CURRICULUM VITAE

Mohammad R. Sayeh

Office
School of Electrical, Computer, and Biomedical Engineering
Southern Illinois University Carbondale
Carbondale, Illinois 62901-6603
Phone: (618) 453-7066, Fax: (618) 453-7972
E-mail: sayeh@siu.edu

Home
38 Lake Indian Hills Ridge
Carbondale, Illinois 62902
Phone: (618) 967-2230

PERSONAL

Date of Birth**:** August 25, 1957
Marital Status: Married, one daughter, one son

EDUCATION

Ph.D. Electrical Engineering, Oklahoma State University, Stillwater, Oklahoma, 1985
M.E. Electrical Engineering, Oklahoma State University, Stillwater, Oklahoma, 1982
B.S. Electrical Engineering, Oklahoma State University, Stillwater, Oklahoma, 1981

PROFESSIONAL EXPERIENCE

Professor and Electrical Engineering Program Coordinator, School of Electrical, Computer, and Biomedical Engineering, Southern Illinois University Carbondale, Carbondale, Illinois, 2005-present
Director of Biomedical Engineering Program, College of Engineering, Southern Illinois University Carbondale, Carbondale, Illinois, 2017-2019
Adjunct Professor, Department of Computer Science, University of Dayton, Dayton, Ohio, 2022 - present
Associate Professor, Department of Electrical and Computer Engineering, Southern Illinois University Carbondale, Carbondale, Illinois, 1991-2005
Assistant Professor, Department of Electrical and Computer Engineering, Southern Illinois University Carbondale, Carbondale, Illinois, 1986-1991
Visiting Assistant Professor, Oklahoma State University, Stillwater, Oklahoma, 1986
Research Associate, Oklahoma State University, Stillwater, Oklahoma, 1982-1985
Teaching Assistant, Oklahoma State University, Stillwater, Oklahoma, 1982-1985

RESEARCH ACTIVITIES

- Optical Delta-sigma Modulators 2001- present
- Photorefratcive Optics 1986 – present
- Neural Networks: Theory and Application to Image Understanding and Fiber-optic Sensors, and Optical Implementation of Associative Memories, 1986 - present
- Statistical Modeling of Frequency Fluctuations in Lasers, 1983 - 1985

TEACHING AND ADVISING ACTIVITIES

Teaching Interests: Electromagnetics, Photonics, Circuits and Systems, and Neural Networks

Courses Taught: Undergraduate level - Digital Signal Processing, Linear Systems, Electric Circuits, Electromagnetic Fields, Laser Electronics, Photonics I, Photonics II, Solid-State Devices and Electronics; Graduate level - Dynamical Systems, Random Systems Modeling and Analysis, Neural Networks, Fiber Optic Communications, Probability and Random Processes, Integrated Photonics, and Optical Information Processing

Courses/Laboratory Established: Fundamentals of Neural Networks in Data Science - BME 470 (2022); Biophotonics - BME 531 (2022); Integrated Photonics – ECE 537 (2007); Photonics I - ECE 441 (1999); Photonics II - ECE 448 (1999); Neural Networks - ECE 572 (1988); Optical Information Processing - ECE542 (1987); and Photonics Laboratory (1987)

Ph.D. Dissertation Supervision:

1. *Noorbakhsh Amiri,* "CNN Model for Recognition of Text-Based Captchas and Analysis of Learning Based Algorithms' Vulnerabilities to Visual Distortion," 2023
2. *Eman Elrifaei,* "Mode Locked Resonance via Internal and External Reflections," 2020
3. *Marji Ayed Alshammari,* "Design of Higher-order All Optical Binary Delta-sigma Modulator Using Ring Laser," 2019
4. *Abdulrahman Mohammed A Ghandoura*, "Designing Proteretic Switch for Optical Binary ΣΔ Modulator Using Ring Laser," 2018
5. *Yijing Watkins*, "Image Data Compression and Channel Error Correction Using Neurally-Inspired Network Models," 2018
6. *Ali Alghamdi*, "Design and Performance Analysis of an Optical Proteretic Delta-Sigma Modulator," 2017
7. *Zahra Sarafraz Yazdi*, "Real-Time Classifier Based on Adaptive Competitive Self-organiziing Algorithm," 2016
8. *Hossein Sarafraz Yazdi*, "All-Optical Bistable Device Using a Single Active Element," 2016
9. *Luae AL-Tarawneh*, "Dynamic Adaptation Of Bandwidth Granularity For Multipath Routing In Elastic Optical OFDM Networks," 2016
10. *Pejman Kamkarian*, "Robotic Off-line Path Planning," 2015
11. *Mohamad Tafazoli-Mehrjerdi*, "All-Optical Delta-Sigma Modulator Design and Implementation," 2015
12. *Nima Davoudzadeh,* "Optical Delta Sigma Modulator Simulation and Characterization," 2014
13. *Ayman Alhejji, "*Nonlinear Systems Class of Dynamical Neural Networks-Based Adaptive Inverse Optimal Control Design," 2014
14. *Raed Althomali*, "Theoretical Investigation and Performance Assessment Of Reversed Hysteresis Delta Sigma Modulator Design," 2014
15. *Aysar A. Al-Khalidi,* "Investigation of Proteretic Hopfield Networks," 2013
16. *Ali D. Khudhair*, "Vector Quantization Using ODE-Based Neural Network," 2012
17. *Jie Cheng*, "Adaptive Associative Memory," 2009
18. *Efa. Calmese*, "Hysteretic A/D Converter," 2008

