Transform", *Proceedings of International Conference on Computer Vision*, pp 284-289, Boston, Ma, June 20–23, 1995.  
(**Acceptance rate 26%**)
198. Ruo Zhang, Ping-Sing Tsai, and Mubarak Shah, "Shape from Intensity", *Workshop on Computer Vision*, Islamabad, Pakistan, January 2-5, 1995.
199. James Davis and Mubarak Shah, "Three-Dimensional Gesture Recognition", *Asilomar Conference on Signals, Systems, And Computers*, Pacific Grove, California, October 31–November 2, 1994.
200. Yu Tian and Mubarak Shah, "Estimating 3D Motion and Shape of Multiple Objects Using Hough Transform", *Proceedings of International Conference on Pattern Recognition*, Jerusalem, Israel, October 9–13, 1994.
201. Yu Tian and Mubarak Shah, "Motion Estimation and Segmentation", *Proceedings International Conference on Image Processing*, Austin, Texas, November 13–16, 1994.
202. Yu Tian and Mubarak Shah, "A General Approach for Determining 3D Motion and Structure of Multiple Objects from Image Trajectories", *Proceedings of IEEE Workshop on Motion of Nonrigid & Articulate Objects*, Austin, Texas, November 11–12, 1994.
203. Claudette Cédras and Mubarak Shah, "A Survey of Motion Analysis from Moving Light Displays", *IEEE Conference on Computer Vision and Pattern Recognition*, Seattle, June 20–23, 1994.  
(**Acceptance rate 17%**)
204. Ruo Zhang, Ping-Sing Tsai, James Cryer and Mubarak Shah, "Analysis of Shape from Shading Techniques", *IEEE Conference on Computer Vision and Pattern Recognition*, Seattle, June 20–23, 1994.  
(**Acceptance rate 17%**)
205. Ruo Zhang and Mubarak Shah, "Height Recovery from Intensity Gradient", *IEEE Conference on Computer Vision and Pattern Recognition*, Seattle, June 20–23, 1994.  
(**Acceptance rate 17%**)

206. James Davis and Mubarak Shah, “Recognizing Hand Gestures”, *European Conference on Computer Vision*, Stockholm, Sweden, May 2-6, 1994.  
(Acceptance rate 18%)
207. James Cryer, Ping-Sing Tsai and Mubarak Shah, “Integration of Shape From X Modules: Combining Stereo and Shading”, *IEEE Conference on Computer Vision and Pattern Recognition*, New York City, June 15–17, 1993.
208. Ruo Zhang, Ping-Sing Tsai and Mubarak Shah, “Shape from Photomtion”, *IEEE Conference on Computer Vision and Pattern Recognition*, New York City, June 15–17, 1993.
209. Mubarak Shah, Krishnan Rangarajan, and Ping-Sing Tsai, “Motion Trajectories ”, *International Computing Congress*, Hyderabad, India, Decmeber 1992.
210. Mubarak Shah, Krishnan Rangarajan, and Ping-Sing Tsai, “Motion Trajectories ”, *Proceedings of International Conference on Pattern Recognition* , The Hague, August 1992.
211. Krishnan Rangarajan, Bill Allen and Mubarak Shah, “Matching Motion Trajectories ”, *Proceedings of International Conference on Pattern Recognition* , The Hague, August 1992.
212. Ping-Sing Tsai and Mubarak Shah, “A Fast Linear Shape From Shading ”, *IEEE Conference on Computer Vision and Pattern Recognition*, June 15–18, 1992, Urbana, Illinois.
213. Mubarak Shah, Krishnan Rangarajan, and Ping-Sing Tsai, “Generation and Segmentation of Motion Trajectories ”, *IEEE Conference on Computer Vision and Pattern Recognition*, June 15–18, 1992, Urbana, Illinois.
214. Krishnan Rangarajan, and Mubarak Shah, “Motion Correspondence”, *IEEE Conference on Computer Vision and Pattern Recognition*, pp 103–108, June 3–6, 1991, Maui, Hawaii.  
(Acceptance rate 18%)
215. Donna Williams, and Mubarak Shah, “Greedy Algorithm for Active Contour ”, *Proceedings of International Conference on Computer Vision* , pp 592–595, Osaka, Japan, December 1990.  
(Acceptance rate 29%)
216. Jay Hackett, and Mubarak Shah, “Multi-sensor Fusion: A Survey”, *Proceedings of IEEE Conference on Robotics and Automation*, Cincinnati, Ohio, May 1990, pp 1324–1330.
217. Donna Williams, and Mubarak Shah, “Edge Contours at Multiple Scales ”, *Proc. First European Conference on Computer Vision*, France, April 1990.  
(Acceptance rate 12%)



218. Donna Williams, and Mubarak Shah, “Normalized Edge Detection ”, *Proceedings of International Conference on Pattern Recognition* , pp 942–946, Vol. 1, Atlantic City, June 1990.
219. Kristine Gould, and Mubarak Shah, “Trajectory Primal Sketch”, *Proceedings of IEEE Conference on Computer Vision and Pattern Recognition*, pp 79–85, San Diego, June 1989.
220. Donna Williams, and Mubarak Shah, “Multiple Scale Edge Linking”, *Proc. S.P.I.E. Technical Symposium on Optics, Electro Optics and Sensors*, Peabody Orlando, FL, March 1989.
221. Rangarajan, Mubarak Shah, and David Van Brackle, “Detecting Corners”, *Proceedings of International Conference on Computer Vision*, pp 90–94, Tarpon Springs, Florida December 1988.
222. Ranganathan, N. and Shah, M.A., “Scale-Space Chip”, *Proceedings of International Conference on Pattern Recognition*, Rome, Italy, November 1988.
223. Shah, M. and Sood, A.K. “Fitting primitives in the scale-space”, *Proc. S.P.I.E. Technical Symposium on Optics, Electro Optics and Sensors*, Peabody Orlando, FL, May 1987.
224. Shah, M., Sood, A. and Jain, R., “Pulse and Staircase Models for Detecting Edges at Multiple Resolutions”, *Proceedings of IEEE Workshop on Computer Vision: Representation and Control*, Bellaire, Michigan, October 1985.
225. Shah, M. and Jain, R., “Time Varying Corner Detector”, *Proceedings of International Conference on Pattern Recognition*, pp 2-5, Montreal, Canada, August 1984.

## D.2 Grants and Contracts

1. (PI) “Visual Analytics in Multiple Camera Networks”, Army Research Office (ARO), \$420,000, June 2014-December 2017. (Credit 100%)
2. (PI) “Automated Visual Analysis of Extremely Dense Crowds In and Around International Sports Events”, Qatar National Research Fund (QNRF), \$900,000, 2014-2017. (Credit 33%)
3. (PI) “Development and Evaluation of Algorithms for Visual Crowd Scene Analysis”, \$4,000, Academy of Applied Science. (Credit 100%)
4. (PI) “Circulating Tumor Cells-Image Analysis Algorithm” , \$13,000, Cornell University, 2014. (Credit 100%)
5. (PI) “Human Action Recognition in Untrimmed Realistic Videos?”, \$41,500, Google, 2014. (Credit 100%)

6. (PI) “Theoretical Analysis and Algorithm Evaluation and Development for Activity Recognition”, Lockheed Martin Missiles & Fire Control, \$75,000 (additional \$75,000 FHTC I-4 Math), June 2013- December 2014. (Credit 100%)
7. (PI) “Facial Recognition”, LSI Corporation \$85,000, March 2013-February 2013.(Credit 100%)
8. (PI) “Geo-localization of Points and Regions”, National Geospatial Intelligence Agency, 1/2013-12/2014, \$300,000.(Credit 100%)
9. (PI) “Collection and Analysis of Crowd Data with Aerial, Rooftop, and Ground Views”, Army Research Office, \$252,328, 2012-2013. (Credit 50%)
10. (PI) “Video Analytic Integration”, US Army CECOM, \$450,000, April 2012-July 2013. (Credit 100%)
11. (PI) “Research Experience for Undergraduates in Computer Vision”, \$359,000, National Science Foundation, 4/1/2012–3/31/2015. (Credit 50%)
12. (PI) “Sparse Learning for Action Recognition in Video”, \$100,000, Harris Corporation, October 2011–May 2012. (Credit 100%)
13. (PI) “BBN Technologies: Content Extraction for IARPA ALLADIN Program”, BBN/IARPA, 2/2011-2/2014, \$900,000.(Credit 100%)
14. (PI) “Sarnoff: Content Extraction for IARPA Aladdin Program”, Sarnoff/IARPA, 2/2011-2/2016, \$2,500,000.(Credit 100%)
15. (PI) “Army NVSED: Crowds, turbulence video analysis”, EOIR/NVSED, \$200,000, 2/2011-12/2011. (Credit 100%)
16. (PI) “Video Image Retrieval and Analysis Tool (VIRAT) - Phase II”, Kitware/DARPA, 1/2011-4/2012, \$234,000. (Credit 100%)
17. (PI) “Human Action Recognition”, Intel Corporation, July 2010-June 2011, \$25,000. (Credit 100%)
18. (PI) “Action Descriptors Workshop”, ARO/DARPA, July 2010-June 2011, \$40,000. (Credit 100%)
19. “Automated Location Identification”, IARPA, August 2010-July2011, \$212,000. (Credit 100%)
20. (PI) “Persistent Stare Exploitation and Analysis System (PerSEAS)”, Kitware/DARPA, \$650,000, July 2010-June 2012. (Credit 100%)
21. (PI) “Students Actualizing Talent at Education’s Subsequent Stages (STATESS)”, National Science Foundation (**NSF**), \$600,000, January 2010–December 213. (Credit 25%)

