Juan Shan

Assistant Professor of Computer Science
Seidenberg School of Computer Science and Information Systems
Pace University, New York, NY, 10038
Phone: 212-346-1014
E-mail: jshan@pace.edu

EDUCATION

Ph.D. in Computer Science, Utah State University, Logan, UT, USA, 2011

B.S. in Computer Science, Harbin Institute of Technology, Harbin, China, 2004

RESEARCH INTERESTS

- Computer-aided Diagnosis
- Machine Learning
- Medical Image Processing
- Pattern Recognition

My research interests lie in the interdisciplinary area of biomedical imaging and machine learning. My primary focus is developing robust and efficient computer-aided diagnosis (CAD) algorithms to help doctors analyzing medical images, discovering distinguishing features, and classifying data utilizing machine learning methods. My on-going research projects include CAD systems for breast cancer, diabetic retinopathy, and knee osteoarthritis.

EMPLOYMENT

Assistant Professor Aug 2013 – present
Department of Computer Science, Seidenberg School of CSIS, Pace University

Assistant Professor Aug 2011– Aug 2013
Department of Math and Computer Science, Benedictine College

GRANTS

- SCH: EAGER: RUI: Collaborative Research: A Novel 3D Image Predictive Model for Knee Osteoarthritis Disease,
  National Science Foundation, $208,107.00, 09/15/2017-08/31/2019, Principal Investigator.
- DAISEC: Data Analytics in Cybersecurity,
  National Security Agency, $188,564.98, 09/2017-08/2018, Co-Principal Investigator.
- Distinguished Lecture Series Grant, **CRA-W**, $750.00, February 2017
- Innovative Teaching Grant, **Pace University**, $5000.00, November 2016
- Scholarly Research Committee Grant, **Pace University**, $2971.00, November 2016
- Kenan Travel Grant, **Pace University**, $1450.00, February 2016

TEACHING

Assistant Professor Aug 2013 – present

Department of Computer Science, Pace University

- Advanced Computer Vision (CS740/CS840), Spring 2018
- Computer Vision (CS631T), Spring 2017, Spring 2018
- Mathematics Structures (CS113), Fall 2013
- Computer Programming II (CS122), Spring 2014, Spring 2015, Spring 2017
- Introduction to Computing (CIS101), Spring 2014
- Computer Programming I (CS121), Fall 2014, Fall 2015, Spring 2016, Fall 2016
- Digital Image Processing (DCS861H), Fall 2015, Fall 2016
- Research Seminar for PhD (CS702/CS802), Spring 2016, Spring 2018

Assistant Professor Aug 2011– Aug 2013

Department of Math and Computer Science, Benedictine College

- Computer Architecture (CS421), Spring 2012
- Introduction of Computer Science with Java (CS114), Spring 2012
- Computer Science Fundamentals (CS101), Fall 2011 and 2012
- Applied Statistics (MA211), Spring 2012, Fall 2011 and 2012
- Operating Systems and Networking (CS440), Spring 2013

PUBLICATIONS

(* indicates student co-author)

Peer-reviewed Journal Papers

1. Y. D. Du*, R. Almajalid*, **J. Shan,** and M. Zhang, "A Novel Method to Predict Knee Osteoarthritis Progression on MRI Using Machine Learning Methods", *IEEE Trans. on NanoBioscience*, Vol. 17, Issue 3, pp. 228-236, 2018. *(Impact Factor: 2.771)*
2. W. Cao*, N. Zarnek*, **J. Shan,** and L. Li, "Microaneurysm Detection Using Principal Component Analysis and Machine Learning Methods", *IEEE Trans. on NanoBioscience*, Vol. 17, Issue 3, pp. 191-198, 2018. *(Impact Factor: 2.771)*
3. J. Malmsten*, N. Zaninovic, Q. Zhan, M. Toschi, Z. Rosenwaks, **J. Shan**, "Automatic Prediction of Embryo Cell Stages using Artificial Intelligence Convolutional Neural Network", *Fertility and Sterility*, vol. 110, no. 4, p. e360, 2018.
4. K. Thakur*, **J. Shan**, and A. K. Pathan, "Innovations of Phishing Defense: The Mechanism, Measurement and Defense Strategies", *International Journal of Communication Networks and Information Security*, Vol. 10, No. 1, 2018.
5. **J. Shan**, S.K. Alam, B. Garra, Y. Zhang and T. Ahmed, "Computer-aided Diagnosis for Breast Ultrasound Using Computerized BI-RADS Features and Machine Learning Methods", *Ultrasound Med Biol.*, Vol. 42, Issue 4, pp. 980-988, Jan. 2016. *(Impact Factor: 2.494)*
6. Y. X. Wang, H. D. Cheng and **J. Shan**, "A Novel Multiplayer Tracking System for Short Track Speed Skating", *IET Computer Vision.* Vol. 8, Issue 6, pp. 629-641, Dec. 2014.