19. *M. Syed*,"Terahertz Optical Modulation," 2008
20. *J.W. Park*, "Fast Spinning-top Dynamics of Photorefractive Grating," 2006
21. *Bai Li,* "Binary Delta-Sigma Modulators," 2005
22. *Ron Marusarz*, "Neural Network Based Multimode Fiber Optic Image Transmission," 1999
23. *Ragu Athinarayanan*, "A Dynamical-System Approach to Classification and Recognition of Analog Input Information," 1994

M.S. Thesis Supervision:

1. *M. Deldadehasl*, "Dynamic Classification Using the Adaptive Competitive Algorithm," 2023
2. *V. Ravichandran*, "Binary Hysteretic/Proteretic Delta Sigma Modulator," 2013
3. *H. Kamatham*, "Propagation Modes in Graded Index Fibers," 2004
4. *P. Tadakaluri*, "Vector Quantization Using LYAM," 2004
5. *AA. Al-Karmi*, "Design of a Continuous-Time Delta-sigma Modulator Using MATLAB and Pspice," 2004
6. *P. Mecconda*, Research Report, 2003
7. *M. Haroon*, Research Report, 2003
8. *L. Veerappan*, Research Report, 2003
9. *S. Ramachandran*, "Optical Orthagonal Codes," 2003
10. *J. Stewart*, "Transverse Dynamics of a Photorefractive Oscillator," 2003
11. *J. Mohammed*, "Continuous-Time Sigma-Delta Modulation: Design and Analysis," 2003
12. *AA. P. Pyakuryal*, Research Report, "Reflection Holograms Using Peristrophic Multiplexing," 2002
13. *N. Phatanarajta*, "Text Document Categorization Using LYAM Network," 2002
14. *J.W. Park*, "Resonant Modes of Fiber Optic Resonator," 2000
15. *N. Gupta*, "Principal Component Analysis and Neural Network Based Face Recognition," 1999
16. *Y. Jeong*, "Holographic Data Storage in Lithium Niobate Crystal Using Two Different Angular Tilting Methods," 1999
17. *AA. Patel*, "Study of Preprocessing Techniques Used in Neural Network Based Fiber Optic Image Transmission," 1999
18. *N. Kerkiz*, "Angle-Multiplexed Volume Holograms," 1997
19. *D. Zinn*, "Optical Associative Memories", 1997
20. R. Hartshorn, "Optical Fiber Strain Sensor Using Cascade-Correlation Network," 1996
21. *K. Haak*, "Fractional Fourier Transform", 1996
22. X. Jiang, "Gaussian Beam Propagation in Uniaxial Anisotropic Media," 1996
23. *S. Ahmed*, "Simple Multiplexing of Multimode Fiber Optic Strain Sensors Using Artificial Neural Networks," 1994
24. *P.K. Dhali*, "Texture Segmentation Using Clustering Algorithms and Kohonen Network," 1993
25. *M. Greatline*, "Neural Network Based Autopilot," 1993
26. *B. Arianlou*, "Analysis of Intensity Distribution of Multi-mode Fiber Optic Strain Sensor Based on Ray Tracing," 1993

27. *P. Varangis*, "Mode Competition in Resonators," 1992
28. *AA. Banergee*, "Implementation of a Multi-mode Fiber Optic Smart Sensor Through the Use of Neural Networks," 1992
29. *AI. Suhrawardy*, "Electronic Implementation of Hopfield-type Neural Networks," 1991
30. *X. Yuan*, "Study of Diffraction Efficiency of Volume Hologram in LiNbO3," 1991
31. *M. Abbasi*, "A Class of Learning Algorithms for Multi-layer Perceptron," 1990
32. *R. Athinarayanan*, "Pattern Classification in Artificial Neural Networks," 1990
33. *N.S. Haider*, "On the Modification of Hopfield Model as an Associative Memory," 1988

Short-Courses Taught:

- "Neural Networks for Engineers," SPIE Midwest Conference, Chicago, 1993 and 1995
- "Artificial Neural Networks," SPIE Midwest Conference, Chicago, 1990 and 1992
- "Fundamentals of Learning," Artificial Neural Networks in Engineering Conference, St. Louis, 1991, 1992, and 1993

Awards:

1. Member of SIU's National Academy of Inventors (NAI) Chapter.
2. Listee in *Who's Who in America 2011.*
3. Outstanding Teaching Award in Department of Electrical and Computer Engineering, SIUC, 2017-2018.
4. Outstanding Teaching Award in Department of Electrical Engineering, SIUC, 1992 – 1993.