22. “Evaluation of Tracking Algorithms on ISIS Video Data for the Wide Area Surveillance Project”, Pacific Northwest National Laboratory, 09/29/2009 to 6/30/2010, \$340,000.
23. (PI) *A Functional Estimation Testbed for Robust Vision-Aided Navigation*, Scientific Systems, 7/2009-7/2011, \$244,000. (Credit 50%)
24. (PI) *Taming Crowded Visual Scenes*, Army Research Office, 05/12/09 - 05/11/12, \$365,469. (Credit 100%)
25. (PI) Computer Assisted Identification and Volumetric Analysis of Enhancing Components, NIH, 05/01/09 - 04/31/11, \$400,000.(Credit 100%)
26. (PI) *Research Experience for Undergraduates in Computer Vision*, with Niels Lobo and Marshall Tappen, National Science Foundation (**NSF**), \$300,000, January 2009–January 212. (Credit 34%)
27. (PI) *Visual Inspection of Railroads: Supplement*, Florida Department of Transportation, \$234,000, November 2008–August, 2010. (Credit 100%)
28. (PI) “Video Image Retrieval and Analysis Tool (VIRAT)”, Lockheed Martin/DARPA, \$807,351, Phase I, September 2008-Feb 2010. (Credit 100%)
29. (PI) “FHTC match to Lockheed Video and Image Analysis and Retrieval (VIRAT)”, \$269,117, September 2008-Feb 2010. (Credit 100%)
30. (PI) “Data Collection for Activity Recognition from Video”, Lockheed Martin and I-4 Match, \$55,000, September 2008-March 2010. (Credit 100%)
31. (PI) “CSUMS: Computational Mathematics with an Emphasis on Computer Vision and Imaging Science (CMECVIS)”, National Science Foundation, \$980,324, September 2008-August, 2013. (Credit 25%)
32. (PI) “Automated Video Processing Research”, \$240,000, July 2008-December 2010, Harris Corporation and I-4 Match. (Credit 100%)
33. (PI) “Consumer Video Indexing”, Eastman Kodak, September 2008-August 2009, \$50,000.
34. (Co-PI) “PROFIT: Pictures Represent Opportunities For Inspiration in Technology”, National Science Foundation, \$1,200,000, 12/01/2007 to 11/30/2010. (Credit 30%)
35. (PI) “Advanced Video Analysis and Fusion”, Lockheed Martin, Gaithersburg, MD, \$100,000, March 2007–November 2007. (Credit 100%)
36. (PI) NSF Graduate Research Fellowship: Enrique Ortiz: Advanced Video Analysis and Fusion of UAV and Surveillance Videos, NSF, 09/01/2007 to 08/31/2010, \$120,000.
37. (co-PI) “DURIP: A Deployable Multi-Platform UAV Team for Visual-Sensing Purposes”, US Army, \$210,600, September 2006. (Credit 50%)

38. (PI) “Geo-registration”, SAIC, \$60,000, 2006. (Credit 100%)
39. (PI) *Content Extraction for Analysis of Ground Reconnaissance Videos-Tier I*, Disruptive Technology Office (DTO), \$999,998, October 2006–September 2009. (Credit 100%)
40. (PI) *Video Analysis and Content Extraction-Tier II* with Perceptek, Disruptive Technology Office (DTO), \$4,500,000, January 2007–December 2010. (UCF part \$750,000). (Credit 100%) (This contract was terminated, UCF received \$55,000.)
41. (PI) *Consumer Video Indexing*, Kodak, \$50,000, October 2005–September 2007. (Credit 100%)
42. (PI) *Research Experience for Undergraduates in Computer Vision*, with Niels Lobo and Takis Kasparis, National Science Foundation (NSF), \$300,000, February 2006–March 2009. (Credit 50%)
43. (PI) *UAV Video Indexing*, Lockheed Martin, Gaithersburg, MD, \$100,000, December 2005–November 2006. (Credit 100%)
44. (PI) *Human Detection and Tracking Algorithms*, Army’s Future Combat System (FCS), Lockheed-Martin/Boeing, \$400,000 (out of \$30,000,000), August 2005–November 2006. I-4 Corridor match \$200,000. (Credit 100%)
45. (Co-PI) *Video Event Recognition Algorithm Assessment Evaluation* (VERAAE), ARDA/TASC, \$70,000, 06/01/2005 to 06/30/2006. (Credit 20%)
46. (PI) *Multi-Platform Motion Analysis and Tracking Study*, Lockheed Martin, Orlando and I-4 Corridor \$36,000, March 2005–April 2005. (Credit 100%)
47. (PI) *UAV Video Indexing*, Lockheed Martin, Gaithersburg, MD, \$100,000, December 2004–November 2005. (Credit 100%)
48. (PI) *ATR Using Multiview Morphing*, Army Research Office, \$360,000, March 2005–February 2008. (Credit 100%)
49. (PI) *Night Time Surveillance*, DARPA STTR/Perceptek, \$250,000, August 2005–November 2006. (Credit 100%)
50. (PI) *Visual Inspection of Railroads*, Florida Department of Transportation, \$430,000, December 2004–February 2008. (Credit 100%)
51. (PI) *Tracking in Multiple Overlapping Moving Cameras*, Lockheed Martin and I-4 Corridor, \$136,000, April 2004–March 2005. (Credit 100%)
52. (PI) *Contour-Based Object Tracking*, TASC/ARDA, VACE Phase II, \$600,000, June 2004, May 2006. (Credit 100%)

53. (PI) *Night-Time Surveillance*, Perceptek/DARPA STTR program, \$35,000, July 2003-June 2004. (Credit 100%)
54. (PI) *Visual Monitoring of Railroad Grade Crossing*, Florida Department of Transportation, \$229,790, March 2003-April 2005. (Credit 100%)
55. (PI) *Implementation of Multi-camera Tracking System*, Lockheed Martin and I-4 Corridor, \$83,000, December 2002–November 2003. (Credit 100%)
56. (PI) *Visual Tracking for Individual Combatant Simulation*, US Army STRICOM, \$126,000, May 2002-April 2003. (Credit 100%)
57. (PI) *Battlefield Simulation Using Dynamic View Morphing*, US Army STRICOM, \$126,000, May 2002-April 2003. (Credit 100%)
58. (PI) *Advanced Image-Based Target Tracking*, Lockheed-Martin and I-4 Corridor, \$106,000, April 2002-June 2003, with Niels Da Vitoria Lobo and Xin Li. (Credit 33%)
59. (Co-PI) *3D Site Modeling*, Boeing and UCF, with Niels da Vitoria Lobo, \$56,000, January 2002-December 2002. (Credit 50%)
60. (PI) *NSF REU PI meeting*, National Science Foundation (**NSF**), \$67,000, November 2001–October 2002. (Credit 100%)
61. (PI) *Research Experience for Undergraduates in Computer Vision*, with Niels Lobo and Takis Kasparis, National Science Foundation (**NSF**), \$350,000, May 2001–April 2006. (Credit 75%)
62. (PI) *Multi-resolution Video Tracking*, Lockheed-Martin and I-4 Corridor, \$90,000, January 2001-December 2001, with Niels Da Vitoria Lobo and Xin Li. (Credit 33%)
63. (PI) *Registration of Video Images Containing Linear Features*, Harris Corporation and I-4 Corridor, \$26,000, January 2001-December 2001. (Credit 100%)
64. (Co-PI) *Feature Recognition and Polygon Reduction Utility*, Boeing, \$84,000, September 2000 to February 2001, with Niels Da Vitoria Lobo and Ratan Guha.(Credit 33%)
65. (PI) *A Field Test of a Computer Vision Enhanced Crime Detection and Deterrence System for Downtown Orlando*, OPD and I-4 Corridor, \$40,000, May 2000 to December 2001, with Ray Surrette. (Credit 50%)
66. (PI) *Image Registration Prescreening Metric*, Harris Corporation and I-4 Corridor, \$52,000, January 2000-June 2000, with Erol Gelenbe, and Niels Da Vitoria Lobo. (Credit 33%)
67. (Co-PI) *CORVIAR*, Harris Corporation and I-4 Corridor, \$50,000, August 1999-June 2000, with Erol Gelenbe, Niels da Vitoria Lobo, and Fernando Gomez. (Credit 10%)

68. (PI) *Advanced Techniques for Motion Compensation*, TeraNex and I-4 Corridor, \$40,000, July 1999-June 2000. (Credit 100%)
69. (Co-PI) *Video Image Dissemination, Exploitation, And Organization (VIDEO)*, with Erol Gelenbe, Mostafa Bassiouni, Niels da Vitoria Lobo, William H. Eyster III, Narsingh Deo, Terry Frederick, Kien Hua and Richard P. Simonian, State of Florida, under I4 corridor program, \$250,000, July 1, 1998-June 30, 1999. (Credit 10%)
70. (PI) *Research Experience for Undergraduates in Computer Vision*, with Niels Lobo and Art Weeks, National Science Foundation (**NSF**), \$280,000, May 1998-April 2001. (Credit 75%)
71. (PI) *Workshop on Motion-Based Recognition in Pakistan*, National Science Foundation (**NSF**), \$9,500, August 1997-July 1998.(Credit 100%)
72. (PI) *Robust Registration of Multimodality Image Data*, with Alan Appley and David Rippe, Florida Hospital Gala Endowment Program, \$9,700, January 1997-December 1997. (Credit 100%)
73. (PI) *Visually Monitoring Dismounted Infantry*, with Niels Lobo, STRICOM & US Army, \$95,321, February 1996-January 1997. (Credit 50%)
74. (Co-PI) *CISE Instrumentation: Specialized Equipment for Vision and Image Processing*, with Niels Lobo, and Takis Kasparis, National Science Foundation (**NSF**), \$68,000, April 1995-March 1996. (Credit 33%)
75. (PI) *Research Experience for Undergraduates in Computer Vision*, with Kevin Bowyer, Niels Lobo and Louise Stark National Science Foundation (**NSF**), \$287,980, May 1995-April 1998.
76. (PI) *Workshop on Computer Vision in Pakistan*, (**NSF**), \$15,000, July 1994-June 1995.
77. (PI) *Movement Analysis*, National Science Foundation (**NSF**), \$229,245, May 1993-April 1996.
78. (Co-PI) *Equipment for Research in Special Purpose VLSI Architecture*, with Amar Mukherjee and Mostafa Bassiouni, National Science Foundation (**NSF**), \$52,000, January 1993-December 1993.
79. (PI) *Science in Developing Countries: Computer Vision Research Participation in Pakistan*, National Science Foundation (**NSF**), \$7,600, December 1992-December 1993.
80. (PI) *Equipment for Research in Image Understanding and Image Compression for Dynamic Scenes*, with Mostafa Bassiouni and Takis Kasparis, National Science Foundation (**NSF**), \$53,000, June 1992-May 1993.
81. (PI) *Research Experience for Undergraduates in Computer Vision*, with Kevin Bowyer, National Science Foundation (**NSF**), \$200,000, June 1992-May 1994.

82. (PI) *Research Experience for Undergraduates in Computer Vision*, with Kevin Bowyer, Krishnan Ganapathi, National Science Foundation (**NSF**), \$104,930, June 1991–May 1992.
83. (Co-PI) *Development of CAD Based Object Recognition System*, with Kevin Bowyer, January–December 1991, Florida HiTech Council, \$50,000.
84. (PI) *Recovery of 3-D information using stereo and shadows* with Kevin Bowyer, January 1990–December 1991, DoD/IST, \$100,000.
85. (PI) *Research Experience for Undergraduates in Computer Vision*, with Kevin Bowyer, Krishnan Ganapathi, National Science Foundation (**NSF**), \$105,000, June 1990–May 1991.
86. (PI) *Development of CAD Based Object Recognition System*, with Kevin Bowyer, January 1990–December 1990, Florida HiTech Council, \$58,000.
87. (PI) *Intelligent Crystal Growth* , with Silvio DiGregorio, DARPA, \$250,000, October 1989–Sept 1990.
88. (PI) *Research Experience for Undergraduates in Computer Vision*, with Kevin Bowyer, Krishnan Ganapathi, National Science Foundation (**NSF**), \$76,000, June 1989–May 1990.
89. (PI) *Intelligent Crystal Growth* , DARPA, \$100,000, October 1988–Sept 1989.
90. (PI) *Recovery of 3-D information from 2-D images*, PMTRADE/DOD, \$75,000, August 1988– July 1989.
91. (PI) *Research Experience for Undergraduates in Computer Vision*, National Science Foundation (**NSF**), \$44,000, June 1987–May 1988.
92. (PI) *Multisensor Fusion*, Center for Electro Optics and Laser (**CREOL**), \$21,000, January 1987–June 1987.

