

## JOHN A. SAGHRI

Electrical Engineering Department  
Cal Poly, San Luis Obispo CA  
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### SPECIALIZATION:

*Active & passive remote sensing*  
*Computer vision*  
*Target recognition & tracking*  
*Bandwidth compression & coding*  
*Signal processing*

### EDUCATION:

Dec. '75 - Aug. '79

**Rensselaer Polytechnic Institute**  
Troy, New York 12181  
Degree: **Doctor of Philosophy**  
Major: **Computer & Systems Engineering**  
Specialty: *Computer Vision, Signal Processing*

Sep. '73 - Jun. '75

**Oregon State University**  
Corvallis, Oregon 97331  
Degree: **Master of Science**  
Major: **Electrical & Computer Engineering**  
Specialty: *Logic Design & Computer Systems*

Sep. '69 - Jun. '73

**California Polytechnic State University**  
San Luis Obispo, California 93407  
Degree: **Bachelor of Science**  
Major: **Electronics Engineering**

### ACADEMIC AWARDS:

**Fellowship:** Rensselaer Polytechnic Institute  
**Scholarship:** Oregon State University  
**Honor Roll:** California Polytechnic University

### EXPERIENCE:

Sep. '00 - present

**Cal Poly State University**  
Position: **Professor**  
Department: **Electrical Engineering & Computer Engineering**  
San Luis Obispo, California 93407

#### Duties:

**Teaching:** 20 graduate & undergraduate courses including: *Remote Sensing, Digital Image Processing, Signals & Systems, & Communications*

**Research:** Funded projects including SAR automatic target recognition & tracking, Early wildfire detection system (*both sponsored by Raytheon*), hyperspectral/multispectral data compression (*US Office of Naval Research sub-grant*), BalloonSat remote sensing station (NSF sub-grant), Bandwidth compression of remotely-sensed imagery data (*Lockheed Martin grant*), Space-based cloud detection (*Lockheed Martin grant*).

**Supervision:** Theses and senior projects

**Service:** serving the department, college, university, and the professional community in various capacities

Sep. '94 – June 00

**Kuwait University**

**Position:** Associate Professor

**Department:** Electrical & Computer Engineering

**Duties:**

***Teaching:*** Graduate & undergraduate courses including: Computer Architecture, Digital Logic Design, *Multimedia systems, Computer Graphics*, Advanced Computer Graphics, Digital Image Processing, Artificial Intelligence, Pattern Recognition, Advanced Pattern Recognition, Remote Sensing, *Computer Engineering Design*, Senior Projects, Master Projects, *Master Thesis*

***Research:*** Funded research in collaboration with Lockheed Martin Advanced Technology Center in the areas of *Satellite communication & Coding, Classification, Remote sensing*

***Supervision:*** Theses and senior projects

***Service:*** serving the department, college, university, and the professional community in various capacities

1995 – 1998  
(Part time)

**Lockheed Martin Space Systems**

1260 Crossman Rd., Sunnyvale, CA 94089-1198

**Position:** Part time Consultant

**Department:** Interactive Technology Center

Nov. '88 - Aug. '94

**Lockheed Martin Advanced Technology Center**

3251 Hanover Street, Palo Alto, California 94304

**Position:** Senior Staff Scientist

**Department:** Electronic Sciences Laboratory

**Duties:**

*Project leader on a variety of advanced R&D programs involving digital signal processing & visual communication issues*

***Sample Research Projects:***

Multispectral Data Compression (*awarded \$2M contract from Air Force LANDSAT Program Office*), Sonar Bandwidth Compression, Sub-pixel Resolution/Super Resolution, Target detection and tracking

Sep. '79 - Oct. '88

**The Aerospace Corporation**

2350 E. El Segundo Blvd., El Segundo California 90245

**Position:** Engineering Specialist

**Department:** Signal Processing Department

**Duties:** *System Engineering and applied R&D in signal processing-related programs.*

***Sample Research Projects:***

Knowledge-based Bandwidth Compression, Model-based Image Restoration, Digital Speech Processing, Synthetic Aperture Radar Image Enhancement, Image Quality Assessment