7. **J. Shan,** H. D. Cheng and Y. X. Wang, "A Novel Segmentation Method for Breast Ultrasound Images Based on Neutrosophic L-Means Clustering", *Medical Physics.* Vol. 39, Issue 9, pp. 5669-5682, Sep. 2012. *(5-Year Impact Factor: 3.095)*
8. **J. Shan**, H. D. Cheng and Y. X. Wang, "Completely Automated Segmentation Approach for Breast Ultrasound Images Using Multiple-Domain Features", *Ultrasound Med Biol.*, Vol. 38, Issue 2, pp. 262-275, Feb. 2012. (*5-Year Impact Factor: 2.576*)
9. H. D. Cheng, **J. Shan**, W. Ju, Y. Guo and L. Zhang, "Automated Breast Cancer Detection and Classification Using Ultrasound Images: A Survey", *Pattern Recognition*, Vol. 43, Issue 1, pp. 299-317, 2010. (*5-Year Impact Factor: 3.402*)
   Ranked #4 of TOP25 Hottest Articles of Pattern Recognition July-September 2009
10. W. Ju, **J. Shan**, C. Yan and H. D. Cheng, "Discrimination of Disease-Related non-Synonymous Single Nucleotide Polymorphism using Multi-Scale RBF Kernel Fuzzy Support Vector Machine", *Pattern Recognition Letters*, Vol. 30, Issue 4, pp. 391-396, March 2009.

Peer-reviewed Conference Papers

1. R. Almajalid*, **J. Shan,** Y.D. Du*, and M. Zhang, "Development of a Deep-Learning-Based Method for Breast Ultrasound Image Segmentation", *IEEE 17th International Conference on Machine Learning and Applications (ICMLA 2018),* accepted.
2. Y. D. Du*, **J. Shan,** R. Almajalid*, and M. Zhang, "Using Whole Knee Cartilage Damage Index to Predict Knee Osteoarthritis: A Two-year Longitudinal Study", *IEEE International Conference on Bioinformatics and Biomedicine* (*BIBM 2018*), accepted. (*Acceptance rate* 19.6%)
3. M. Zhang, **J. Shan,** Y.D. Du*, and R. Almajalid, "Whole Knee Cartilage Quantification Based on Informative Locations", *IEEE International Conference on Bioinformatics and Biomedicine* (*BIBM 2018*), accepted. (*Acceptance rate 19.6%*)
4. Y. D. Du*, **J. Shan,** R. Almajalid*, and M. Zhang, "Knee Osteoarthritis Severity Level Classification Using Whole Knee Cartilage Damage Index and ANN", *IEEE Conference on Connected Health: Applications, Systems and Engineering Technologies*, Washington DC, USA, Sep. 26-28, 2018.
5. Y. D. Du*, **J. Shan,** and M. Zhang, "Knee Osteoarthritis Prediction on MR Images Using Cartilage Damage Index and Machine Learning Methods", *IEEE International Conference on Bioinformatics and Biomedicine*, Kansas City, Nov., 2017, pp. 671-677. (*Acceptance rate 19%*)
6. L. Li and **J. Shan**, "Automated Microaneurysm Detection in Fundus Images through Region Growing", *17th IEEE International Conference on Bio-Informatics and Bio-Engineering (BIBE - 2017)*, Washington D.C., Nov., 2017.
7. W. Cao*, N. Zarnek*, **J. Shan**, and L. Li, "Microaneurysm Detection in Fundus Images by Small Image Patches and Machine Learning Methods", *IEEE International Conference on Bioinformatics and Biomedicine*, Kansas City, Nov., 2017, pp. 325-331. (*Acceptance rate 19%*)
8. Li, L. & **Shan, J.**, "Automated Microaneurysm Detection in Fundus Images by Region Growing", *2017 IEEE International Conference on Biomedical and Health Informatics*, Orlando, Florida, February, 2017.
9. R.A. Mukaddim*, **J. Shan**, I. E. Kabir1, A. S. Ashik, R. Abid, Z. Yan, D. N. Metaxas, B. S. Garra, K. K. Islam and S. K Alam, "A Novel and Robust Automatic Seed Point Selection Method for Breast Ultrasound Images", *The International Conference on Medical Engineering, Health Informatics and Technology (MediTec 2016),* Dhaka, Bangladesh, Dec. 17-18, 2016.
10. N. Butt* and **J. Shan**, "CyberCare: A Novel Electronic Health Record Management System", *The First IEEE Conference on Connected health: Applications, Systems and Engineering Technologies*, Washington DC, USA, June 27-29, 2016.