### D.3 KeynotesInvited Talks, Colloquia, Tutorials and Workshops

1. “Counting, Detecting and Tracking of People in Crowded Scenes”, **Invited Talk**, IEEE 22nd Signal Processing and Communications Applications Conference (SIU-2014), April 23-25, 2014, at Karadeniz Technical University, Trabzon TURKEY.
2. “Counting, Detecting and Tracking of People in Crowded Scenes”, Istanbul Teknik niversitesi, April 21, 2014.
3. “Counting, Detecting and Tracking of People in Crowded Scenes?”, ITA - Instituto Tecnolgico de Aeronutica, So Jos dos Campos,SP , Brazil, April 9, 2014.

4. "Counting, Detecting and Tracking of People in Crowded Scenes?", University of Sao Paulo, Sao Paulo, Brazil, April 7, 2014.
5. "Counting, Detecting and Tracking of People in Crowded Scenes", Georgia Tech's Behavior Imaging Seminar Series, Atlanta, Georgia, February 26, 2014.
6. "Visual Tracking: Single and Multiple Object Tracking", **Keynote Talk** at IEEE Workshop on Visual Object Tracking Challenge Workshop, in conjunction with ICCV 2013 on December 2, 2013 in Sydney, Australia.
7. "Camera Networks and Wide Area Scene Analysis", Keynote Talk at The Sixth ACM SIGSPATIAL International Workshop on Computational Transportation Science, held in conjunction with the 21st ACM SIGSPATIAL International Conference on GIS 2013 on November 5, 2013 in Orlando, FL.
8. "Visual Geo-Localization And Location-Aware Image Understanding", Texas Instrument, Dallas, TX, November 4, 2013.
9. "Crowd Analysis", Two day tutorial, International Summer School on Trends in Computing (SSTC 2013), Tarragona, Spain, July 23-24, 2013.
10. "Video Surveillance and Monitoring", Universitat Jaume I, Spain, July 22, 2013.
11. "Visual Crowd Analysis", **half day Tutorial** at International Conference on Computer Vision Systems, Saint Petersburg, Russia, July 15, 2013.
12. "Activity Understanding", **Keynote Talk** at IEEE Workshop on Human Activity Understanding from 3D Data, June 24, 2013, held at CVPR-2013, Portland, Oregon.
13. "Visual Crowd Analysis", Friedrich-Alexander University Erlangen-Nuremberg, April 25, 2013.
14. "Discovering Motion Primitives for Unsupervised Grouping and One-shot Learning of Human Actions, Gestures, and Expressions", University of Freiburg, Germany, April 23, 2013.
15. "Detection and Tracking of Pedestrians", City University of Hong Kong, Hon Kong, December 11, 2012.
16. "Automatic Tracking of Pedestrians", National University of Singapore, Singapore, December 14, 2012.
17. "Human Action Recognition", Frontiers of Information Technology, Islamabad, Pakistan, December 18, 2012.
18. "Thirty Years of Computer Vision Research: My Perspective", Motion and Computer Vision - 40+ years at 40 Acres Symposium and Celebration Honoring the MS and PHD students of J.K. Aggarwal, University of Texas Austin, December 1, 2012.



19. Crowd analysis, Human Activity and Vision Summer School 1st to 5th, October 2012, INRIA, Sophia Antipolis, France. (**Half Day Tutorial**)
20. “Visual analysis of crowded scenes”, ARO Workshop on Populations & Crowds: Dynamics, Disruptions and their Computational Models, September 6-7, 2012, USC Los Angeles, CA.
21. “Representing Human Actions As Motion Patterns”, **Keynote**CVPR 2012 Workshop on Large-Scale Video Search and Mining (LSVSM’12), June 21, 2012, Providence, RI.
22. “Camera Networks and Wide Area Surveillance” **Keynote**, 2nd IEEE Workshop on Camera Networks and Wide-Area Scene Analysis co-located with CVPR 2012 on June 17, 2012, Providence, RI.
23. “Automatic Pedestrian Detection and Tracking”, **Keynote**, 6th International Conference on Pedestrian and Evacuation Dynamics - PED 2012 in a special session on Computer Vision, Graphics and Robotics, June 4-8, Zurich, Switzerland.
24. “Representing Human Actions As Motion Patterns”, June 7, 2012, ETH Zurich, Switzerland.
25. “Representing Human Actions As Motion Patterns”, **Keynote**13th Int. Workshop on Image Analysis for Multimedia Interactive Services (WIAMIS 2012), 23-25 May 2012 Dublin, Ireland.
26. “A Semantic Representation of Actions, Events, and Activities”, Crowds and Computer Vision workshop, University of Milano-Bicocca, Milan, Italy, February 28, 2012.
27. “Representing Actions, Events, and Activities as Motion Patterns”, Electrical and Computer Engineering, University of California, Riverside, February 21, 2012.
28. “Representing Actions, Events, and Activities as Motion Patterns”, University of California, Los Angeles, February 16, 2012.
29. “Motion Patterns: A Semantic Representation of Actions, Events, and Activities”, University of California, Santa Barbara, February 14, 2012.
30. “Motion Patterns: A Semantic Representation of Actions, Events, and Activities”, Computer Science and Engineering Department, University of Notre Dame, January 26, 2012.
31. “Patterns of Motion: Discovery and Generalized Representation”, Escuela Politecnica. Universidad de Alcal, Madrid ESPAA (SPAIN), November 11, 2011.
32. “Visual Tracking”, DHS S&T Video Analytics Symposium, MIT Lincoln Lab, November 2, 2011.
33. “Human Actions”, ARO/DARPA Workshop on Exploitation of Full Motion Video Sequences, October 20-21, 2011, College Park, Maryland.

34. "Video Surveillance Systems-UCF Computer Vision Lab Experience" 8th International Conference on Computer Vision Systems (ICVS), Nice, France, September 20 to 22, 2011. (**Keynote talk**)
35. "Visual Recognition of Human Action", Chinese Academy of Sciences, Xian, China, August 17, 2011.
36. "Patterns of Motion: Discovery and Generalized Representation" at the 6th International Conference on Image and Graphics (ICIG), August 12 to 15, 2011, Hefei, Anhui, China. (**Keynote talk**)
37. "Visual Crowd Surveillance" the 3rd USA-Sino Summer School in Vision, Learning and Pattern Recognition, August 7 to August 14, 2011, Chengdu, China. (**Half Day Short Course**) supported by US NSF.
38. "Airborne Video Surveillance", Ningbo Institute of Material Technology & Engineering - Chinese Academy of Sciences, Ningbo, China, August 11.
39. "Visual Recognition of Human Action", Computer Science, University of Warwick, Coventry, Uk, May 23, 2011.
40. "Crowd Analysis", Short Spring School on Surveillance - May 17-19 2011 - Modena, Italy. (**Half Day Course**)
41. "Video Analytics and Activity Recognition" the SPIE "Biometric Technology for Human Identification VIII" conference, Orlando, April 25, 2011. **keynote talk**
42. "Scalable Image Matching", invited talk at USPTO Workshop on Image Search and Analysis April 4, 2011.
43. "Human Action Recognition: Trajectories, Bag of words, Feature Tree", **ACM Distinguished Speaker Program Lecture**, Paris Tech, Paris, France, January 4, 2011.
44. "Airborne Video Surveillance", **Keynote Talk**, ICMV 2010 : 2nd International Conference on Machine Vision, Islamabad, Pakistan, December 29, 2010.
45. "Recognizing Human Actions", IBA Sukkur, Sukkur, Pakistan, December 27, 2010.
46. "Human Action Recognition: Trajectories, Bag of words, Feature Tree", ACM Distinguished Spekaer Program Lecture, Iqra University, Karchi, Pakistan, December 23, 2011.
47. "Human Action Recognition", **Distinguished Lecture**, UAE University, Al Ain, UAE, December 19, 2010.
48. "UAV Video Analysis", Monash University, Churchill Australia, December 16, 2010.
49. "UAV Video Analysis", **Invited Talk**, ACIVS 2010, Sydney, Australia, December 13, 2010.

50. “Visual Crowd Analysis”, University of Technology, Sydney, Australia, December 14, 2010.
51. “Visual Crowd Surveillance is Like Hydrodynamics”, **Keynote Talk**, ACM Conference on Multimedia, Florence, Italy, October 28, 2010.
52. “Airborne Video Surveillance”, AVSS, **Plenary Lecture**, August 30, 2010, Boston, MA.
53. “Semantic Video Retrieval using High-level Context”, **Invited Talk**, Large-Scale Multi-Media Workshop, ICPR, Istanbul, Turkey, August 22, 2010.
54. “Human Action Recognition: Trajectories, Bag of Video Words, and Spatiotemporal Interest Points”, Google, July 9, 2010.
55. “Detecting Motion Patterns”, University of Houston, July 2, 2010.
56. “Human Action Recognition: Trajectories, Bag of Video Words, and Spatiotemporal Interest Points”, **invited talk**, First International Workshop on Computer Vision for Computer Games, June 14th 2010, San Francisco, California.
57. “Detecting Motion Patterns”, ACM MM Conference 2010 meta reviewer workshop, University of Amsterdam, June 24, 2010.
58. “Visual Analysis of Crowded Scenes”, NVSED, U.S. Army, Night Vision and Electronic Sensors Directorate, Fort Belvoir, VA, May 12, 2010.
59. “Human Action Recognition: Chaotic Invariants, Diffusion Maps and Feature Trees”, **IBM TJ Watson Distinguished Speaker Series**, Hawthorne, NY, April 27, 2010.
60. “Human Action Recognition: Chaotic Invariants, Diffusion Maps and Feature Trees”, ECE Department, Columbia University, NY, April 26, 2010.
61. “Detecting Key Motion Patterns”, IEEE Local chapter, Princeton, NJ, April 23.
62. “Human Action Recognition and Key Motion Pattern Detection”, Department of Statistics, UCLA, February 23, 2010.
63. “Human Action Recognition”, SINICA, Taipei, Taiwan, December 30, 2009.
64. “Human Action Recognition”, National Taiwan University, Taipei, Taiwan, December 24, 2009.
65. “Crowd Scene Understanding”, SINICA, Taipei, Taiwan, December 23, 2009.
66. “Taming Visual Crowded Scenes”, **ACM Distinguished Speaker Lecture**, Mesa State College, Grand Junction, Colorado, November 20, 2009.

