Juan Shan

Assistant Professor of Computer Science
Seidenberg School of Computer Science and Information Systems
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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: A Novel 3D Image Predictive Model for 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.
- Computing Research Association-Woman DLS Grant, **CRA-W**, $750.00, February 2017
- Innovation Grant, **Pace University**, $5000.00, November 2016
- Scholarly Research Committee Grant, **Pace University**, $2971.00, November 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)

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*, accepted, 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*, accepted, 2018. *(Impact Factor: 2.771)*
3. 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.
4. **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)*
5. 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.
6. **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)*

7. **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*)
8. 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
9. 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. 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%*)
2. 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.
3. 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%*)
4. 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.
5. 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.
6. 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*, June 27-29, Washington DC, USA, 2016.
7. **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*, June 27-29, Washington DC, USA, 2016.
8. **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.
9. **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.
10. **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%*)
11. **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%*)

12. **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.
13. 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%*)
14. **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%*)
15. **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,* 2007. (*Oral presentation*)
16. 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,* 2007.
17. 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. "A Deep Learning Method for Microaneurysm Detection in Fundus Images", *The First IEEE Conference on Connected health: Applications, Systems and Engineering Technologies*, June, Washington DC, USA, 2016.
2. "Automatic Computer-aided Diagnosis for Breast Cancer", *Pace Research Seminar*, February, 2015.
3. "A Similarity Measurement of Clinical Trials Using SNOMED - A Preliminary Study", *The 2014 International Conference on Collaboration Technologies and Systems (CTS 2014)*, Minneapolis, MN, May, 2014.
4. "A New Scheme to Evaluate the Accuracy of Knowledge Representation in Automated Breast Cancer Diagnosis", *CTS 2014*, Minneapolis, MN, May, 2014.
5. "Automatic Breast Cancer Diagnosis using Ultrasound Images", Invited talk, Pace University DPS seminar, 2013.
6. "An Automatic Segmentation Method for Breast Ultrasound Images", *Intermountain Graduate Research Symposium 2011*, Logan, UT, March, 2011.
7. "Completely Automatic Segmentation for Breast Ultrasound Using Multiple-Domain Features", *Int. Conf. on Image Processing (ICIP2010)*, Hong Kong, China, September, 2010.
8. "Completely Automatic Segmentation for Breast Ultrasound", *Intermountain Graduate Research Symposium 2010*, Logan, UT, March, 2010.
9. "Discrimination of Disease-Related Non-Synonymous Single Nucleotide Polymorphism Using Fuzzy Support Vector Machine", *10th Joint Conference on Information Science*, Salt Lake City, UT, July, 2007.

AWARDS AND HONORS

- **Kenan Fund Award,** Pace University, 2016
- **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 several journals in the field of Pattern Recognition, Biomedical and Ultrasonics, including Artificial Intelligence Review, Information, Neural Computing and Applications, International Journal of Pattern Recognition and Artificial Intelligence, 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
- DPS students: Jonas Malmsten, Ephraim Adeola, Wen Cao
- Undergraduate student: Tomer Alon

Graduated Students
- Ph.D. student: Kutub Thakur (April 2018, New Jersey City University)
- Undergraduate students: Nida Butt, Choenyi Gangshar, Sabiya Bacchus