Sep. '78 - Jun. '79

**Rensselaer Polytechnic Institute**

Troy, New York 12181

**Position:** Instructor

**Department:** Electrical Engineering

**Duties:** *Taught courses in Logic Design and Computing Fundamentals.*

Sep. '76 - Jun. '78

**Rensselaer Polytechnic Institute**

**Position:** Research Assistant

**Department:** Electrical Engineering

**Duties:** *R&D in Graphics & Image Processing & Supervising of RPI Image Processing Laboratory.*

Sep. '73 - Jun. '75

**Oregon State University**

**Department:** Electrical Engineering, **Position:** Teaching Assistant

## **PROFESSIONAL ACTIVITIES:**

**Fellow:** The International Society for Optical Engineering

**Life Senior Member:** IEEE Computer Society

**Former Associate Book Editor:** Journal of Optical Engineering

**Technical Reviewer:** *Journal of Optical Engineering, IEEE Transaction on Pattern Analysis & Machine Intelligence, IEEE Transaction on Acoustic Speech & Signal Processing, IEEE Transaction on Education, IEEE Transaction on Geosciences & Remote Sensing, International Journal of Signal Processing, Journal of Computer Vision, Graphics, & Image Processing, Visual Communications & Image Representation*

**Conference organization and chairing:**

*A program committee member and sessions chair for the Society of Optical Engineering Conference "Application of Digital Image Processing", 1983- present*

## **PUBLICATIONS:**

*Over 65 journal and conference papers including two textbook chapter contributions in the fields of digital signal/image processing, Bandwidth Compression, and Remote Sensing (See attached list for details)*

## **HONORS:**

*Winner of the Outstanding Technical Accomplishment Award from The Aerospace Corporation in 1985, Recipient of a Certificate of Appreciation for Outstanding Professor from Cal Poly student chapter of IEEE in 2003, Most Animated Professor from Computer Engineering students in 2007, Most Entertaining Professor from EE students in 2010*

### **PUBLICATIONS**

#### **Books**

- 1- Contributed Chapter "**Comparative Analysis of Line Drawing Modeling Techniques**," by H. Freeman and J. A. Saghi, in **Image Modeling**, edited by A. Rosenfeld, Academic Press, 1981.
- 2- Contributed Chapter "**Image Quality Measure based on a Human Visual Quality System Model**," by J. A. Saghi, in **Visual Communications: Technology and Applications**, edited by T.R. Hsing and A.G. Tescher, SPIE Press, 1990.

#### **Refereed Journal Papers**

- 1- Saghi, J. A., Schroeder, S., and Tescher, A. G., "**An Adaptive 2-stage Karhunen-Loeve-Transform Scheme for Spectral Decorrelation in Hyperspectral Bandwidth Compression**", journal of Optical Engineering , Vol.49, No. 5, May 2010
- 2- Saghi, H. A., et al., "**Balloonsat: Design, Implenentation, and Application of a Low-Cost Tethered Weather Balloon Remote Sensing Station**", Cal Poly Honors Undergraduate Research Journal vol. 2, 2009, pp. 27-47
- 3- Saghi, J.A., Tescher, A.G., and Omran, M.J., "**Impact of Lossy Compression on Classification of Remotely Sensed Imagery Data**", Journal of Imaging Science and Technology, Vol. 46, No. 6, November/December 2002
- 4- Saghi, J.A., Tescher, A.G., and Omran, M.J., "**Class Prioritized Compression of Multispectral Imagery Data**", Journal of Electronic Imaging, Vol. 11, No. 2, April 2002
- 5- Saghi, J.A., Tescher, A.G., and Jaradi, F. "**A Viable End-Member Selection Scheme for Spectral Unmixing of Multispectral Satellite Imagery Data**", Journal of Imaging Science and Technology, Vol. 44, No. 3, May/June 2000
- 6- Saghi, J.A., Tescher, A.G., and Reagan, J.T., "**Spaced-based Data Compression Issues**", Journal of Electronic Imaging , vol. 8(3), July 1999
- 7- Saghi, J.A., Tescher, A.G., and Boujarwah, A., "**Spectral-Signature-Preserving Compression of Multispectral Data**," Journal of Optical Engineering, vol.38, No. 2, December 1999
- 8- Dhodi, M.K., Saghi, J.A., Ahmad, I., and Ul-Mustafa, R., "**D-ISODAT: A Distributed Algorithm for Unsupervised Classification of Remotely-Sensed Data on Network of Workstations**," Journal of Parallel and Distributed Computing, vol. 59, October 1999
- 9- Saghi, J.A., Tescher, A.G., Reagan, J.T., "**Practical Transform Coding of Multispectral Imagery**", IEEE Signal Processing Magazine, Vol.12, No.1, January 1995