67. “An Overview of Visual Tracking in EO and IR Imagery”, **keynote talk**, IEEE Workshop on Object Tracking & Classification in and Beyond the Visible Spectrum (OTCBVS), CVPR 2009, Miami Beach, FL, June 20, 2009.
68. “Visual Analysis of Crowded Scenes, International Workshop on Video, Barcelona, Spain, May 27, 2009.
69. “Taming Crowded Visual Scenes”, DARPA ISAT workshop, Berkeley, CA, May 6, 2009.
70. “Taming Crowded Visual Scenes”, EECS department, University of Michigan Ann Arbor, MI, April 8, 2009.
71. “Taming Crowded Visual Scenes”, ECE department, Wayne State University, Detroit, MI, April 7, 2009.
72. “UCF VIRAT efforts”, Audacity/VIRAT workshop, Lockheed Martin, Herndon, VA, February 18, 2009.
73. “Floor field Models for Tracking in High Density Crowds”, European Conference on Computer Vision, October 14, 2008, Marseille, France.
74. “Tracking Across Multiple Moving Cameras”, Missouri University of Science and Technology, **ACM Distinguished Lecture**, Rolla, Missouri, October 10, 2008.
75. “Video Surveillance and Monitoring”, Austrian Research Centers GmbH, Vienna, August 1, 2008.
76. “Human Action Recognition Using Bag of Video Words”, Vienna University of Technology, Vienna, July 17, 2008.
77. “Video Surveillance and Monitoring”, Klagenfurt University, Klagenfurt, Austria, July 15, 2008.
78. “Visual Analysis of Crowded Scenes”, **invited talk** at DARPA Workshop on Cityscapes, Reno, Nevada, March 8-9, 2008.
79. “Visual Analysis of Crowded Scenes”, **Keynote talk** at International Conference on Machine Vision, Islamabad, Pakistan December 28, 2007.
80. “Visual Analysis of Crowded Scenes”, **Keynote talk** at International Symposium on Visual Computing, Lake Tahoe, Nevada, November 26-28, 2007.
81. “Video Surveillance and Monitoring Using Distributed Cameras”, **Keynote talk** at ACM/IEEE International Conference on Distributed Smart Cameras (ICDSC-07), September 25-28, 2007, Vienna, Austria.
82. “Recognizing Actions, Objects and Actions as Objects”, **Keynote talk** at British Machine Vision Conference (BMVC), Warwick, Uk, September 12, 2007.

83. "Video Surveillance and Monitoring", half day tutorial at ICIAP, Modena, Italy, September 10, 2007.
84. "Aerial and Video Surveillance and Monitoring", Capstone talk at IEEE Workshop on Multimodal Sentient Computing: Sensors, Algorithms, and Systems, Minneapolis, Minnesota, USA, Friday, June 22, 2007.
85. "Visual Analysis of Crowded Scenes", Computer Science, University of California Irvine, May 29.
86. "An Overview of Video Surveillance and Monitoring Research at UCF", HRL Lab, Malibu California, June 1, 2007.
87. "Visual Analysis of Crowded Scenes", Statistics Department, University of California, LA, May 29, 2007.
88. "The Fundamental Matrix in Human Action Recognition", Honda Research, Mountain View, CA, April 25, 2007.
89. "Spatiotemporal Regularity Flow", **plenary** talk at Frontier of Information Technology (FIT2006), Islamabad, Pakistan, December 20, 2006.
90. "Video Understanding", BCC Fast, Karachi, Pakistan December 18, 2006.
91. "Spatiotemporal Regularity Flow: (SPREF): Its Estimation and Applications", Workshop on Computational/Compressed Imaging, Lockheed Martin, Orlando, FL, September 26, 2006.
92. "Object Tracking", **Keynote** talk at Computer Vision, Graphics and Image Processing Conference, August 14, 2006, Ta Shi, Taiwan.
93. "Recognizing Human Actions From Video Sequences", Asia University, Taichung, Taiwan, August 15, 2006.
94. "The Fundamental Matrix in Human Action Recognition, AIST, Tsukuba, Japan, Japan, August 17, 2006.
95. "The Fundamental Matrix in Human Action Recognition, University of Tsukuba, Tsukuba, Japan, August 18, 2006.
96. "Estimating Geospatial Trajectory of a Moving Camera", International Conference on Pattern Recognition", Hong Kong, August 23, 2006.
97. "The Fundamental Matrix in Human Action Recognition, Princeton University, April 10, 2006.
98. "Advances in Video Understanding Research", **Weissberger/Williams Kodak** Lecture Series, Kodak Research April 12, 2006, Rochester, New York.

99. "The Fundamental Matrix in Human Action Recognition, **Azreil Rosenfeld Lecture**, University of Maryland, College Park, May 1, 2006.
100. "Tracking Across Multiple Moving Cameras", **plenary** talk, ICIAR-2006, Povoia de Varzim, Portugal, September 19, 2006.
101. "Recognizing Human Actions", **plenary** talk at ELMAR-2006, Zadar, Croatia, June 7, 2006.
102. "Recognizing Human Actions", Lahore University of Management Sciences, Lahore, Pakistan, January 5, 2006.
103. "Tracking Across Multiple Moving Cameras", Military College of Signals, Islamabad, January 6, 2006.
104. "Recognizing Human Actions", Electrical and Computer Engineering, University of Miami, Miami, November 16, 2005.
105. "Tracking Across Multiple Moving Cameras", Istituto di Cibernetica "E. Caianiello, Napoli, ITALY, September 15, 2005.
106. "Recognizing Human Actions", IDIAP Research Institute Martigny, Switzerland, September 12, 2005.
107. "Automatic Segmentation of Home Videos", IEEE International Conference on Multimedia & Expo July 6-8, 2005, Amsterdam, The Netherlands.
108. "Tracking Across Multiple Moving Cameras", July 13, 2005, CMU.
109. "Tracking Across Multiple Moving Cameras", Universit degli Studi di Firenze, Italy, May 13th 2005.
110. "Tracking Across Multiple Moving Cameras", Responsable d'quipe - Vision et Imagerie Centre de Recherche Informatique de Montral (CRIM), Canada, April 5, 2005.
111. "Video Registration, Segmentation and Tracking", invited talk, 2nd International Workshop on Frontiers of Information Technology, Islamabad, Pakistan, December 20-21, 2004.
112. "Emerging technologies, education and research and their impact", invited talk NCET2004, Karachi, Pakistan, December 18-19, 2004.
113. **Keynote address**, 17th International Conference on Computer Applications in Industry and Engineering (CAINE-2004) November 18, 2004, Orlando, Florida U.S.A.
114. "Video Registration, Segmentation and Tracking", invited talk, 58th Automatic Target Recognition Working Group, Lockheed Martin Missiles and Fire Control, Orlando, Florida, November 16-18, 2004.

115. "Object Tracking", Ohio State University, Columbus, October 13, 2004.
116. "Layer-Based Video Registration", Air Force Lab, Dayton, Ohio, October 14, 2004.
117. "Layer-Based Motion Segmentation In Presence of Occlusion", City University of New York, New York, October 12, 2004.
118. "Object Tracking", Sarnoff Corporation, Princeton, NJ, October 8, 2004.
119. "Human Action Recognition", Columbia University, New York, October 7, 2004.
120. "Recognizing Human Actions", University of Dundee, Dundee, Scotland, July 26, 2004.
121. "Registration, Tracking and Segmentation", invited talk, IEEE Workshop on Video Registration, CVPR, July 2, 2004.
122. "Multimedia: Computer Vision View", IEEE Workshop MDDE, CVPR, July 2, 2004.
123. "Target Tracking", Lockheed Martin Aeronautics Company Advanced Development Programs Combat Air Systems Integration & Demonstrations, Fort Worth, TX, June 2, 2004.
124. "Layer-Based Motion Segmentation", University of Texas, Austin, June 1, 2004.
125. "Representations for Action Recognition", Computer Science University of Texas, Dallas, April 5, 2004.
126. "Representations for Action Recognition", Computer Science and Engineering department, Penn State University, January 19, 2004.
127. "From Images to Video", Lahore University of Management Sciences, Lahore, Pakistan, December 26, 2003.
128. "Computer Vision and Undergraduate Research", invited talk, NSF Workshop on Frontiers of Information Technology, Islamabad, Pakistan, December 23-24, 2003.
129. "Geo-registering Aerial Video Imagery", invited talk, GeoSensor Networks (GSN03) Portland, Maine; October 2003.
130. "Understanding Hollywood Movies", Cognitive Sciences Colloquium, UCF, September 26, 2003.
131. "Understanding Video", A. Louis Medin Modeling & Simulation Seminar, Institute of Simulation and Training, UCF, July 21, 2003.
132. "Ontology and Taxonomy of Meeting Videos", ARDA Workshop on Video Event Taxonomy, La Jolla, California, July 14, 2003.
133. "Wide Area Surveillance Using Advanced Computer Vision", 2003 ONDCP International Technology Symposium Counter drug C4I Research and Development July 8-11, 2003, San Diego, CA.

134. "Wide-baseline Matching", NAVAIR, China Lake, California, July 9, 2003.
135. "Video Understanding", University of Michigan, Dearborn, June 13, 2003.
136. "Representation and Recognition of Events", panel for Workshop on Event Mining: Detection and Recognition of Events in Video, IEEE CVPR, June 17, 2003.
137. "Visual Tracking and Action Recognition", Auburn University, June 10, 2003.
138. "The Changing Face of Computer Vision Research", Colorado School of Mines, March 14, 2003.
139. "Computer Vision Research at UCF", United Space Alliance, Kennedy Space Center, Florida, January 17, 2003.
140. "Research Experience for Undergraduates in Computer Vision", University of California Berkeley, January 10, 2003.
141. "The Changing Face of Computer Vision Research", IBM Almaden Research Center, California, January 13, 2003.
142. "Video Data Mining", University of Illinois, Chicago, January 6, 2003.
143. "KNIGHT: Realtime Video Surveillance System", LOCKHEED MARTIN M&DS, Gaithersburg, MD.
144. "Introduction of Panel On Motion and Video Computing", IEEE WMVC, January 5-6, 2003, Orlando, FL.
145. "Video Categorization using Semantics and Semiotics", Center for Discrete Mathematics & Theoretical Computer Science Workshop on Video Data Mining, Rutgers University, N Piscataway, New Jersey, November 6, 2002.
146. "Visual Tracking and View Invariant Representation and Recognition of Human Action", Sarnoff Corporation, Princeton, NJ-08543, USA, November 8, 2002.
147. "Tracking in Uncalibrated Multiple Cameras, and View Invariant Representation and Recognition of Human Action", University of Southern California, October 18, 2002.
148. "Multiple Cameras, and View Invariant Representation and Recognition of Human Action", University of California, Riverside, October 16, 2002.
149. "Target Detection and Tracking in EO and FLIR Imagery", Second Lockheed-Martin ATR Workshop, Orlando, FL, October 2, 2002.
150. "Computer Vision and Undergraduate Research", Burnet Honors College, UCF, October 14-15, 2002.



