

CURRICLM VITAE OF DR. HONGJIAN SHI

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SCIENTIFIC RESEARCH AND DEVELOPMENT

I have been doing research and teaching in pattern recognition and image reconstruction and processing, applying my knowledge and skills in mathematics to existing or new research and industrial product development. It may be summarized in the following fields or aspects :

1. Image and video processing including image and video segmentation, registration, compression, video analytics and related pattern recognition and machine learning
2. CT/CBCT imaging and image processing, 2D panoramic imaging, registration and navigation of images with different modalities
3. Imaging diagnosis of pathologies including detection, visualization, auto-measurement of pathological sites
4. Computer vision and pattern recognition including 3D morphology visualization and biomechanical modeling of surgical planning and image guided surgeries

EDUCATION BACKGROUND

- 2002.08-2007.12 , PhD, *Medical Imaging*, Department of Electrical and Computer Engineering, University of Louisville, USA
- 1999.01-2001.09 , MA of Applied Science, *Image and Video Processing*, Department of Electrical and Computer Engineering, The University of British Columbia, Canada
- 1993.08-1998.05 , MA, PhD, *Real Analysis*, Department of Mathematics and Statistics, Simon Fraser University, Canada
- 1984.09-1987.07 , MA, *Harmonic Analysis*, Department of Mathematics, Peking University
- 1980.09-1984.07 , Bachelor, *Mathematics Education*, Henan Normal University

WORK EXPERIENCES

- 2019.8 – , Professor, Program of Computer Science and Technology, Division of Science and Technology, Beijing Normal University-Hong Kong Baptist University United International College, China
- 2016.12-2019.8, Research Professor, Department of Electrical and Electronic Engineering, Southern University of Science and Technology, China
- 2015.04-2016.12, Research Scientist, Edda Technology, USA
- 2014.11-2015.04, Researcher, Clear Video, USA
- 2013.09-2014.11, Chief Video Engineer, Care Cam, USA
- 2007.01-2013.09, Senior Research Scientist, Dental Imaging Technologies, Danaher, USA
- 2006.01-2007.01, Research Scientist, Imaging Sciences International, USA
- 2002.08-2006.01, Research Scientist, CVIP Lab, University of Louisville, USA
- 2004.01-2005.12, Research Associate, Dental School, University of Louisville, USA
- 2000.10-2002.07, Senior Engineer, Ward Laboratories, Canada
- 1998.08-1999.01, Assistant Professor, Department of Applied Mathematics, University of Wisconsin, USA

- 1987.07-1993.08, Lecturer, Department of Applied Mathematics, Nanjing University of Science and Technology, China

TEACHING EXPERIMENTENCE

- 2019.08 – present, Professor, Computer and Technology, Beijing Normal University – Hong Kong Baptist University United International College, China
 - Course taught:
 - Data Mining and Knowledge Discovery, Fall 2019
 - Graduates
 - 2 master students 2019: Ziwen Dong, Xi Zhang
- 2016.12 – 2019.08, Research Professor / Visiting, Department of Electrical and Electronic Engineering, Southern University of Science and Technology, China
 - Courses taught:
 - Pattern Recognition, Spring 2019
 - Pattern Recognition Experiments, Spring 2019
 - Pattern Recognition, Spring 2018, student/colleague rate: 100/94
 - Pattern Recognition Experiments, Spring 2018, student/colleague rate: 99/100
 - Pattern Recognition, Spring 2017, student/colleague rate: 97.65/98
 - Pattern Recognition Experiments, Spring 2017, student/colleague rate: 97.65/98
 - Image and Video Processing, Fall 2017, 2018, student rate: 95
 - Image and Video Processing Experiments, Fall 2017
 - Innovation and Experiment, 2017, 2018, Spring 2019
 - Innovation Frontier, Spring 2018
 - Graduates
 - 2 master students 2017: Siyu He, Xiaoting He
 - Guiding them 3 research papers, their opening proposals, and their theses.
 - 4 master students 2018: Benxiang Jiang, Minmin Bi, Siyuan Li, Hang Dong
 - Finished 1 research papers
 - Undergraduates (2018) – leading 7 students for their graduation theses and accomplished 7 research papers
 - Wanli Chen – won one of 10 best students in Southern University of Science and Technology with excellent graduate thesis, and got an offer from Microsoft Research Asia but will go abroad for PhD study
 - Siyuan Li – got admitted to graduate study without examination with excellent graduate thesis
 - Minmin Bi – got admitted to graduate study without examination and refused Huawei offer and won the first award for undergraduate innovation in Guangdong
 - Danxia Lu – got the highest score for graduation thesis and an offer from Huawei
 - Songze Zhang – got the first award for undergraduate innovation in Guangdong and a research assistant with me
 - Yufu Lin – has been working in Micon Research
 - Benxiang Jiang – a student from Department of Biomedical Engineering, got admitted to graduate study
 - Undergraduates (2019) – leading 5 students for their graduation theses and accomplished 3 research papers
 - Liang Tian, Changjie Pan, Tingkang Wang, Yunlai Li
 - Education Research