- 10- Saghri, J.A., Tescher, A.G., **"Sonar Feature-Based Bandwidth Compression"**, Journal of Visual Communication & Image Representation, Vol.4, No.2, June 1993
- 11- Saghri, J.A., Tescher, A.G., **"Near-Lossless Bandwidth Compression for Radiometric Data"**, Journal of Optical Engineering, Vol.30, No.7, July 1991
- 12- Saghri, J.A., Tescher, A.G., **"Image Quality Measure Based on a Human Visual System Model"**, Journal of Optical Engineering, Vol.28, No.7, July 1989
- 13- Saghri, J.A., Tescher, A.G., **"Feature-based Image Bandwidth Compression"**, Journal of Optical Engineering, Vol.27, No.10, October 1988
- 14- Tescher, A.G., Saghri, J.A., **"Advances in Transform Image Coding"**, Journal of Optical Engineering, Vol.26, No.5, July 1987
- 15- Saghri, J.A., Tescher, A.G., **"Personal Computer Based Image Processing with Halftoning"**, Journal of Optical Engineering, Vol.25, No.3, March 1986
- 16- Saghri, J.A., Tescher, A.G., **"Adaptive Transform Image Coding Based on Chain Coding Concepts"**, IEEE Transactions on Communications, Vol.COM.34, No.2, February 1986
- 17- Saghri, J.A., Tescher, A.G., **"Adaptive Transform Coding and Image Quality"**, Journal of Optical Engineering, Vol.25, No.5, August 1986
- 18- Saghri, J.A., Sawchuk, A.A., **"Detection of Moving Point Objects Against a Moving Background"**, Optical Society of America, Journal of Applied Optics, Vol.24, No.11, June 1985
- 19- Saghri, J.A., Tescher, A.G., **"An Iterative Image Enhancement Procedure with Dynamic Range Constraints"**, Journal of Optical Engineering, Vol.23, No.5, September 1984
- 20- Saghri, J.A., Tescher, A.G., **"A Model-Based Restoration Procedure for Small, Low-Resolution Optical Images"**, Journal of Optical Engineering, Vol.23, No.3, May 1984
- 21- Saghri, J.A., Freeman, H., **"Analysis of the Precision of Generalized Chain Codes for Presentation of Planar Curves"**, IEEE Transactions on Pattern Recognition & Machine Intelligence, Vol.3, No.9, September 1981
- 22- Freeman, H., Saghri, J.A., **"Comparative Analysis of Line Drawings Modeling Schemes"**, Journal of Computer Vision, Graphics & Image Processing, Vol.12, pp.203-223, 1980

#### Refereed Conference Papers

- 23- Saghri, J.A., Jacobs, J.T., Davenport, T., Garges, D., **"Detection of smoke plume for a land-based early forest fire detection system"**, Proc. Of SPIE, Vol. 9599-No. 6, August 10, 2015
- 24- Aldama, R.S, Boynton, A.J, Saghri, J.A., Jacobs, J.T., **"Early Forest Fire Detection using dual Mid-wave and Long-wave Infrared Cameras"**, Proc. of SPIE, Vol. 8856-No. 26, August 27, 2013
- 25- Saghri, J.A., Jacobs, J.T., Garges, D., **"Detection of smoke plume for a land-based early forest fire detection system"** Proc. of SPIE, Vol. 9599-No. 6, August 10, 2015
- 26- Saghri, J.A., Jacobs, J.T., Kohler, D., Davenport, T., Moussa, G. **"Characterization and identification of smoke plume for early forest Detection"**, Proc. of SPIE, Vol. 8499, No. 54, August 15, 2012
- 27- Saghri, J.A., Radjabi, R2., Jacobs, J.T., **"Early Forest Fire Detection Using Principal Component Analysis of Infrared Video"**, Proc. of SPIE, Vol. 8135, No. 46, August 24, 2011
- 28- Hupton, J.R., Saghri, J. A., **"Three-dimensional target modeling with synthetic aperture radar"**, Proc. of SPIE, volume 7798, No. 24, August 3, 2010
- 29- Saghri, J.A., **"Raytheon-Sponsored SAR ATR and Tracking Projects at Cal Poly, San Luis Obispo"** Raytheon's Information Systems & Computing Technology Symposium, Dallas, April 21, 2010
- 30- Saghri, J. A., Schroeder, S., Tescher, A. G., **"An Adaptive 2-stage KLT Scheme for Spectral Decorrelation in Hyperspectral Bandwidth Compression"**, Proc. Of SPIE, volume 7443, No. 39, August 5, 2009
- 31- Saghri, J. A. **"SAR Automatic Target Recognition Using Maximum Likelihood Template-based Classifiers,"** Proceedings of SPIE, Vol. 7073, No. 59, August 14, 2008
- 32- Saghri, J. A., Cary, D. A. **"A Rectangular-Fit Classifier for Synthetic Aperture Radar Automatic Target Recognition,"** Proceedings of SPIE, Vol. 6696, No. 46, August 30, 2007
- 33- Saghri, J. A., DeKelaita, A. **"Exploitation of Target Shadows in Synthetic Aperture Radar Imagery for Automatic Target Recognition,"** Proceedings of SPIE, Vol. 6312, No. 41, August 2, 2006
- 34- Saghri, J. A., Guilas, C. **"SAR Automatic Target Recognition using a Probabilistic Hausdorff Distance Transform Approach,"** proc. of SPIE, volume 5909, Number 3, August 2005
- 35- Saghri, J. A., Tescher, A. G., and Planinac, A. M., **"Bandwidth Compression of Hyperspectral Imagery Data using a Simplified KLT/JPEG2000 approach,"** Proceedings of the SPIE, Vol 5558, No. 68, August 2004
- 36- Saghri, J. A., Tescher, A. G., and Planinac, A. M., **"KLT/JPEG 2000 Multispectral Bandwidth compression With Region of Interest Prioritization Capability,"** Proceedings of the SPIE, Vol 5203, No. 31, August 2003