Patents:

1. "Optical Strain Sensor," A. Mahajan, B. Regez, F. Figueroa, and M. R. Sayeh under preparation through NASA.
2. "All-Optical Proteretic Photonic Integrated Device," M. R. Sayeh, N. Davoodzadeh, and M. Tafazoli, US Patent: 9,806,697, October 31, 2017.
3. "Hybrid Intelligent Fiber Optic Sensor for 3D Local Positioning System," T. Mostafavi, J. H. Merritt, and M. R. Sayeh, US Provisional Patent: 61/772,922, March 2013.
4. " Binary Delta-Sigma Modulators," M. R. Sayeh and S. Siahmakoun from Rose-Hulman Institute of Technology, US Patent: 7,355,538, April 8, 2008.

Grants:

1. "All-optical embedded fiber-optic up/down-links for motor controller," PI: M. R. Sayeh, sponsored by NSF I/UCRC for Embedded Systems, 2012-2013, amount: $25,000.
2. "Low-power Terahertz Optical A/D Converter," PI: M.R. Sayeh, sponsored by US Navy/ONR, 2006-2008, amount: $507,000.

3. "Terahertz Optical A/D Converter (TOADC): Decimation Module," PI: M.R. Sayeh, sponsored by US Navy/ONR, 2004-2005, amount: $64,000.
4. "Energy Contracts and Energy Management Systems for Pepsi Mid-America," Co-PIs: M.R. Sayeh and C. Spezia, sponsored by Pepsi Mid-America, 2004, amount: $42,180
5. "Photorefractive Continuous-Time Delta-Sigma Modulator," PI: M.R. Sayeh, sponsored by Rose-Hulman Institute of Technology/ONR, 2003, amount: $17,000
6. "Real-time Modeling of Flexible Structures for Health Monitoring and Control," Co-PIs: M.R. Sayeh, F. Pourboghrat, and M. Daneshdoost, sponsored by the Materials Technology Center and Coal Research Center, and Graduate School at SIU-C, 2001-2002, amount: $37,500
7. "Real-time Modeling and Adaptive Control of Flexible Structures with Multiple Sensors and Actuators," Co-PIs: M. R. Sayeh, F. Pourboghrat, and M. Daneshdoost, sponsored by the Materials Technology Center and Coal Research Center at SIU-C, 2000-2001, amount: $45,442
8. "Design and Control of Smart Structures" Co-PIs: M.R. Sayeh, S.K. Dhali, S. Abrate, M. Daneshdoost, R. Etienne-Cummings, K. Farhang, L. Gupta, D. Kagaris, F. Pourboghrat, R. Viswanathan, sponsored by the Materials Technology Center at SIU-C, 1997-1999, amount: $91,494
9. "Neuroengineering Research Center," Co-PIs: M.R. Sayeh and et.al, (Project Manager: G. Galanos,) sponsored by the State of Illinois, Technology Challenge Fund, 1990-1992, amount: $600,000
10. "Smart Sensors for Composite Material Testing," Co-PIs: M.R. Sayeh and R. Viswanathan, sponsored by the Materials Technology Center at SIU-C, 1989-1991, amount: $62,000
11. "GBT-Structured Pattern Associator," PI: M.R. Sayeh, sponsored by the Office of Research Development and Administration at SIU-C, 1990, amount: $10,000
12. "Cluster Learning Systems," PI: M.R. Sayeh, sponsored by the McDonnell Aircraft Company, 1989, amount: $20,000
13. "Neural Network Research," PI: M.R. Sayeh, sponsored by the McDonnell Aircraft Company, 1989, amount: $1,800
14. "Neural Network Research,"PI: M.R. Sayeh, sponsored by Materials Technology Center at SIU-C, 1988, amount: $6,000
15. "A New Approach to Optical Pattern Recognition," PI: M.R. Sayeh, Summer Research Fellowship Award, sponsored by the Office of Research and Development and Administration at SIU-C, 1987, amount: $4,000

TECHNICAL PUBLICATIONS

Refereed:

1. "Adaptive noise-resilient deep learning for image reconstruction in multimode fiber scattering," M. Mohammadzadeh, S. Tabakhi, and M. R. Sayeh, (2024) *Applied Optics*, Vol. 63, No. 12, pp. 3003-3014.
2. "Enhancing the Analog to Digital Converter Using Proteretic Hopfield Neural Network," A. Abdulrahman, M. Sayeh, and A..Fadhil, (2024) *Neural Computing and Applications,* Vol. 36, pp. 5735-5745.