151. "Tracking in Uncalibrated Multiple Cameras, and View Invariant Representation and Recognition of Human Action", INRIA Sophia-Antipolis Cede, France, September 6, 2002.
152. "Video Understanding: Visual Tracking, Representation and Recognition", Electrical and Computer Engineering, University of Houston, Houston, June 10, 2002.
153. "Video Understanding Research at UCF", TASC, Boston, February 15, 2002.
154. "Automatic Feature Detection and Pose Recovery for Faces", Asian Conference on Computer Vision, Melbourne, Australia, January 24, 2002.
155. "Understanding Human Behavior from Video Sequences", Computer Science department, University of Dallas, Texas, January 3, 2002.
156. "Overview of Research Experience for Undergraduates in Computer Vision", invited talk IEEE Workshop on Combined Research-curriculum development in Computer Vision, December 10, 2001, Kuauai, Hawaii.
157. "Understanding Human Behavior Using Video Sequences", invited talk at NSF/NIMA Defining a Motion Imagery Research and Development Program Workshop", Nov 28-30, 2001, Washington, DC.
158. "Target Detection and Tracking in FLIR Imagery", U.S. Army AMCOM AMSAM-RD-MG-IP/ Redstone Arsenal, Alabama, October 15, 2001.
159. "Distinguished Visitor Lecture Series", University of Texas, Austin, March 5-8, 2001. Four Lectures: Video Understanding, Video Registration, Video Segmentation, Visual Tracking.
160. "Understanding Human Behavior: Progress and New Challenges", invited talk, IEEE Workshop on Human Motion, HUMO-2000, Austin, TX, Dec 7-8, 2000.
161. "Video Computing", one week concentrated course, University Grants Commission, Islamabad, Pakistan, December 15-22, 2000 (Funded by UNDP).
162. "A Framework for Visual Tracking and Object-based Segmentation of Video" Department of Mathematics, UCF, October 3, 2000.
163. "Inverse Hollywood Problem: Understanding Video Sequences", ACM Student chapter at UCF, October 4, 2000.
164. "Image Quality Metrics and the Role of Linear Features in Video Registration", Harris Corporation, November 1, 2000.
165. "Visual Tracking", Texas Instruments, Dallas, Texas, July 31, 2000.
166. "An Overview of Video Analysis Research at UCF", Lockheed-Martin, August 28, 2000.

167. "Tracking People in The Presence of Occlusion", invited talk in Asian Conference on Computer Vision", Taipei, Taiwan, January 11, 2000.
168. "Visual Tracking and Recognition", National Taiwan University, Taipei, January 9, 2000.
169. "Video Computing", a half day tutorial before Asian Conference on Computer Vision, Taipei, Taiwan, January 2000.
170. "Video Understanding", Istanbul Technical University, Istanbul, October 1999.
171. A Tutorial on "Video Computing", I Taller de Computacion Robotica y Vision, de Monterey Campus Morelos, Mexico, November 1999. (One Day)
172. "Video Computing", a half day tutorial before IEEE CVPR, Fort Collins, Colorado, June 1999.
173. "Video Understanding", Congreso Nacional De Sistemas Computacionales Y Electronicos, Cuernavaca, Mexico, October 29-31, 1998.
174. "Recognizing Human Activities", Ghulam Ishaque Khan Institute of Technology, Topi, Pakistan, January 1999.
175. "Video Computing", 15-week course, Information Systems Division, Harris Corporation, Melbourne, FL, September 1998-March 1999.
176. "Motion-Based Recognition", Information System Division, Harris Corporation, Melbourne, Florida, March 6, 1998.
177. "Model-Based Approach for Recognizing Human Activities From Video Sequences", invited talk Workshop on Recent Advances in Computer Vision, Karachi, Pakistan, January 1-2, 1998.
178. "Short Course on Computer Vision", December 15-31, 1997, Karachi, Pakistan. (funded by UNDP)
179. "Visually Recognizing Human Activities, Gestures, and Speech", Computer Science department, University of Reno, Nevada, November 21, 1997.
180. "Mentoring Undergraduates In Computer Vision Research", invited talk IEEE Workshop on Undergraduate Education & Image Computation El San Juan Hotel, Puerto Rico, June 20, 1997.
181. "Experience With NSF REU Program", IEEE Workshop on Undergraduate Education & Image Computation El San Juan Hotel, Puerto Rico, June 20, 1997.
182. "Visually Recognizing Human Activities, Gestures, and Speech", University of California Irvine, April 7, 1997.

183. "Detecting and Recognizing Human Activities from Video Sequences", CREOL Industrial Partnership Day, January 10, 1997.
184. "Seven Years of NSF REU at UCF", ACM University of Central Florida chapter, February 13, 1996.
185. "Short Course on Computer Vision", Computer Training Center, Atomic Energy Commission, Islamabad, Pakistan, December 19, 1995–January 5, 1996. (Funded by UNDP)
186. "Recent Advances in Computer Vision", Shaheed Zulfikar Ali Bhutto Institute, Karachi, Pakistan, December 31, 1995.
187. "Shape from Shading and Photomotion", University of Bern, Bern, Switzerland, June 30, 1995.
188. "Shape from Intensity", National University of Singapore, Singapore, December 29, 1994.
189. "Computer Vision: Theory and Practice", *Workshop on Computer Vision*, Islamabad, Pakistan, January 2-5, 1995.
190. "Shape from Intensity", *Workshop on Computer Vision*, Islamabad, Pakistan, January 2-5, 1995.
191. "Shape from Intensity", Tsing Hua University Hsin-Chu city, Taiwan, December 27, 1994.
192. "Visual Gesture Recognition and Lipreading", David Sarnoff Lab, Princeton, N. J., September 23, 1994.
193. "Visual Gesture Recognition and Lipreading", IBM T J Watson Lab, New York, September 26, 1994.
194. "A Survey of Motion Analysis from Moving Light Displays", *IEEE Conference on Computer Vision and Pattern Recognition*, Seattle, June 20–23, 1994.
195. "An Overview of Computer Vision", N. E. D. University, Karachi, Pakistan, May 14, 1994.
196. "Short Course on Computer Vision", Mehran University of Engineering and Technology, Jamshoro, Pakistan, December 1992. (Funded by NSF)
197. "Greedy Algorithm for Active Contour", International Conference on Computer Vision, Osaka, Japan, December 1990.
198. "Edge Contours at Multiple Scales", First European Conference on Computer Vision, Antibes France, April 1990.
199. "Multisensor Fusion: Object Recognition Using Feature Overlap", National Science Foundation, Washington, D.c, an invited talk for REU project, March 1990.

200. ‘Trajectory Primal Sketch’, IEEE Conference on Computer Vision and Pattern Recognition”, San Diego, June 1989.
201. “Trajectory Primal Sketch”, Computer Science and Engineering, University of South Florida, May 1989.

## D.4 Patents & Copyrights

1. “Multi-Source Multi-Scale Counting in Extremely Dense Crowd Images”, Applied October 2013.
2. “Complete Video Face Recognition From Tracking to Recognition using Mean-Sequence Sparse Representation-based Classification”, Applied August 2013
3. “Systems and Methods for Modeling Three-Dimensional Objects from Two-Dimensional Images” Shah et al. Patent No.: US 8,363,926, Issued: Jan. 29, 2013.
4. Janaka Liyanage and Mubarak Shah, “Homography-based passive vehicle speed measuring systems”, UCF#7654 / 0210652-USO, 2012.
5. Omar Javed, Khurram Shafique, Mubarak Shah, “Multi Camera Tracking”, US Patent No 7,450,735 B1, November 11, 2008.
6. Paul Sconvaner, Vlad Riely, Mikel Rodriguez, Mubarak Shah, “Human Detection”, US copyrights, effective September 2006.
7. Smith P., Shah M., da Vitoria Lobo N., “System for monitoring Driver Alertness”, U.S. Patent 6,927,694 B1 issued Spring 2005.

## D.5 Research Accomplishments Summary

(<http://www.cs.ucf.edu/~vision/projects/projects.html>)

### D.5.1 Video Surveillance

- UCF Computer Vision Lab is considered as a world leader in Video Surveillance area. My group has contributed to all aspects of video surveillance including Object Detection, Tracking, and Action Recognition. I Have published ten papers in this area, which has more than **200** citations.
- An overview of this work is given a couple of summary papers and a book.
- We have developed four real world surveillance systems: **KNIGHT**, **COCOA**, **NONA** and **KEYS**.
- **Human Action Recognition**  
(<http://server.cs.ucf.edu/~vision/projects/html#action>)

- We have published a series of papers on human action recognition, and have obtained some of the best results on standard data sets.
- We have introduced several data sets for human action recognition, which serve as a standard for the field: UCF Sports, UCF YouTube, UCF 50, UCF ARG.

- **Visual Crowd Analysis**

(<http://server.cs.ucf.edu/~vision/projects.html#crowd>)

- I started this new area of research in Computer Vision in 2007, and published a series of papers in 2007, 2008, and 2010.
- Secured funding from ARO and Army Night Vision lab.
- Organized first IEEE Workshop on Modeling, Simulation and Visual Analysis of Large Crowds in November, at ICCV-2011 held in Barcelona, Spain.
- Published a summary article in *Communications of ACM* (CACM) in December 2011.

- **Motion Patterns** (<http://server.cs.ucf.edu/~vision/projects.html#motion>)

- Have developed a new way to discover and statistically represent traffic patterns, human actions and motion patterns.

- **Visual Tracking**

(<http://www.cs.ucf.edu/~vision/projects/projectsTracking.html>)

Tracking is crucial in the context of motion-based recognition, we have developed a series of tracking algorithms.

- A comprehensive survey paper on Visual Tracking, published in ACM Computing Surveys, which has **more than one thousand citations**.
- An algorithm for tracking an individual in a crowded scene using floor fields.
- Our widely used motion correspondence algorithm for point tracking.
- A recent algorithm for multi-frames point correspondences using a graph theoretical formulation.
- Object tracking in imagery acquired by a moving camera using mean shift and global motion compensation.
- Contour-based object tracking using a Bayesian approach.
- Tracking in multiple overlapping cameras using Field of View lines.
- Tracking in multiple non-overlapping cameras.