- 37- Saghri, J. A., Tescher, A. G., and Kozak, F. E. "**Analysis of of JPEG versus JPEG-2000 for KLT-based Compression of Multispectral Imagery Data**", Proceedings of the SPIE, Vol. 4790, No. 33, July 2002
- 38- Saghri, J.A., Tescher, A.G., and Omran, M., "**Feature Prioritized Compression of Multispectral Imagery Data**", 2001 SPIE's Annual International Symposium; conference on Applications of Digital Image Processing, vol. 4472, no. San Diego, July 2001
- 39- Saghri, J.A., Tescher, A.G., and Omran, M., "**Impact of Lossy Compression on the Classification of Remotely-Sensed Imagery Data**", 2000 SPIE's Annual International Symposium; conference on Applications of Digital Image Processing, vol. 4115, no. 13, San Diego, July 2000
- 40- Saghri, J.A., Tescher, A.G., and Jaradi, F. , "**A Viable End-Member Selection Scheme for Spectral Unmixing of Multispectral Satellite Imagery Data**", 1999 SPIE's Annual International Symposium; conference on Applications of Digital Image Processing, vol. 3808, no. 108, Denver, July 1999
- 41- Saghri, J.A., Tescher, A.G., and Omran, M.J., "**Feature-Based Lossy Compression of Multispectral Data**", IEEE 1999 International Geoscience and Remote Sensing Symposium, paper 99.0157, July 1999
- 42- Saghri, J.A., Tescher, A.G., Bou-Shehri, A., "**Spaced-based Data Compression Issues**", 1998 SPIE's International Symposium on Voice, Video, and Data Communication issues, Vol. 3528, November 1998
- 43- Saghri, J.A., Tescher, A.G., Boujarwah, A., "**Spectral-signature preserving Transform Coding of Multispectral Data**", 1998 SPIE's Annual Int. Symposium; Conf. on Appl. of Dig. Image Proces., Vol. 3460, San Diego, July, 1998
- 44- Tescher, A.G., and Saghri, J.A., "**Environmental Data Compression Issues**", SPIE's International Symposium on Applications of Digital Image Processing, Vol.3164, San Diego, July 1997
- 45- Tescher, A.G., Reagan, J.T., Saghri, J.A., Hutchison, K.D., Paul, D., Topping, P.C., "**Comparative Study on the Value and Limitations of Image Compression for Meteorological Information**", SPIE's Conference on Applications of Digital Image Processing XX, Vol.3164, San Diego, California, July 1997
- 46- Saghri, J.A., Tescher, A.G., Reagan, J.T., "**Adaptive Data Compression for Remotely-Sensed Data**", Satellite Remote Sensing Conference, Paris, September 1995
- 47- Saghri, J.A., Tescher, A.G., Reagan, J.T., "**Practical Issues for Multispectral Data Compression**", SPIE's Signal Processing & Target Recognition Conference, Orlando, Florida, April 1995
- 48- Saghri, J.A., Tescher, A.G., Reagan, J.T., "**Transform Coding of Multispectral Imagery**", Picture Coding Conference, Sacramento, California, September 1994
- 50- Saghri, J.A., Tescher, A.G., Reagan, J.T., "**Terrain-Adaptive Transform Coding of Multispectral Imagery**", IEEE Geoscience and Remote Sensing Symposium, Cal.Tech., Pasadena, California, August 1994
- 51- Saghri, J.A., Tescher, A.G., Reagan, J.T., "**Terrain-Adaptive Transform Coding of Multispectral Imagery**", SPIE's Application of Digital Image Processing Conference; San Diego, California, July 1994
- 50- Saghri, J.A., Tescher, A.G., Reagan, J.T., "**Terrain-Adaptive Multispectral Bandwidth Compression**", IEEE Data Compression Conference; Industry Workshop, Snowbird, UT, April 1994
- 52- Saghri, J.A., Tescher, A.G., Reagan, J.T., "**Three-Dimensional Transform Coding of Multispectral Data**", Twenty Seventh Asilomar Conference on Signals, Systems & Computer, November 1993
- 53- Saghri, J.A., Tescher, A.G., "**Sonar Feature-Based Bandwidth Compression**", SPIE International Technical Symposium, Orlando, FL, Vol.1699, April 1992
- 54- Reagan, J.T., Tescher, A.G., Saghri, J.A., "**Sub-pixel Resolution For Target Tracking**", SPIE's International Symposium conference on Applications of Digital Image Processing , Vol. 1771, San Diego, CA, July 1992
- 55- Saghri, J.A., Tescher, A.G., "**Near-Lossless Bandwidth Compression for Radiometric Data**", SPIE's International Technical Symposium Conf. on Applications of Digital Image Processing, Vol.1349, San Diego, CA, July 1990
- 56- Saghri, J.A., Tescher, A.G., "**A Human Visual System-Based Image Quality Measure**", SPIE's International Technical Symposium Conf. on Applications of Digital Image Processing, , Vol. 974, San Diego, CA, August 1988
- 57- Saghri, J.A., Tescher, A.G., "**Digital Processing of Halftone Images**", SPIE's International Technical Symposium Conference on Applications of Digital Image Processing, Vol 757, San Diego, CA, January 1987
- 58- Saghri, J.A., Tescher, A.G., "**Knowledge-Based Image Bandwidth Compression**", SPIE's International Technical Symposium Conference on Applications of Digital Image Processing, , Vol. 697, San Diego, CA, August 1986
- 59- Saghri, J.A., Tescher, A.G., "**PC Based Image Processing With Halftoning**", SPIE's International Technical Symposium Conference on Applications of Digital Image Processing, Vol. 575, San Diego, CA, August 1985
- 60- Tescher, A.G., Saghri, J.A., "**Image Quality Consideration in Transform Coding**", SPIE, International Technical Symposium, Vol. 23, Washington DC, September 1984
- 61- Saghri, J.A., Tescher, A.G., "**Adaptive Transform Coding Based on Chain Coding Concepts**", Seventh International Conference on Pattern Recognition, Montreal, Canada, July 1984
- 62- Saghri, J.A., Tescher, A.G., "**Adaptive Transform Coding Based on Chain Coding Concepts**", Proc. of SPIE's International Technical Symposium Conf. on Applications of Dig. Image Processing. Vol. 432, San Diego, August 1983