3. “An all-optical proteretic switch using semiconductor ring lasers,” A. Syed, M. Tafazoli, N. Davoudzadeh, and M. R. Sayeh, (2020) *Optics Communications*, Vol. 475, pp. 126252-126259.
4. “Coupled ring resonance and unitary groups,” J. Kocik and M. R. Sayeh, (2019) *Journal of the Optical Society of America B***,** Vol. 36, pp. 667-673, DOI: 10.1364/JOSAB.36.000667.
5. “Real-time Classifier Based on Adaptive Competitive Self-organizing Algorithm,” Z. Sarafraz and M. R. Sayeh, (2017) *Journal of Adaptive Behavior,* Vol. 26, pp. 21-31, DOI:10.1177/1059712318760695.
6. “Effects of Gain Medium Parameters on the Sensitivity of Semiconductor Ring Laser Gyroscope,” Arpit Khandelwal, Y.S. Hossein, Azeemuddin Syed, M.R. Sayeh, and Jagannath Nayak, (2017) *Optics Communications*, Vol. 398, pp. 18-23.
7. “Theoretical and Numerical Analysis of an All-Optical Delta-Sigma Modulator,” N. Davoudzadeh, M. R. Sayeh, and L. L. Goddard, *Microwave and Optical Technology Letters*, (2017), DOI: 10.1002/mop.30495.
8. "Analysis on optical bi-stability parameters in photonic switching devices," H. Sarafraz, M. R. Sayeh, (2016) *Opt. Eng.* 55(6), 066119, DOI: 10.1117/1.OE.55.6.066119.
9. “Minimizing Vehicle Noise Passing the Street Bumps Using Genetic Algorithm,” H. Sarafraz, Z. Sarafraz, M. Hodaei, and M. R. Sayeh, (2016) *Applied Acoustics,* 106:87-92. DOI:10.1016/j.apacoust.2015.11.021.
10. “Dynamic Neural Network-Observer-Based Adaptive Inverse Optimal Control Design for Unknown Nonlinear Systems”, Ayman K. Alhejji and M. R. Sayeh, (2015) *Int. J. of Industrial Electronics and Devices*.
11. “All-Optical Proteretic (Reversed-Hysteretic) Bi-stable Device,” N. Davoudzadeh, M. Tafazoli, and M. R. Sayeh, (2014) *Optics Communications*, Vol. 331, pp. 306-309.
12. “On Linearity of All Optical Asynchronous Binary Delta-Sigma Modulator,” N. Davoudzadeh, M. Tafazoli, and M. R. Sayeh, (2013) *Optics Communications*, Vol. 308, pp. 49-53.
13. “All-optical Asynchronous Binary Delta-sigma Modulator,” M. Tafazoli, N. Davoudzadeh, and M. R. Sayeh, (2013) *Optics Communications*, Vol. 291, pp. 228-231.
14. “All Optical Digital Logic Gates Library,” A. Syed, G. V. Chaitanya, and M. R. Sayeh, (2012) Journal of Optics, DOI: 10.1007/s12596-012-0076-y.
15. “Real-Time Vector Quantization and Clustering Based on Ordinary Differential Equations,” J. Cheng, M. R. Sayeh, M.R. Zargham, Q. Cheng, (2011) *IEEE Transactions on Neural Networks*, Vol. 22, No. 12, pp. 2143-2148.
16. “Effect of Various Parameters on Working of All-optical Schmitt Trigger,” S. Azeemuddin and M. R. Sayeh, (2011) *Optik*, Vol. 122, No. 21, pp 1935-1938.
17. “A Novel Fiber Optics Based Method to Measure Very Low Strains in Large Scale Infrastructures,” B. Regez, A. Mahajan, M. R. Sayeh, and F. Figueroa, (2009) *Measurement*, Vol. 42, pp. 183-188.
18. “Spinning-top Dynamics of Photorefractive Grating,” M. R. Sayeh and J.W. Park, (2008) *Optics Communications*, Vol. 281, No. 8, pp. 2309-2315.