- **KNIGHT**

(<http://www.cs.ucf.edu/~vision/projects/Knight/Knight.html>)

- KNIGHT is a realtime surveillance system. **KNIGHT** has been implemented in 6,000 lines of code in C++ following object oriented principles, runs on a 1.7 GHz Pentium IV machine, and processes 12-15 frames a second for a frame size of  $320 \times 240$  pixels.
- The system automatically detects important changes, events, and activities using computer vision techniques, flags significant events, and presents a summary in terms of key frames and textual description of activities to a monitoring officer for final analysis and response decision.
- A preliminary version of **KNIGHT**, with tracking and activity detection capabilities, has been installed and is currently being field tested at four locations in **downtown Orlando**, Florida.
- KNIGHT is also be used in Visual Monitoring of Railroad Crossings funded by the **Florida Department of Transportation**, and for Night-Time Surveillance supported by **DARPA**.
- KNIGHT will be used in the Army's Future Combat Systems (**FCS**) for human detection and tracking.
- KNIGHT is a one of a kind system, which has received significant attention from the media including articles in Business Week (11/13/2002), New Scientist (11/3/01), Orlando Sentinel (3/31/01), Information Week (11/6/01).

- **COCOA**

- A system for automatic indexing of videos taken from an aerial platform.
- **COCOA** integrates different stages of UAV video exploitation process into one monolithic system.
- It provides end users with the features of robust frame to frame alignment, moving target detection, target tracking, event detection and indexing of the videos.
- The archived videos can be searched and retrieved using a query event of interest or a query video.
- **COCOA** has four core modules: Ego Motion Compensation, Independent Motion Detection, Tracking and Event Recognition.
- The system has been tested on video clips from the DARPA VIVID data collection collected at Eglin AFB.

- **PEGASUS**

- A web-based search system with an interactive user interface for broadcast news.
- The indexing system for ASR is established using the Lucene technology.
- To achieve fast indexing and retrieval, the regions (features) are archived in the database using the SR-tree structure.

- The system has been tested on a large open-benchmark dataset, which contains 140 news program videos provided by the US National Institute of Standards and Technologies (NIST) for the TRECVID 2005 forum.

- **Taxonomy and Ontology of Video Events**

(<http://www.cs.ucf.edu/~vision/papers/aaai-caseE.pdf>)

- A representational gap exists between low-level measurements (segmentation, object classification, tracking) and high-level understanding of video sequences. We have proposed a novel representation of events in videos to bridge this gap, based on the CASE representation of natural languages.
- We have also defined a meeting ontology that is determined by the knowledge base of various meeting sequences. This ontology validates and refines the taxonomy based on the hierarchy of events and behaviors, and regroups similar meetings in one category, refining the classes.

### D.5.2 Video Registration

(<http://www.cs.ucf.edu/~vision/projects/videoReg/videoReg.html>)

- Contributed to DARPA Airborne Video Surveillance and Monitoring (AVS) project at Harris Corporation during my sabbatical in 1998-99. Have co-authored papers on robust method for registering video images with geodetically accurate reference image.
- Organized the first ever IEEE Workshop on Video Registration in 2001.
- Published a book on “**Video Registration**”, **Kluwer Academic Publishers, 2003**.

### D.5.3 Video Categorization and Segmentation

(<http://www.cs.ucf.edu/~vision/projects/projects.html/VideoSegmentation>)

- Have developed automatic methods for segmenting interview videos, classifying Hollywood movies based on their previews, story segmentation in broadcast news, and for scene detection in Hollywood movies and TV Shows.
- Have participated in TREC Video 2003, 2004 and 2005 competitions organized by NIST.
- Have also contributed to object-based segmentation of video. We have proposed a maximum a posteriori probability (MAP) framework that uses multiple cues, like spatial location, color and motion, for segmentation.
- Recently, have proposed method for Motion Layer Extraction in the Presence of Occlusion using Graph Cuts, the idea is to segment scene into multiple planar regions.

#### D.5.4 Video Synthesis

(<http://www.cs.ucf.edu/~vision/projects/viewMorphing/index.html>)

- **Dynamic View Morphing**

We have developed a novel technique for synthesizing *dynamic* scene between two images without use of 3D model. The scene can contain rigid or non-rigid objects, each of them can move in any orientation or direction.

- **Wide-baseline Matching**

We have also developed a complete approach to automatically recover corresponding features and epipolar geometry over two wide baseline frames.

- **Tri-View Morphing**

Have developed an efficient image-based approach to navigate a scene based on only three wide-baseline uncalibrated images without the use of a 3D model. We have demonstrated three applications of the tri-view morphing algorithm: 4D video synthesis, multiple view morphing, and dynamic scene synthesis using three still images.

- **Video Completion**

Have developed methods for large object removal in a single image and a video.

- **Realistic Shadow Synthesis**

Have developed a method to generate a realistic shadow of an object matted from a natural scene and composited into a novel target background with different lighting condition.

#### D.5.5 Active Contours

<http://www.cs.ucf.edu/~vision/papers/shah/92/WIS92A.pdf>

- My highly cited (**more than 1,200 citations**) work on active contours or snakes is now a classic, which is covered in text books, and is widely used in industry, academia, and other fields like medical imaging and entertainment.
- It is the part of the **Intel Open CV library**, and numerous implementations are available on the internet.
- This work has made one of the most fundamental contributions to the field, and has popularized snakes in vision community and beyond.
- The recent work on object contour tracking in imagery acquired by moving camera extends active contour work and obtains the one of the best results in the field.



## D.5.6 Shape From Shading

(<http://www.cs.ucf.edu/~vision/projects/ShapeFromShading/ShapeFromShading.html>)

- Have developed a very simple algorithm for shape from shading (sfs), which outperforms many known sfs algorithms, and generated lots of follow up work.
- Subsequently, have demonstrated that the recovered shape can successfully be used for object recognition based on shape from shading; and using symmetry property of faces shape from shading can be simplified for face images.
- Also conceived photomotion technique for recovering shape from shading using multiple images, which essentially generalizes well known photometric stereo technique.
- The work in combining shape from shading and stereo demonstrated somewhat amazing reconstruction results, which are significantly better than stereo or shading alone.
- An extensive survey paper on “Shape from shading” which appeared in PAMI is an excellent resource for other researchers, which has **more than 750 citations**.

## D.5.7 Research Experience for Undergraduates in Computer Vision

(<http://www.cs.ucf.edu/~vision/reu-web/REU.html> )

- I have involved a large number of undergraduates in computer vision research during the last 27 years (REU model is detailed in “Mentoring Undergraduates in Computer Vision Research”, co-authored with Kevin Bowyer, IEEE Transactions on Education, Volume 44, Number 3, pp 252–257, August 2001)
- This work has been supported by a series of REU grants totaling in amount of **more than \$2.5 million from NSF**.
- In August 2007, we celebrated Twenty Years of NSF REU. We invited current and previous participants, their advisors, and some distinguished guests. These guests included UCF President John Hitt. A full day of events was scheduled and included panels, a poster session by current students and a keynote talk at the banquet was given by Professor Ruzena Bacjys of UC Berkeley. (visit: <http://server.cs.ucf.edu/~vision/reu-web/Picture>)
- More than **270 undergraduates** from more than **sixty five institutions** throughout the country have participated in this project.
- These undergraduates have co-authored more than 70 research papers (in reputed journals like PAMI, PR, CVGIP, and conferences like ICCV, CVPR, ICPR).
- Approximately half of these participants have gone to graduate schools, fifteen students have written Honors in the Major Theses, several participants are now faculty members at different Universities, and five participants have started their own companies.

- Several students have received NSF fellowships for their graduate programs.
- One student, Paul Smith, received **Barry Goldwater fellowship**, the first ever for UCF, on his REU project.
- I was the organizer of two CISE REU PIs meetings (Orlando, Florida, 2002; Monterey, California, 2004).

### D.5.8 Computational Science Training for Undergraduates in the Mathematical Sciences (CSUMS)

(<http://www.math.ucf.edu/csums/index.htm>)

- In 2008, I received \$980,324 grants from NSF for training undergraduates in Mathematical Sciences. GAUSS, a new program in Computational Science Training for Undergraduates in Mathematical Sciences (CSUMS) funded by the National Science Foundation.

### D.5.9 Research Experience for High School Students and Teachers

- In 2007, I received as co-PI a \$1,200,000 NSF grant for inspiring High School teachers and students in technology. The PROFIT project (<http://profit.eecs.ucf.edu/>) is centered on the idea of introducing computer vision and imaging experience into the core curriculum of mathematics. It was designed as a novel model for training mathematics teachers to use pictorial IT, for transferring exciting, appealing modules into core curricula, and as a model for mentoring students through the last of their pre-collegiate years and attract them into IT-STEM careers.
- I have received several supplementary grants from NSF for Research Experience for Teachers (RET). Following teachers have participated.
  - Francisco Chaparro-Torress Olympia High School and Charles Lynch Hagerty High School, 2011.
  - Paul Ackerman of Edgewater High School and David Pollock of Oak Ridge High School, 2007.
  - Charles Percival of Pine View School in Sarasota, FL and Timothy Gallagher of Winter Springs High School in Winter Springs, FL, 2006.
- I have served as a mentor for a number of local High School students. Some of this recent work has been supported by grants from ARO under REAP and HSAP.
  - Ann Dang, University High School, 2014
  - Jose Rodriguez, University High School, 2014
  - Tommy Goris Cypress Creek High School, 2011.
  - Megan Herrera Timber Creek High School, 2011.

- Nelson Tan, University High School, Orlando, FL, 2010.
- Chris Bethel, Elizabeth A. Ennis from Lake Brantley High School in Altamonte Springs, FL, 2005-2006.
- Joey Wilson, Lake Brantley High School, in Altamonte Springs, FL, 2002-2003.
- Jed Rose, from Lake Brantley High School, Altamonte Springs, FL, 1997-1998.

#### D.5.10 Collaborative Research Work With Industry

##### Harris Corporation

- I have received several research contracts from Harris Corporation: 2011 (\$100,000), 2010 (\$30,000), 2009 (\$150,000), 2008 (\$130,000), 2001(\$26,000), 2000(\$52,000).
- I spent my sabbatical at **Harris corporation** during 1998-99, where I taught a 15-week course on video computing to Harris engineers, contributed to **DARPA AVS** program in Precision Video Registration, and started a colloquium series.
- As an outgrowth of my work with Harris on video registration, I organized the first ever IEEE Workshop on Video Registration, 2001, and published a book on **Video Registration, Kluwer Academic Publishers, 2003**.
- Harris awarded me Engineering achievement award in 1999.