11. **J. Shan** and L. Li, "A Deep Learning Method for Microaneurysm Detection in Fundus Images", *The First IEEE Conference on Connected health: Applications, Systems and Engineering Technologies*, Washington DC, USA, June 27-29, 2016.
12. **J. Shan** and L. Li, "A New Scheme to Evaluate the Accuracy of Knowledge Representation in Automated Breast Cancer Diagnosis", *The 2014 International Conference on Collaboration Technologies and Systems (CTS 2014)*, Minneapolis, Minnesota, 2014.
13. **J. Shan,** H. D. Cheng and Y. X. Wang, "Breast Ultrasound Image Segmentation Based on Neutrosophic L-means Clustering", *Int. Conf. on Image Processing (ICIP2012)*, Orlando, Florida, 2012.
14. **J. Shan**, Y. X. Wang and H. D. Cheng, "Completely Automatic Segmentation for Breast Ultrasound Using Multiple-Domain Features", *Int. Conf. on Image Processing (ICIP2010)*, Hong Kong, China, September 26-29, 2010. (*Oral acceptance rate 480/2545 = 18.8%*)
15. **J. Shan**, H. D. Cheng and Y.X. Wang, "A novel automatic seed point selection algorithm for breast ultrasound images", *Proc. of the 19th International Conference on Pattern Recognition (ICPR 2008)*, Florida, USA, Dec 8-11, 2008. (*Oral acceptance rate 295/1631 = 18.0%*)
16. **J. Shan**, H. D. Cheng and Y.X. Wang, "A completely automatic segmentation method for breast ultrasound images using region growing", *11th Joint Conference on Information Science*, Shenzhen, China, Dec 15-20, 2008.
17. Y.X. Wang, H. D. Cheng and **J. Shan**, "Detecting shadows of moving vehicles based on HMM", *Proc. of the 19th International Conference on Pattern Recognition (ICPR 2008)*, Florida, USA, Dec 8-11, 2008. (*Oral acceptance rate 295/1631 = 18.0%*)
18. **J. Shan**, Y. Wang and C. Yan, "Toward the recognition code of protein-DNA recognition", *Proc. of IEEE 7th International Symposium on BioInformatics and BioEngineering*, pp. 1290 – 1293, 2007. (*Acceptance rate 13%*)
19. **J. Shan**, W. Ju, C. Yan and H. D. Cheng, "Discrimination of Disease-Related Non-Synonymous Single Nucleotide Polymorphism Using Fuzzy Support Vector Machine", *10th Joint Conference on Information Science*, Salt Lake City, UT, USA, 2007. (*Oral presentation*)
20. W. Ju, **J. Shan**, C. Yan and H. D. Cheng, "Discrimination of Outer Membrane Proteins using Fuzzy Support Vector Machines", *10th Joint Conference on Information Science*, Salt Lake City, UT, USA, 2007.
21. M. Wacht, **J. Shan**, and X. J. Qi, "A Short-Term and Long-Term Learning Approach for Content-Based Image Retrieval", *Int. Conf. on Acoustics, Speech, and Signal Processing*, pp. 389-392, Toulouse, France, May 14-19, 2006. (*Acceptance rate 1465/3045=48%*)

SELECTED PRESENTATIONS

1. "Knee Osteoarthritis Severity Level Classification Using Whole Knee Cartilage Damage Index and ANN", poster presentation, *IEEE 3rd Conference on Connected Health: Applications, Systems and Engineering Technologies*, Washington DC, USA, September, 2018.
2. "A Novel 3D Image Predictive Model for Knee Osteoarthritis Disease", lightning talk, *NSF Connections in Smart Health Workshop & NSF SCH PI Annual Meeting*, Washington DC, USA, September, 2018.
3. "A Deep Learning Method for Microaneurysm Detection in Fundus Images", poster presentation, *IEEE 1st Conference on Connected Health: Applications, Systems and Engineering Technologies*, Washington DC, USA, June, 2016.
4. "Introduction to Basic Research Methodologies and Computer-aided Diagnosis for Breast Cancer", invited talk, *Pace University Honor Research and Thesis Forum*, March 8, 2016.