19. “The Hopfield Neural Network with Predictive Hysteresis,” M. R. Sayeh and I. Calmese, (2008) *Intelligent Engineering Systems Through Artificial Neural Networks*, Vol. 18, Editors: C.H. Dagli, D. L. Enke, K. M. Bryden, H. Ceylan, and M. Gen, ASME Press, pp. 485-492.
20. “Lorentzian-Based Model for Clustering,” J. Cheng, M. R. Sayeh, and M. R. Zargham, (2007) *Intelligent Engineering Systems Through Artificial Neural Networks*, Vol. 17, Editors: C.H. Dagli, A. L. Buczak, D. L. Enke, M. J. Embrechts, and O. Ersoy, ASME Press, pp. 513-518.
21. “Neural Net Based Models for Clustering” with J. Cheng and M. Zargham, (2006) *International Journal of Computational Intelligence Theory and Practice*, Vol. 1, No. 2, pp. 91-105.
22. “An Unsupervised Learning Model Based on Differential Equations and Its Application to Gender Recognition,” with J. Cheng and N. Mogharraban, (2006) *International Journal of Computational Intelligence Theory and Practice*, Vol. 1, No. 1, pp. 59-65.
23. “Nonlinear Dynamics of Two-wave Coupling Process,” with A. Siahmakoun, (2004) *Optics Express*, Vol. 12, No. 13, pp. 2999-3010
24. “Analytical Solution for Nonlinear Dynamics of Photorefractive Gratings,” with A. Siahmakoun, (2003) *OSA Trends in Optics and Photonics Series*, Vol. 87, pp. 306-312.
25. “Adaptive Competitive Self-organizing Associative Memory,” with R. Athinarayanan and D.A. Wood, (2002) *IEEE Transactions on Systems, Man, and Cybernetics – Part A: Systems and Humans*, Vol. 32, No. 4, pp. 461-471.
26. “Neural Network Based Multi-mode Fiber Optic Information Transmission,” with R. Marusarz, (2001) *Applied Optics*, Vol. 40, No. 2, pp. 219-227.
27. “Multiplexed Fiber-optic Strain Sensors for Distributed Sensing,” with L. Gupta, D. Kagaris, R. Viswanathan, and B. Chung, (2000) *Distributed Optical Fiber Sensors and Measuring Networks,* Edited by Y.N. Kulchin, SPIE Selected Papers, Vol. 47-53.
28. “w-limit Set of Nonlinear Neural Network,” with R. Athinarayanan, (1999) *International Journal of Smart Engineering System Design*, Vol. 2, pp. 33-42.
29. “Limit Cycles and Stability of Critical Points of LYAM System,” with R. Athinarayanan, (1995*) Intelligent Engineering Systems Through Artificial Neural Networks*, Vol. 4, Editors: C.H. Dagli, M. Akay, C.P.L. Chen, B.R. Fernandez, and J. Ghosh, ASME Press, pp. 103-108.
30. “Clustering Based on Union and Intersection of Distance Measure: Aplied on Texture Segmentation,” with P.K. Dhali, (1994) *Neural, Parallel & Scientific Computations*,Vol. 3, pp. 219-234.
31. “The -Limit Set ofLYAM System,” with R. Athinarayanan, (1994) *Intelligent Engineering Systems Through Artificial Neural Networks*, Vol. 4, Editors: C.H. Dagli, B.R. Fernandez, J. Ghosh, and S.R.T. Kumara, ASME Press, pp. 115-120
32. "Operation of an Associative Memory," with R. Athinarayanan and M.R. Zargham, (1994) *Pattern Recognition*, Vol. 27, No. 12, pp. 1815-1821.
33. "Equilibrium States of LYAM System," with R. Athinarayanan, (1994) *Journal of Intelligent Material Systems and Structures*, Vol. 5, No. 2, pp. 160-164 (invited paper).

34. "Extrema of R-Energy Function in LYAM System," with R. Athinarayanan, (1993) *Intelligent Engineering Systems Through Artificial Neural Networks*, Vol. 3, Editors: C.H. Dagli, L. I. Bruke, B. R. Fernandez, and J. Ghosh, ASME Press, pp. 39-44.
35. "A Modified Algorithm for Training of Kohonen Network," with P. Dhali, (1993) *Intelligent Engineering Systems Through Artificial Neural Networks*, Vol. 3, Editors: C.H. Dagli, L. I. Bruke, B. R. Fernandez, and J. Ghosh, ASME Press, pp. 207-212.
36. "Gaussian Perceptron Capable of Classify 2N+1 Distinct Classes of Input Patterns," with K. Ashenayi and J. Vogh, (1992) *Control and Computers,* Vol. 20, No. 2, pp. 54-59.
37. "Study and Generalization of Cluster Learning Algorithm," with R. Athinarayanan, (1992) Heuristics, *The Journal of Knowledge Engineering*, Vol. 5, No. 2, pp. 75-88 (invited paper).
38. "Interclass Member Mapping Without Retraining the Network," with A. Ragu, (1992) *Journal of Intelligent Manufacturing*, Vol. 3, pp. 277-284 (invited paper).
39. "Multiple Threshold Perceptron Using Sinusoidal Function," with K. Ashenayi, J. Vogh, B. Karimi, and T. Baradaran, (1992) *International Journal of Modelling and Simulation*, Vol. 12, No. 1, pp. 22-26.
40. "Use of LYAM System in Texture Segmentation of Markov Modeled Images," with R. Athinarayanan and P.K. Dhali, (1992) *Intelligent Engineering Systems Through Artificial Neural Networks,* Vol. 2, Editors: C.H. Dagli, L. I. Bruke, and Y.C. Shin, ASME Press, pp. 415-420.
41. "Self-Organization of Stable Recognition Codes in an Unsupervised Classifier," with R. Athinarayanan, and H.H. Szu, (1991) *Intelligent Engineering Systems Through Artificial Neural Networks,* Editors: C.H. Dagli, S.R.T. Kumara, and Y.C. Shin, ASME Press, pp. 613-618.
42. "Stable Equilibrium States of LYAM system," with R. Athinarayanan,, (1991) *Intelligent Engineering Systems Through Artificial Neural Networks*, Editors: C.H. Dagli, S.R.T. Kumara, and Y.C. Shin, ASME Press, pp. 39-44.
43. “Optical Associative Memory,” with P. M. Varangis, (1991) *5th Oklahoma Symposium on Artificial Intelligence,* Norman, Oklahoma.
44. "Single-layer Perceptron Capable of Classifying 2N+1 Distinct Input Patterns," with K. Ashenayi, J. Vogh, H.M. Tai, and M.T. Mostafavi, (1990) *International Journal of Modelling and Simulation,* Vol. 10, No. 4, pp. 124-128.
45. "A Neural Network Approach to Robust Shape Classification," with L. Gupta and R. Tammana, (1990) *Pattern Recognition*, Vol.23, No. 6, pp. 563-568.
46. "Neural Network Models for the Learning Control of Dynamical Systems with Application to Robotics," with F. Pourboghrat, (1989) *Lecture Notes in Control and Information Sciences,* Vol. 130, Springer-Verlag.
47. "Convergence and Limit Points of Neural Network and its Applications in Pattern Recognition," with J.Y. Han and J. Zhang, (1989) *IEEE Transactions on Systems, Man, and Cybernetics,* Vol. 19, No. 5, pp. 1217-1222.
48. “Optical Resonator with External Source: Excitation of Hermite-Gaussian Modes,” with H.R. Bilger and T. Habib, (1985) *Applied Optics*, Vol. 24, pp. 3756-3761.