##### Lockheed Martin

- In 2013 and 2014 received \$75,000 each year funding from Fire & Missile Systems Lockheed Martin IR&D.
- In 2008, received a sub-contract of \$807,000 from Lockheed Martin for DARPA VIART program.
- In 2005, I received Army's FCS (Future Combat Systems) grant with Lockheed, which is a \$30,000,000 project, UCF part was of \$400,000. My group was the only University group among 360 companies covering 150 congressional districts in 35 states receiving a grant under US Army's Future Combat Systems program.
- Received three grants (2004-2007) \$100,000 each from Lockheed Martin Integrated Systems & Solutions, Gaithersburg, Maryland.
- Received three grants (2003-2005) from Lockheed-Martin Fire & Missile Systems on Multiple Camera tracking and ATR.
- Received two corporate grants(2001-2002) from Lockheed-Martin on Tracking in FLIR Imagery.
- I have co-authored several papers with Lockheed researchers.

##### Kitware

- In 2011, received \$234,000 contract from Kitware under DARPA VIRAT Phase II.
- In 2010, received \$650,000 contract for two years funding from Kitware under DARPA PerSEAS program.

### **Other Companies**

- In 2011, received \$500,000 per year for 5 years contract from SRI Sarnoff under IARPA ALADDIN program.
- In 2011, received \$300,000 per year for 3 years contract from BBN Raytheon under IARPA ALADDIN program.
- Have received two contracts (2007, 2008) \$50,000 each from Eastman Kodak for consumer video indexing.
- Have received two grants from Boeing corporation, and one from startup Teranex.
- Have received DARPA STTR Phase I and II grants with a start up company, Perceptek.
- Have received two millions dollar joint grant with TASC (Northrop Gruman) from ARDA.

## **E Professional Service**

### **E.1 Panel Chair, Reviewer**

- Session Chair NSF/FBI/DARPA sponsored workshop on Frontiers in Image and Video Analysis, January 28-29, 2014, DARPA, Arlington, VA.
- Session Chair, Robust Methods For The Analysis Of Images And Videos, For Fishery Stock Assessment, A National Research Council Workshop Sponsored by NOAA Fisheries, May 16-17, 2014, Washington DC.
- Reviewer, CUNY Graduate Center Computer Science Doctoral Program Review, May 8-9, 2014, New York City, NY.
- Member, IEEE CS Fellows Committee, 2013-2014.
- Member, Proliferation Deterrence Merit Review Team, DOE, November 2013.

### **E.2 Participation in International Visiting Scholars and Joint Programs**

#### **E.2.1 Memorandums of Understandings**

- MOU with Mehran University of Engineering and Technology, Jam Shoro, Sindh, Pakistan April 2006.

- MOU with National University of Science and Technology, Islamabad, Pakistan, August 2006.
- MOU with University of Modena, Italy, 2005.

### E.2.2 Visitors

I have hosted following visitors in my lab. All of them have been supported by some fellowships.

1. Tilman Wekel, Technical University of Berlin, Berlin, Germany, Spring 2014.
2. Michael Teutsch, Karlsruhe Institute of Technology, Fall 2013
3. Ehsan Zare Borzeshi University of Technology, Sydney August 2012 - January 2013.
4. Florian Burkert Technische Universität München March 2012 - June 2012.
5. Jesper Birks Bkdahl, MS, Aalborg University, November 2011-June 2012. (**Fulbright Fellow**)
6. Pau Agusti-Ballester, Universidad Jaume I, Spain, September 2011-December 2011.
7. Chunping Liu, Associate Professor, Soochow University, March 2011-September 2011 and July 2010-January 2011.
8. Sergio Alvarez, Ph.D. Candidate, University of Alcalá, January 2011-July 2011.
9. Jianwei Luo, Ph.D. Candidate, Beihang University, November 2010-September 2012.
10. Jacob Buhl, Masters Student, Aalborg University, October 2010-June 2011. (**Fulbright Fellow**)
11. Markus Quaritsch, Research Staff Member, Klagenfurt University, January 2010-March 2010.
12. Xiaoguang Di, Associate Professor, Harbin Institute of Technology, December 2009-December 2010.
13. Zahid Riaz, Ph.D. Candidate, Technical University of Munich, December 2009-April 2010.
14. Marco Zini, Student, University of Modena, November 2009-May 2010.
15. Wang Yong, Ph.D. candidate, Shanghai Jiao Tong University, September 2009-April 2011.
16. Xiali Wang, Teacher, Chang'an University, January 2009-January 2010.
17. Kairoek Choeychuen, Prince of Songkla University Thailand, June 2008-May 2009.

18. Kittiya Khongkraphan, Prince of Songkla University Thailand, June 2008-December 2008.
19. Dr. Fangshi Wang, Beijing Jiatotong University, September 2007-August 2008.
20. Javed Ahmed, National University of Science & Technology, July 2006-December 2006.
21. Marco Leo, Researcher, Institute of Intelligent System for Automation in Bari, Italy, June 2007.
22. Aakif Tanveer, Undergrad, Pakistan Ghulam Ishaq Khan Institute, May 2007-July 2007.
23. Shahzad Aziz, Undergrad, Pakistan Ghulam Ishaq Khan Institute, May 2007-July 2007.
24. Professor Jianjun Huang, Fuzhou University, Peoples Republic of China, November 2006-April 2007.
25. Sohail Sattar, NED University Karachi, Pakistan, November 2006-April 2007.
26. Javed Sheikh, NUST Islamabad, Pakistan, July 2006-February 2007.
27. Ravi Agrawal, Senior Undergrad, Indian Institute of Technology, Kharagpur, May 2006-August 2006.
28. Reetu Raj, Junior Undergrad, Indian Institute of Technology, Kanpur, May 2006-August 2006.
29. Humera Noor, NED University Karachi, Pakistan, 2005 and April 2006-July 2006.
30. Roberto Vezzani, University of Modena, Italy, 2005.
31. Professor Jeff Boyd, University of Calgary, Canada, August 2004-May 2005.

## **E.3 Editorships and Services as a Reviewer**

### **E.3.1 Editorship of Book Series**

- Series Editor, *Video Computing*, International Book Series, Kluwer Academic Publishers, 2000-.
  - “Automated Multi-Camera Surveillance: Algorithms and Practice”, Omar Javed, and Shah, Mubarak, September 2008.
  - “Multimodal Video Characterization and Summarization”, Smith, Michael A., Kanade, Takeo, October, 2004.

- 3D Face Processing: Modeling, Analysis and Synthesis Wen, Zhen, Huang, Thomas S. Huang, June 2004.
- “Content-Based Image and Video Retrieval”, Xian Sean Zhu and Thomas Huang, August 2003.
- “Video Mining Techniques”, Editors: Azriel Rosenfeld, Daniel DeMenthon, and David Doermann, July 2003.
- “Mean Shift Analysis”, Dorin Comaniciu and Peter Meer, (under preparation).
- “Video Registration”, Mubarak Shah, and Rakesh Kumar, May 2003.
- “Media Computing: Computational Media Aesthetics”, Chitra Dorai, Svetha Venkatesh, April 2002.
- “Analyzing Video Sequences of Multiple Humans”, Jun Ohya, Akira Utsumi, and Junjo Yamato, March 2002.
- “Face Detection and Gesture Recognition for Human-Computer Interaction”, Ming-Hsuan Yang and Narendra Ahuja, August 2001.
- “Visual Event Detection”, Niels Haering, Niels da Vitoria Lobo, July 2001.

### **E.3.2 Editorships of Archival Journals**

- Editor in Chief, *Machine Vision and Applications*, 2004-
- Associate Editor, *IEEE Transactions on PAMI*, 1998-2002.
- Associate Editor, *ACM Computing Surveys*, 2006-
- Associate Editor, *Pattern Recognition*, international journal, 1994-2006.
- Associate Editor, *Machine Vision and Applications*, international journal, 1999-.

### **E.3.3 Guest Editorship of Archival Journal**

- Guest Editor, *IEEE Transactions on PAMI*, special section on Award Winning Papers from the IEEE CS Conference on Computer Vision and Pattern Recognition (CVPR), vol. 31 no. 12, December 2009.
- Guest-Editor, *International Journal of Computer Vision*, Special Issue on Video Computing, November, 2002.

### **E.3.4 Editorships of Workshop Proceedings**

- IEEE Workshop on Motion and Video Computing, 2002.
- “Recent Advances in Computer Vision”, Karachi, Pakistan, January 1-2, 1998.
- *Workshop on Computer Vision*, Islamabad, Pakistan, January 2-5, 1995.

## E.4 Conference and Workshop Program Committee Memberships and Organization

- Tutorial Chair, International Conference on Pattern Recognition, Tampa, FL, December 2008.
- Program co-chair, IEEE CVPR 2008.
- General Chair, 2007 International Conference on Machine Vision, Islamabad, Pakistan, December 28-29, 2007.
- Member Program Committee, Automatic Target Recognition XVIII, SPIE Defense and Security, 16 - 20 March 2008 Orlando World Center Marriott Resort and Convention Center Orlando, FL USA.
- Program co-chair IJCAI-2007 Workshop on Multimodal Information Retrieval Hyderabad, India - January 6, 2007.
- Chair, The Sixth IEEE International Workshop on Visual Surveillance, VS2006, May 13, 2006, Graz, Austria.
- Member Program Committee, IEEE Conference on Computer Vision and Pattern Recognition, CVPR-2005, 2006.
- Member Program Committee, European Conference on Computer Vision, ECCV-2006.
- Member Program Committee, International Conference on Pattern Recognition, ICPR-2006.
- Area Chair, Asian Conference on Computer Vision, ACCV-2006.
- Member Steering Committee, The 3rd International Workshop on Frontiers of Information Technology, Islamabad, Pakistan, December 2005.
- Member Program Committee, IEEE International Conference on Computer Vision, ICCV-2005.
- Member Program Committee, IEEE Workshop on Motion and Video Computing, January, 2005.
- Program Co-Chair, International Workshop on Semantic Knowledge in Computer Vision, ICCV, 2005, Beijing, China.
- Member Program Committee, ACM 2nd International Workshop on Video Surveillance and Sensor Networks, 2004.
- Session Chair, International Conference on Pattern Recognition, Cambridge, England, August 2004.
- Member Program Committee, IEEE Workshop on Video Registration, June 2004.