- Have been doing education practice to training students for high technology career, there are 3 undergraduates went to Huawei, Tencent, Nano Research Institute, and 4 undergraduates are pursuing Master or PhD.
- Applied for a major education research project of Shenzhen Education Bureau and got defense opportunity
- 1998.08-1999.01, Assistant Professor, Department of Applied Mathematics, University of Wisconsin, USA
- 1987.07-1993.08, Lecturer, Department of Applied Mathematics, Nanjing University of Science and Technology, China
 - Taught various mathematics courses including Real Analysis, Functional Analysis, Complex Analysis, Calculus, Linear Algebra, Polynomials and Transforms, Trigonometric Series

PROFESSIONAL HONORS AND ACTIVITIES

- Won the *Albert Nelson Marquis Lifetime Achievement Award* from *THE MARQUIS WHO'S WHO PUBLICATIONS BOARD* for unwavering excellence in medical imaging, 2017
- Won the *Scientific Reviewer Award* from *The American Academy of Oral and Maxillofacial Radiology* for service as one of top five manuscript reviewers for *Journal of Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology*, 2016
- Won *one of the ten most popular products* rated by <<DENTAL REPORTS>>, 2009 (the main creator of the product "Tru-Pan Imaging System")
- Won *one of nine Danaher Innovation Award* for creation of Tru-Pan Imaging product, 2008
- Senior Member of International Association of Electronic and Electric Engineers since 2009
- Member of International Association of Dental and Maxillofacial Imaging and Radiology since 2007
- Reviewer of *Journal of Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology* since 2006
- Reviewer of *Proceeding of International Conference of Image Processing*, 2007-2013
- Reviewer of *Proceeding of International Conference of Medical Image Computing and Computer Assisted Intervention*, 2005-2009
- Technical program committee member of *International Conference of Information, Technologies and Management (ICISTM)*, 2012
- Technical program committee member of *International Conference of Connected Vehicles and Expo*, 2012, 2013

PATENTS AND PUBLICATIONS (equal contribution or communication author denoted with *)

1. W. Chen, R. Ward, **H. Shi*** "Image Expansion via Edge Neighbor Interpolation and Guided Image Filtering", *IEEE Transactions on Image Processing*, submitted in Sept. 2018, and in revision.
2. L. W. Y. Liu, A. Kandawal, Q. Cheng, **H. Shi***, I. Tobore, Z. Nie, Non-Invasive Blood Glucose Monitoring Using a Curved Goubau Line, *Electronics* 8(6) 662, 1-12, 2019. <https://doi.org/10.3390/electronics8060662>.
3. B. Jiang, Y. Zhang, X. Tang, **H. Shi***, "Region Growing With Edge Restriction for Multiple Roots Segmentation REGION", The 3rd International Symposium on Image Computing and Digital Medicine, Xi'an, China, Aug. 2019
4. Y. Zhang, J. Wu, W. Chen, Y. Liu, J. Lyu, **H. Shi***, Y. Chen, Ed X. Wu, X. Tang*, "Fully Automatic White Matter Hyperintensity Segmentation using U-net and Skip Connection", *41st Annual International Conference of the IEEE Engineering in Medicine and Biology*, Berlin, Germany, July 2019