49. "Flicker Noise in Frequency Fluctuations of Lasers," with H.R. Bilger, (1985) *Physical Review Letters*, Vol. 55, pp. 700-702.

Conference Contributions:

1. "Image Compression: Sparse Coding vs. Bottleneck Autoencoders," Yijing Z. Watkins, Mohammad R. Sayeh, Oleksandr Iaroshenko, and Garrett Kenyon, SSIAI Proceedings, 2018.
2. "Image Data Compression and Channel Error Correction using Deep Neural Network," Yijing Z. Watkins and Mohammad R. Sayeh, Procedia Computer Science, Volume 95, 2016, Pages 145–152.
3. "Analyzing Phase-Amplitude Coupling Effects on the Dynamics of Semiconductor Ring Laser Gyroscope," A. Khandelwal, Y. S. Hossein, A. Syed, M. R. Sayeh, and J. Nayak, 2016 IEEE Photonics Conference, 29th Annual Conference of the IEEE Photonics Society held at Hawaii.
4. "Student Yield Maximization Using Genetic Algorithm on a Predictive Enrollment Neural Network Model," Z. Sarafraz, H. Sarafraz, M. R. Sayeh, J. Nicklow, Procedia Computer Science 12/2015; 61:341-348, DOI:10.1016 j.procs.2015.09.154.
5. "System Parameter Analysis on Devices with Bi-stable Characteristics," H. Sarafraz and M. R. Sayeh, IEEE 58th International Midwest Symposium on Circuits and Systems, August 2015, Fort Collins, Colorado.
6. "Dynamical Neural Networks-based Inverse Optimal Sliding Mode Controller," with Ayman Alhejji, 2016 Annual IEEE Systems Conference (SysCon), 3rd IEEE International Conference on Control, Decision and Information Technologies (CoDIT'16).
7. "Application of Artificial Neural Network for Modeling the Cleaning Performance of FGX Dry Separator," with H. Akbari, B. Zhang, and M. Mohanty (2011) R-H Yoon Symposium: Gravity Separations, Denver, Colorado.
8. "Stability Analysis of an ODE-based Vector Quantization/Clustering Model," with J. Cheng, M.R. Zargham, and Q. Cheng (2010) International Conference on Data Mining and Knowledge Engineering, Rome, Italy.
9. "A Self-Organizing Map and its Modeling for Discovering Malignant Network Traffic," with C. Langin, H. Zhou, B. Gupta, and S. Rahimi, (2009) 2009 IEEE Symposium on Computational Intelligence in Cyber Security, Nashville, TN, March 30 - April 2.
10. "Real Time Clustering Model," with J. Cheng and M.R. Zargham, (2008) Proc. of the Tenth International Conference on Enterprise Information Systems, ICEIS 2008, pp. 235-240.
11. "Design and Simulation of All-Optical Schmitt Trigger Using Semiconductor Ring Lasers," with S. Azeemuddin, (2008) the International Conference on Fiber Optics and Photonics, New Delhi, India, December 14-17.
12. "Intelligent Shape Sensor," with J. Merritt and M. T. Mostafavi, (2007) ASPE Proceedings, ASPE '07. Dallas TX.
13. "A Novel Derivation for Number of Modes in Step-Index Fiber," with M. T. Mostafavi, (2007) HONET07 Conference Proceedings