- Member Program Committee, IEEE Workshop on Computer Vision beyond the visible Spectrum June 2004.
- Member Program Committee, IEEE Workshop on Video Event Mining, June 2004.
- Member Program Committee International Conference on Pattern Recognition, 2004.
- Member Program Committee, IEEE Workshop MDDE 04, June 2004.
- Member Program Committee IEEE Conference on Computer Vision and Pattern Recognition, 2004.
- Program Chair, NSF REU Site PIs meeting, Monterey, California, February 23-24, 2004.
- Member Program Committee, European Conference on Computer Vision, 2004.
- Member Program Committee, Asian Conference on Computer Vision, January 28-30, 2004, Jeju Island, KOREA.
- Member Program Committee International Conference on Computer Vision, 2003.
- Member Program Committee, IEEE Workshop on Detection and Recognition of Events in Video, Madison, Wisconsin, June, 2003.
- Member Program Committee, MIRAGE-2003, Model-based Imaging, Rendering, image Analysis and Graphical special Effects, March, 10-11 2003, INRIA Rocquencourt, France.
- Member Program Committee, Conference on Computer Animation and Social Agents 2003, Rutgers the State University of New Jersey May 7-9, 2003.
- Member Program Committee, IASTED International Conference Computer Science and Technology CST 2003 May 19-21, 2003 Cancun, Mexico.
- Program Committee, IEEE CVPR-2003, Madison, Wisconsin, June 16-22, 2003.
- Organizer NSF REU PI meeting, Disney Coronado Springs Resort, January 2002.
- Co-chair IEEE Workshop on Motion and Video Computing, December 2002, Orlando, FL.
- Member Program Committee IEEE CVPR, December, 2001, Kuauai, Hawaii.
- Member Program Committee, International Conference on Pattern Recognition, Quebec City, Canada, August 11-15, 2002.
- Member Program Committee, Asian Conference on Computer Vision, Melbourne, Australia: January 23-25 2002.

- Member Program Committee, IEEE Workshop on Detection and Recognition of Events in Video, Vancouver, Canada, July 8, 2001.
- Co-Chair Program Committee, Workshop on Video Registration, Vancouver, Canada, July 13, 2001.
- Co-chair, IEEE Workshop on Combined Research-curriculum development in Computer Vision, December 10, 2001, Kuauui, Hawaii.
- Session Chair, ISCIS-99, Izmir, Turkey, October 1999.
- Member Program Committee, CVPR-99, IEEE Conference on Computer Vision and Pattern Recognition.
- Session Chair, IEEE South East Conference, April 1998, Orlando, Florida.
- Organizer, Workshop on Recent Advances in Computer Vision, Karachi, Pakistan, January 1998. (Funded by NSF).
- Member Program Committee, CVPR-98, IEEE Conference on Computer Vision and Pattern Recognition.
- Session Chair, IEEE CVPR-96, San Francisco, June 1996.
- Member Program Committee, IEEE CVPR-96, San Francisco, June 16-20, 1996.
- Member Program Committee, International Conference on Pattern Recognition, Vienna, Austria on August 25 - 30, 1996
- Organizer, Workshop on Computer Vision, Islamabad, Pakistan, January 1995. (Funded by NSF)
- Session Chair, Workshop on Computer Vision”, Islamabad, Pakistan, January 1995.
- Session Chair, IEEE CVPR-94, Seattle, June 1994.
- Panelist, Recent Advances, New Opportunities in Computer Vision, held during South-eastcon 94 in Miami, April 13, 1994.
- Session Chair, SPIE Applications of AI Conference, Orlando, April 1991.
- Session Chair, IEEE International Conference on Pattern Recognition, Atlantic City, June 1990.
- Member Program Committee, ACM Computer Science Conference, Washington, D.C., February 1989.
- Member Program Committee, Machine Vision and Robotics Conference, April 1991.

#### **E.4.1 Publication Reviewer**

- Computer Vision & Image Understanding
- International Journal of Computer Vision
- IEEE Transaction on Image Processing
- Pattern Recognition Letters
- IEEE Transactions on PAMI
- Machine Vision and Applications
- Optical Engineering
- IEEE Transactions on Systems, Man, and Cybernetics
- Pattern Recognition
- International Journal of Pattern Recognition and Artificial Intelligence
- IEEE Proceedings
- Image and Vision Computing
- IEE Vision, Image and Signal Processing
- Electronic Imaging

#### **Conferences**

- IEEE Conference Computer Vision and Pattern Recognition
- International Conference on Pattern Recognition
- IEEE Conference Robotics and Automation
- SPIE conference on Applications of Artificial Intelligence
- IEEE Workshop on Human Motion Analysis

## **E.5 Proposal Review**

- Served on NSF CISE Computer Vision proposal panel, November 2008.
- Served on NSF DDDAS-AS2 Panel, August 1-2, 2005.
- Served on NSF Computer Vision Panel, June 2-3, 2005.
- Served on NSF panel Multimedia program, 2003
- Served on NSF review panel, Sensor networks, 2003.
- Served on NSF review panel on REU, 2002
- Served on NSF review panel on Information Technology Research, 2000
- Served on NSF review panel on Computer Vision research, 1992
- Served on NSF review panel on Computer Vision research, 1998
- Reviewer for proposals submitted to NSF International Programs, since 1993

## **E.6 Other Professional Service**

- Member membership committee, International Association of Pattern Recognition, 2002-2004.
- Member Advisory Board, NSF Combined Research and Curriculum Development in Computer Vision project, University of Nevada, Reno, 2000-.
- Member Advisory Board, OPSTeC College of Computer Science, Pakistan, 2000-.
- Member Academic Committee, Shaheed Z. A. Bhutto Institute of Science and Technology (SZABIST), Pakistan, 1997-.
- Secretary IEEE Orlando chapter, August 1997-July 1998.

# **F University Service**

## **F.1 Computer Vision Distinguished Speaker Series**

- Organized the highly acclaimed Computer Vision Distinguished Speaker series to attract top Computer Vision Researchers to UCF campus.

**2007-2008**

- Dr. Aaron Bobick, “Seeing Action”, Georgia Institute of Technology September 17, 2007.

- Dr. Demetri Terzopoulos, “Simulation of Humans and Lower Animals”, University of California Los Angeles, October 4, 2007.
- Dr. Larry Davis, “Event Recognition in Surveillance Video - The Challenge of Identity Maintenance”, University of Maryland ”November 5, 2007.
- Dr. Jan Olof Eklundh, “Detecting and Recognizing Objects in the Real World”, Royal Institute of Technology, January 10, 2008.
- Dr. David Fleet, “Model-Based Human Pose Tracking”, University of British Columbia, February 2008.
- Dr. Song-Chun Zhu, “Object Category Modeling, Learning, and Recognition by Stochastic Grammar”, University of California - Los Angeles, March 27, 2008.

### **2006-2007**

- Dr. James Duncan, “Model-Based Recovery of Structure and Function from Medical Images”, Yale University, April, 2007.
- Gerard Medioni, “Tensor Voting: Overview and Applications to Vision and Learning”, University of Southern California, March, 2007.
- Dr. David Lowe, “Object and Place Recognition from Invariant Local Features”, University of British Columbia, February, 2007.
- Ted Adelson, “Image Statistics, Visual Perception and Visual Illusions”, Massachusetts Institute of Technology, January 18, 2007.
- Anil Jain, “Biometric Recognition: How Do I Know Who You Are?”, Michigan State University, November, 2006.
- Zhengyou Zhang, “Computer Vision for Real-Time Communication and Human-Computer Interaction, Microsoft Research, Redmond, October, 2006.
- Amnon Shashua, “The Role of multi-linear Factorization in Image Coding, Clustering and Visual Learning”, Hebrew University of Jerusalem, September, 2006.

### **2005-2006**

- Allen Hanson, “Vision of Vision”, University of Massachusetts, Amherst, April 2006.
- Tom Huang, “Vision-Based Hand Gesture Tracking and Recognition”, University of Illinois at Urbana Champaign, March, 2006.
- Luc Van Gool, “Total Recall: A Plea for Realistic 3D Reconstruction of Cultural Heritage”, Swiss Federal Institute of Technology in Zurich (ETHZ), February 2006.
- Jitendra Malik, “Recognizing Objects and Actions in Images and Videos”, University of California at Berkeley, January 2006.

- Takeo Kanade, “Modeling and Reconstruction of Deformable Object Shapes from Video”, Carnegie Mellon University, November, 2005.
- Rama Chellapa, “Machine Perception of Humans and their Activities”, University of Maryland, October, 2005.
- Jake Aggarwal, “ Understanding of Human Motions, Actions and Interactions”, University of Texas at Austin, May, 2005.

## **F.2 University, College and Department Committees**

- Member Provost Professorship Faculty Search Committee, 2013-.
- Member CECS Dean Search Committee, 2013.
- Member SoTL Committee, 2013.
- Member CS Executive Committee, Fall 2011-.
- Member College Tenure/Promotion Committee, 2010.
- Member Trustee Chairs Review Committee, Spring 2007.
- Group Coordinator, Computer Vision and Graphics, SEECS, 2006-.
- Member graduate committee, SEECS, 2006-.
- Member SEECS executive committee, 2006-.
- CECS, RIA selection committee, 2006.
- Chair, department Promotion and Tenure committee, 2004-05.
- Member, ECE chair search committee, 2003-04.
- Member CECS TIP committee, 2003-04.
- Member, University Undergraduate Research Council, 2003.
- Chair Faculty Search Committee, 2003.
- Member CS Promotion/Tenure Review Committee, 2003-04.
- Member, University Graduate Council, 2003-04, 2004-05.
- Member, Dean’s Research Committee, 2003.
- Member CS YAC (Committee for \$2.5 millions CS special), 2003.
- Member, Graduate Program Focus Group, UCF Strategic Planning Council, 2000-01.

- Served as a chair of the Graduate Committee, 1996-2001. Committee Duties/Accomplishments include (Please visit: <http://www.cs.ucf.edu/csdept/academics.html>):
  - Design of new Ph.D. qualifying exam.
  - Selection of new graduate students among a large number of applicants for GTA and other fellowship awards;
  - Assigning advisor to each supported graduate student;
  - Managing of Ph.D. qualifying exam twice a year;
  - Reviewing of graduate students every semester;
  - Other misc items related to graduate program.

As a result of these efforts:

- The Computer Science graduate program **grew 225%** in students credit hours from 1998 to 2001.
- Served as a member SCS Director Search Committee, 1997-98. Hired Erol Gelenbe as the first director of SCS, which became SEECS.
- Served as a member of the Dean’s “Computer Science Academic Excellence” committee, 1997. Accomplishments/Duties included:
  - Authoring of Top-50 proposal for Computer Science excellence to UCF president, which was funded at \$400,000 first year, with \$500,00 yearly, which has reached to \$2,500,000 this year.
- Served as a member of CAS (College of Arts and Sciences) In-House Awards Committee, 1995-1996.
- Served as a member of department Graduate Committee, 1993–present.
- Served as a member of department tenure and promotion committee, 1994.
- Served as a member of Computer Science department chair search committee, 1993.
- Served as a chair and a member of department colloquium committee, 1991-1992.
- Served as a member of College of Arts and Sciences tenure and promotion committee, 1992-1993.
- Served as a chair of department student complain committee, 1992-1993.
- Served as a chair of faculty screening committee, 1993.
- Served as a member of faculty screening committee, 1994.
- Served as member of technical report committee, 1991.

- Served as chair of publication committee, 1994.
- Served as a member of department computer interface committee, 1993.
- Served as a member of Ph.D. qualifying committee, 1993.
- Served as a member of Ad hoc Dept secretary committee, 1992.
- Served as a member of department committee for graduate program, 1988.