5. W. Chen, Y. Zhang, J. He, Y. Qiao, Y. Chen, **H. Shi**, X. Tang, E. X. Wu, "Prostate Segmentation using 2D Bridged U-net", *The international Joint Conference on Neural Networks*, Budapest, Hungary, July 2019.
6. L. W. Y. Liu, A. Kandawal, Q. Cheng, **H. Shi***, I. Tobore, Z. Nie, Non-Invasive Blood Glucose Monitoring Using a Curved Goubau Line, *Electronics* 8(6) 662, 1-12, 2019. <https://doi.org/10.3390/electronics8060662>.
7. L. W. Y. Liu, A. Kandwal, **H. Shi***, Q. S. Cheng, "Wireless Power Transfer Using an RF Plasma", *IEEE Access*, Vol.6, No. 1, 73905-73915, December 2018.
8. S. Zhang, J. Xie, **H. Shi***, "Jaw segmentation from CBCT images", *The 23rd IEEE International Conference on Digital Signal Processing (DSP)*, Shanghai, China, November 2018.
9. S. He, **H. Shi***, "Segmentation of bony tissues from CBCT images", *The 23rd IEEE International Conference on Digital Signal Processing (DSP)*, Shanghai, China, November 2018.
10. D. Lu, **H. Shi***, "A SIFT-Based Image Fusion Method", *The 14th IEEE International Conference on Signal Processing (ICSP)*, Beijing, China, August 2018.
11. W. Chen, Y. Zhang, J. He, Y. Qiao, Y. Chen, **H. Shi**, X. Tang, "W-net: Bridged U-net for 2D Medical Image Segmentation", *Computer Vision and Pattern Recognition*, <https://arxiv.org/pdf/1807.04459>, July 2018.
12. Y. Zhu, W. Chen, X. Zhan, Z. Guo, **H. Shi*** & I. G. Harris, "Head Mounted Pupil Tracking Using Convolutional Neural Network", *Computer Vision and Pattern Recognition*, <https://arxiv.org/abs/1805.00311>, April 2018.
13. W. Chen, **H. Shi***, "An Edge Based Adaptive Interpolation Algorithm for Image Scaling", *IEEE Future Technologies Conference (FTC)*, Vancouver, Canada, November 2017.
14. S. Zhang, **H. Shi***, "An Improvement of the Canny Edge Based Image Expansion Algorithm", *The 10th International Congress on Image and Signal Processing, BioMedical Engineering and Informatics (CISP-BMEI)*, Shanghai, China, October 2017.
15. W. Chen, Y. J. Yu and **H. Shi***, "An Improvement of Edge-Adaptive Image Scaling Algorithm Based on Sobel Operator," *2017 4th International Conference on Information Science and Control Engineering (ICISCE)*, Changsha, Hunan, China, 2017
16. **H. Shi**, L. Zhang, "Elementary Real Analysis", *Shanghai Education Publishing*, December 2015.
17. P. Jouhikainen, D. A. Sebok, B. S. Carlson, **H. Shi**, M. Parma etc., "PANORAMIC IMGAING USING MULTI-SPECTRAL X-RAY SOURCE":
 - US10405813, App. Date 2/4/2015, Grant date 9/10/2019;
 - EP16154275A/EP3053525A3, App. Date 2/4/2016, Pub. date 9/21/2016, Patent Pending;
 - JP2016-140762A, App. Date 1/28/2016, Pub. Date 8/8/2016, Pending;
 - KR20160096024A, App. Date 2/1/2016, Pub. Date 8/12/2016, Pending;
 - CN105832357A, App. Date 2/4/2016, Pub. Date 8/10/2016, Patent Pending.
18. **H. Shi**, A. Singh, E. Marandola, U. Mundry, S. Kreang-arekul, "Dental imaging using segmentation and master arches":
 - JP6002201B2, App. Date 12/5/2014, Grant Date 10/5/2016
19. **H. Shi**, A. Singh, E. Marandola, U. Mundry, S. Kreang-arekul, "DENTAL IMAGING USING SEGMENTATION AND AN ARCH":
 - US8548120B2, App. Date 12/4/2012, Grant Date 10/1/2013.
20. **H. Shi**, A. Singh, E. Marandola, U. Mundry, S. Kreang-arekul, "Panoramic dental imaging using segmentation and a master arch":
 - US832574B2, App. Date 7/30/2010, Grant Date 12/4/2012;