5. "Automatic Computer-aided Diagnosis for Breast Cancer", poster presentation, *Pace Research Seminar*, February, 2015.
6. "A Similarity Measurement of Clinical Trials Using SNOMED - A Preliminary Study", oral presentation, *International Conference on Collaboration Technologies and Systems (CTS 2014)*, Minneapolis, MN, May, 2014.
7. "A New Scheme to Evaluate the Accuracy of Knowledge Representation in Automated Breast Cancer Diagnosis", oral presentation, *CTS 2014*, Minneapolis, MN, May, 2014.
8. "Automatic Breast Cancer Diagnosis using Ultrasound Images", invited talk, Pace University DPS seminar, 2013.
9. "An Automatic Segmentation Method for Breast Ultrasound Images", oral presentation, *Intermountain Graduate Research Symposium 2011*, Logan, UT, March, 2011.
10. "Completely Automatic Segmentation for Breast Ultrasound Using Multiple-Domain Features", oral presentation, *Int. Conf. on Image Processing (ICIP2010)*, Hong Kong, China, September, 2010.
11. "Completely Automatic Segmentation for Breast Ultrasound", oral presentation, *Intermountain Graduate Research Symposium 2010*, Logan, UT, March, 2010.
12. "Discrimination of Disease-Related Non-Synonymous Single Nucleotide Polymorphism Using Fuzzy Support Vector Machine", oral presentation, *10th Joint Conference on Information Science*, Salt Lake City, UT, July, 2007.

AWARDS AND HONORS

- **Research Day 2014 Awardee,** Pace University, 2014
- **First Place Research Paper,** Intermountain Graduate Research Symposium, 2011
- **Dissertation Fellowship**, Utah State University, 2010
- Paper ranked #4 of **TOP25 Hottest Articles of Pattern Recognition,** July-September, 2009
- Listed on **Honor Roll of Graduate School**, Utah State University, 2006

SERVICE

Internal

- Faculty Affaires and Scholarship Release Time Committee, Seidenberg School, 2018
- Pace University Faculty Satisfaction Survey Committee (Survey delivered May 2018), 2018
- Faculty Search Committee, Department of Computer Science, 2014-2015, 2017-2018
- Seidenberg School Technical Report Committee, 2016-present
- ABET Assessment Course coordinator for CS121 and CS122, 2015-present
- Honor Thesis Supervisor, 2015-2017
- Chair of Computer Science Curriculum Committee, 2015-2016.
- Computer Science Curriculum Committee, 2014-2017
- CIS101 Review Committee, 2014-2015
- DPS Dissertation Committee, 2014-present

External

- Ad hoc reviewer for 12 journals in the field of Pattern Recognition, Biomedical and Ultrasonics,

including *IEEE Journal of Biomedical and Health Informatics* (impact factor 3.850), *Biomedical Signal Processing and Control* (impact factor 3.063), *Computer Methods and Programs in Biomedicine* (impact factor 2.840), *Artificial Intelligence Review* (impact factor 2.627), *Neural Computing and Applications* (impact factor 2.505), *Ultrasonics* (impact factor 2.028), etc.

- Program committee of International Conference of Young Computer Scientists, Engineers and Educators (ICYCSEE 2016), 2016
- Session Chair of 2014 International Conference on Collaboration Technologies and Systems, Minneapolis, MN, 2014

STUDENT ADVISING

Current Students

- Ph.D. students: Yaodong Du, Rania Almajalid, Anthony Richardson, Teresa Brooks
- DPS students: Jonas Malmsten, Ephraim Adeola, Wen Cao
- Master students: Jonathan Koller, Ian Carvalho, Rebecca D'Agostino
- Undergraduate student: Tomer Alon

Graduated Students

- Ph.D. student: Kutub Thakur (April 2018, Faculty at New Jersey City University)
- Undergraduate students: Choenyi Gangshar (Honor Thesis 2017), Nida Butt (Honor Thesis 2016), Sabiya Bacchus (Independent Study 2015)