14. "Comparison of Wavelength Conversion in SOA and EDFA Fiber Ring Systems," with A. Siahmakoun, Y. Tang, S. C. Granieri, N. Hoghooghi, S. Teferra, (2006) SPIE Photonics East Proceedings
15. "Fast Spinning-Top Dynamics of Photorefractive Grating," (2005) Trends in Optics and Photonics Series, Vol. 99, pp. 434-438
16. "Binary Delta-sigma Modulator," with A. Siahmakoun, (2005) SPIE Photonics North Proceedings
17. "Analytical Solution for Nonlinear Dynamics of Photorefractive Gratings," with A. Siahmakoun, (2003) Trends in Optics and Photonics Series, Vol. 87, pp. 306-312
18. "Unsupervised Classification Using Associative Memory," with B. Li, (2002) 45th IEEE International Midwest Symposium on Circuits and Systems, Tulsa, OK, pp. I416-I418
19. "Reflection Holograms Using Peristrophic Multiplexing," with Y. Jeong, (2000) Proceedings of SPIE, Vol. 4046, pp. 34-40.
20. "Multiplexed Fiber-optic Strain Sensor System," with L. Gupta, D. Kagaris, R. Viswanathan, and B. Chung, (1999) SPIE Proceedings, Vol. 3670, pp. 385-390
21. "A Web-Based Information System for Stock Selection and Evaluation," with M. Zargham, (1999) Proceedings of WECWIS'99 Conference, pp. 143-145
22. "Fiber Optic Sensor Based System to Estimate Stress in Smart Structures," with R. Viswanathan, L. Gupta, D. Kagaris, and D. Kammeganti, (1998) SPIE Proceedings, Vol. 3330, pp. 352-361.
23. "Muliplexing of Multimode Fiber Optic Strain Sensors Using Artificial Neural Network," with S. Ahmed, B. Arianlou, (1995) SPIE Proceedings, Vol. 2622, pp. 622-671
24. "A Qualitative Approach to Analyzing Neural Network Dynamics," with R. Athinarayanan, (1995) SPIE Proceedings, Vol. 2622, pp. 672-675
25. "Analysis of Long-Term Behavioral Dynamics of an Unsupervised Pattern Classification System," with R. Athinarayanan, (1994) World Congress on Neural Networks, pp. IV223-IV228.
26. "Mode Competition in Photorefractive Resonators," with P. M. Varangis, (1992) SPIE Proceedings, Vol. 1779, pp. 260-274
27. "Image Texture Segmentation Using a Neural Network," with R. Athinarayanan and P. K. Dhali, (1992) SPIE Proceedings, Vol. 1779, pp. 252-259
28. "Use of Neural Networks in Fiber-Optic Strain Sensor," with A. N. Banerjee, (1992) 6th Oklahoma Symposium on Artificial Intelligence, Tulsa
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32. "Neural Networks for Smart Structures with Fiber Optic Sensors," with R. Viswanathan and S. K. Dhali, (1990) SPIE Proceedings, Vol. 1396, pp. 417-423
33. "Imposing a Temporal Structure in Neural Networks," with L. Gupta and A. M. Upadhye, (1990) SPIE Proceedings, Vol. 1396, pp. 266-269

34. “A Neural Network Design for Channel Routing,” with M. R. Zargham, (1990) SPIE Proceedings, Vol. 1396, pp. 202-208
35. “Class of Learning Algorithms for Multilayer Perception,” with M. Abbasi, (1990) SPIE Proceedings, Vol. 1396, pp. 237-242.
36. “Generating Good Design from Bad Design: Dynamical Network approach,” with A. Ragu, (1990) SPIE Proceedings, Vol. 1396, pp. 276-280
37. “Use of Neural Networks in Fiber Optic Smart Structures,” with R. Viswanathan and S. K. Dhali, (1989) Materially Speaking, MTC-SIUC, Vol. 6, No. 3 (invited paper)
38. “Training Neural Nets for Robust Shape Classification,” with L. Gupta and R. Tammana, (1989) Proceedings of Twenty-Seventh Annual Allerton Conference on Communication, Control, and Computing, pp. 1060-1061
39. “Application of Allan Variance and Fourier Transform in Modeling Insolation and Temperature Data,” with K. Ashenayi, (1989) Alternative Energy Sources VIII, Vol. 1 Solar Energy Fundamentals and applications, ed. T. N. Veziroglu, Hemisphere Publ., N.Y
40. “Pattern Classification Using Associative Memory,” with K. Ashenayi and S. Singh, (1988) 31st Midwest Symposium on Circuits and Systems, St. Louis, MO (invited paper)
41. “A Relaxation Model as an Associative Memory for Pattern Classification,” with F. Pourboghrat and N. S. Haider, (1988) The Proceedings of the 1988 International Conference on Advances in Communication and Control Systems Vol. II, Eds., W. A. Porter and S. C. Kak, pp. 681-687
42. “A Relaxation Model for Pattern Classification and Association,” with F. Pourboghrat, (1988) Neural Networks, Vol. 1, p. 356 (abstract)
43. “Neural Network Learning Controller for Manipulators,” with F. Pourboghrat, (1988) Neural Networks, Vol. 1, Supp. 1, p. 356 (abstract).
44. “Neural Path Planning and Motion Control of Mobile Robots,” with F.Pourboghrat, (1988) Neural Networks, Vol. 1, Supp. 1, p. 460 (abstract)
45. “Neural Networks for Planar Shape Classification,” with L. Gupta, (1988) IEEE 1988 International Conference on Acoustics, Speech, and Signal Processing, pp. 936-939
46. “Neural Networks for Motor Function Generation of Robots,” with F. Pourboghrat and M. Daneshdoost, (1988) Proceedings of the 31st Midwest Symposium on Circuits and Systems, pp. 286-289
47. “Pattern Recognition Using a Neural Network,” with J. Y. Han, (1987) Proceedings of SPIE, Vol. 848, pp. 281-285
48. “Computational Model for Sensing Depth from a 2-D Image,” with M. Daneshdoost and F. Pourboghrat, (1987) Proceedings of SPIE, Vol. 850, pp. 136-139
49. “White Noise and 1/f Noise in Optical Oscillators: State-of-the-Art in Ringlasers,” with H. R. Bilger, (1986) Noise in Physical Systems and 1/f Noise, eds. A. D’Amico and P. Mazetti, Elsevier Science Publ. B.V., pp. 293-296.
50. “Analysis of Solar Insolation Data by Means of Allan Variance and Fourier Transform,” with K. Ashenayi, (1985) Proceedings of the IASTED International Symposium: Applied Simulation and Modelling ASM ‘85, Montreal, pp. 113-116