- 62- Saghri, J.A., Tescher, A.G., **"A Model-Based Restoration Procedure for Optimal Images"**, Optical Society of America Topical Meeting on Signal Recovery, Lake Tahoe, NV, January 1983
- 63- Saghri, J.A., Sawchuk, A.A., **"Analysis of the Signal Processing for Point Target Detection with Staring Mosaic Sensor System"**, IEEE Computer Society Workshop on Appl. Imagery Pattern Recog., MD, October 1983
- 64- Saghri, J.A., Tescher, A.G., Habibi, A., **"Block Size Consideration for Adaptive Transform Image Coding"**, IEEE National Telecommunications Conference, Galveston, Texas, November 1982
- 65- Saghri, J.A., Tescher, A.G., **"A Model-Based Restoration Procedure for Small, Low-Resolution Optical Images"**, SPIE's International Technical Symposium Conference on Applications of Digital Image Processing, Vol. 395, San Diego, CA, August 1982
- 66- Saghri, J.A., Tescher, A.G., **"An Iterative Image Enhancement Procedure with Dynamic Range Constraints"**, SPIE's International Technical Symposium Conference on Applications of Digital Image Processing, , Vol. 249, San Diego, CA, August 1980
- 67- Saghri, J.A., Freeman, H., **"Generalized Chain Codes for Planar Objects"**, IEEE 4th International Conference on Pattern Recognition, Kyoto, Japan, 1978