- JP5663015B2, App. Date 7/30/2010, Grant Date 2/4/2015;
 - KR101850557B1, App. Date 7/30/2010, Grant Date 4/19/2018;
 - CN102573644B, App. Date 7/31/2010, Grant Date 7/1/2015;
 - EP2459070A4, App. Date 6/6/2012, Pub. Date 4/23/2014;
 - WO2011014786A1, App. Date 7/30/2010, Pub. Date 2/3/2011
21. **H. Shi**, “Tru-Pan Imaging” - *a novel imaging product, Dental Imaging Technologies Incorporation, Danaher Group, Hatfield, USA, 2009.*
 22. **H. Shi**, E. Marandola, A. Singh, “True Panoramic Images from CBCT Data Sets”, *The 17th International Congress of Dental Maxillofacial Radiology*, June 28 – July 2 2009.
 23. **H. Shi**, A. Singh, “Adaptive Thickness Panoramic Imaging”, *Danaher Innovation Conference*, Washington, USA, August 2008.
 24. **H. Shi**, A. Farag, R. Fahmi, and D. Chen, “Validation of Finite Element Models of Liver Tissue using Micro-CT”, *IEEE Transactions on Biomedical Engineering*, Vol. 55, No. 3, 978-984, March 2008.
 25. R. R. Resapu, R. D. Bradshaw, A. Farag, **H. Shi***, “Finite Element Analysis of Liver Tissue Modeled Using Micro-CT”, *Proceedings of the XIth International Congress and Exposition*, Orlando, Florida, USA, June 2008.
 26. **H. Shi**, W. C. Scarfe, and A. G. Farman, “Three-dimensional reconstruction of individual cervical vertebrae from cone beam CT images,” *American Journal of Orthodontics and Dentofacial Orthopedics*, Volume 131, Issue 3, 426-432, March 2007.
 27. **H. Shi**, “Finite Element Modeling of Soft Tissue Deformation”, 144 pages, a book published by *ProQuest Information and Learning Company*, Ann Arbor, MI, Dec. 2007.
 28. **H. Shi**, W. C. Scarfe, and A. G. Farman, “Estimation of mandibular rotational torque during mouth opening,” (**invited oral presentation**), *The 16th International Congress of Dental Maxillofacial Radiology*, 120, June 2007.
 29. **H. Shi**, W. C. Scarfe, and A. G. Farman, “Maxillary Sinus 3D Segmentation and Reconstruction from Cone Beam CT Data Sets,” *International Journal of Computer Assisted Radiology and Surgery*, Volume 1, Number 2, 83-89, June 2006.
 30. **H. Shi**, W. C. Scarfe, and A. G. Farman, “Upper airway segmentation and dimensions estimation from cone-beam CT image datasets,” *International Journal of Computer Assisted Radiology and Surgery*, Volume 1, Number 3, 177-186, Oct. 2006.
 31. **H. Shi**, R. Fahmi, “Energy Minimization within the F.E. Framework to Predict Liver Tissue Deformation”, *International Journal on Graphics, Vision, and Image Processing*, Special Issue on Medical Image Processing, Volume 6, 97-103, Jan. 2006.
 32. A. A. Farag, **H. Shi***, R. Fahmi, and M. Voor, “Basic Experiments and Finite Element Analysis of Soft tissues”, *Biomechanics Applied to Computer Assisted Surgery*, (Yohan Payan, Ed.), Research Signpost, Kerala, India, Chapter 12, 193-208, ISBN 81-308-0031-4, 2005.
 33. **H. Shi**, R. Fahmi, and A. Farag, “Validation Framework of the F.E. Modeling of Liver Tissue,” *Lecture Notes in Computer Science: Medical Image Computing and Computer-Assisted Intervention – MICCAI 2005*, Springer Verlag, New York, Volume 3749, 531-538, Oct. 2005.
 34. A. El-Baz, S.E. Yuksel, **H. Shi**, A. Farag, M.A. El-Ghar, T. Eldiasty, and M. A. Ghoneim, “2D and 3D Shape Based Segmentation Using Deformable Models,” *Lecture Notes in Computer Science:*