51. “Design Considerations of a Large Laser Ring,” with H. R. Bilger, (1985) 15th Winter Colloquium on Quantum Electronics, Snowbird, UT, 9-11, January
52. “Noise Phenomena in Ring Lasers,” with H. R. Bilger, (1983) Nois in Physical Systems and 1/f Noise, Elsevier Science Publ., B. V., pp. 325-328

SERVICE ACTIVITIES

University

Member, Associate Chancellor for Institutional Diversity Screening Committee, 2009
Member, University Faculty Seed Grant Review Board, 2009-present
Senator, University Senate, 2008-2009
Member, College Ph.D. Committee, 2007-2008
Member, University Doctoral Fellowship Review Board, 2006-present
Member, University Outstanding Dissertation Committee, 2006-present
Chairman, Department Communications and Electronics Committee, 2003-present
Member, University Internal Review of Computer Science Department, 2001
Member, University Undergraduate Research Award Committee, 2000
Member, Department Undergraduate Committee, 2001-2005
Chairman, Department Electromagnetics and Optics Committee, 1988-2001
Member, Department Graduate Committee, 1991-1998
Member, Department Faculty Search Committee, 1987-1989
Member, Department Undergraduate Committee, 1987-1988
Member, Department Curriculum Committee, 1987

Professional Society Offices Held

Member of Program Committee of *International Conference on Optics, Photonics and Lasers,* 2017 - present
Member of the editorial board of *International Journal of Smart Engineering System Design*, 1996-present
Member of advisory committee of *International Journal of Smart Engineering System Design*, 1996-1999
Member of the editorial board of *The Journal of Neural Network Computing*, 1989-1991
Chairman of SIGINNS - Midwest, International Neural Network Society, 1990-1991
Point of contact for SIGINNS - Optics, International Neural Network Society, 1990-present

PROFESSIONAL ACTIVITIES

Associate Member, Graduate Faculty of the University of North Carolina at Charlotte, 2010 - 2013
Judge for the Best Paper Award, Artificial Neural networks in Engineering Conference, St. Louis, 1993, 1994.
Technical reviewer: NSF, 1991-present; IEEE Transactions on SMC, 1989-present; IEEE Journal of Quantum Electronics, 1992-present; IEEE Transactions on ASSP, 1989-present; Progress in Neural Networks, Ablex Publishing 1988; Computer, IEEE Computer Society, 1987

Technical consultant: McDonnell Aircraft Company, 1989
Organizing committee member of Artificial Neural Networks in Engineering Conference, 1991-present
Invited Speaker: Advances in Optical Neurocomputers, World Congress on Neural Networks, San Diego, 1994
Session Chair: World Congress on Neural Networks, Washington DC, 1995 and San Diego, 1994; IJCNN Conference, China, 1992; SPIE Optical Engineering Midwest-92, Chicago, 1990, 92, 93, and 95; Artificial Neural Networks in Engineering Conference, St. Louis, 1991-95; The First SIUC Workshop on Neuroengineering, 1990; Neural Networks in the 1st Annual IEEE Symposium on PDP, Dallas, 1989;
Guest Speaker: SPIE Chicago Chapter meeting, 1990; Neural Network Workshop at University of Tulsa, Oklahoma, 1989
Co-organizer, Co-editor, speaker for SIUC Workshop on Neural Networks, 1988

Society membership: Phi Kappa Phi, Eta Kappa Nu, Optical Society of America (senior member).