- Medical Image Computing and Computer-Assisted Intervention – MICCAI 2005*, Springer Verlag, New York, Volume 3750, 821-829, Oct. 2005.
35. **H. Shi**, A. A. Farag, “Validating linear elastic and linear visco-elastic models of lamb liver tissue using cone-beam CT”, *Proceedings of Computer Assisted Radiology and Surgery (CARS), International Congress Series*, Volume 1281, 473-478, June 2005.
 36. **H. Shi** and A. Farag, “Intensity and Region-of-Interest Based Finite Element Modeling of Brain Deformation”, *Proceedings of Computer Assisted Radiology and Surgery (CARS), International Congress Series*, Volume 1268, 373-377, June 2004.
 37. **H. Shi**, N. Kharna, and R. Ward, “Novel set-theoretic definitions of common fuzzy hedges, theory and application,” *Journal of Intelligent and Fuzzy Systems*, Volume 15, Number 2, 105-114, 2004.
 38. **H. Shi**, and R. Ward, “Canny edge based image expansion,” *Proceedings of IEEE International Symposium on Circuits and Systems - ISCAS 2002*, Volume I, 785-788, May 2002.
 39. Q. Wang, R. Ward and **H. Shi**, “Isophote estimation by cubic-spline interpolation,” *Proceedings of IEEE International Conference on Image Processing – ICIP 2002*, Volume 3, 401-404, 2002.
 40. **H. Shi**, “A Type of Path Derivatives,” *Real Analysis Exchange* 28, no.2, 279-286, 2002/03.
 41. **H. Shi**, “Prevalent properties of continuous functions”, Invited report at annual conference of American Mathematical Society, Notices of the AMS, Volume 48, No. 10, 189, Nov. 2001.
 42. **H. Shi**, R. Ward, N. Kharna, “Expanding the definitions of linguistic hedges”, *Proceedings of IFSA World Congress and 20th NAFIPS International Conference*, 2591-2595, June 2001.
 43. **H. Shi**, “Prevalence of Some Known Typical Properties in Function Spaces,” *Acta Mathematica Universitatis Comenianae*, Volume 70, No. 2, 185-192, 2001.
 44. **H. Shi**, R. Ward, “A novel compression technology”, Industry Liaison Office, University of British Columbia, October 2000.
 45. **H. Shi**, “Shyness of Sets in the Space of Automorphisms on $[0, 1]$,” *Acta Mathematica Hungarica*, Volume 89, Issue 1/2, 135-147, 2000.
 46. **H. Shi**, B. S. Thomson, “Prevalent Properties in Function Spaces”, *Real Analysis Exchange*, Volume 24, No. 1, 113-116, 1998/99.
 47. **H. Shi** and B. S. Thomson, “Haar null sets in the space of automorphisms on $[0, 1]$,” *Real Analysis Exchange*, Volume 24, No. 1, 337-350, 1998/99.
 48. **H. Shi**, “Measure-theoretic notions of prevalence”, *PhD Dissertation, Simon Fraser University*, Vancouver, Canada, 1997.
 49. **H. Shi**, “Some typical properties of symmetrically continuous functions, symmetric functions, and continuous functions”, *Real Analysis Exchange*, Volume 21, No. 2, 708-714, 1995/96.
 50. **H. Shi**, “Weighed norm inequalities of some maximal operators”, *Journal of Nanjing University of Science and Technology*, Volume 3, 89-73, 1992.
 51. **H. Shi**, “A two weight inequality of a potential operator”, *Journal of Nanjing University of Science and Technology*, Volume 1, 63-66, 1990.
 52. **H. Shi**, “Weighted norm inequalities for the vector-valued Hardy-Littlewood maximal functions of one parameter rectangles”, *Approximation in Theory and Applications*, Volume 5, No. 1, 87-96, March 1989.