

YONGGANG SHI, PH.D.

CURRICULUM VITAE

The Institute for Neuroimaging and Informatics
Keck School of Medicine, University of Southern California
Phone: 323-442-7246 Email: yonggans@usc.edu

EDUCATION

- Southeast University, Nanjing, China
B.S. in Electrical Engineering, 1993–1996
- Southeast University, Nanjing, China
M.S. in Electrical Engineering, 1996 –1999
- Boston University, Boston, MA, USA
Ph.D. in Electrical Engineering, 1999–2005
- UCLA School of Medicine, Los Angeles, CA, USA
Postdoctoral training in Brain Imaging, 2005–2009

PROFESSIONAL EXPERIENCE

- Tenure-Track Assistant Professor, Institute for Neuroimaging and Informatics, Keck School of Medicine, University of Southern California, 2013--present
- Assistant Professor, Department of Neurology, UCLA School of Medicine, 2009—2013
- Intern, Siemens Corporate Research, Princeton, NJ, USA. 2004
- Visiting scholar, I3S Laboratory, University of Nice-Sophia Antipolis, France. 2003

HONORS AND AWARDS

- Best Paper Award, MMBIA, 2008
- Winner of Student Paper Competition at ICASSP, 2005
- Outstanding Master Thesis Award, Jiangsu Province, China, 1999

Research Support

1. NIBIB K01EB013633 (PI: Shi), 4/01/12-3/31/17, \$154,300/year
Intrinsic Modeling and Tracking of Neuroanatomy in Alzheimer's Disease
This is a Mentored Research Scientist Development Award. The goal is to obtain training in neuroanatomy, biostatistics, MR imaging, multimodal analysis, and develop novel software tools for AD research.
Role: PI
2. NMSS RG4752-A-3 (PI: Sicotte), 7/01/12-6/30/14, \$64,000/year
Tracking Hippocampal Subregional Atrophy in Multiple Sclerosis: Effects of Estriol Treatment
This project will use novel surface mapping methods to study hippocampal changes in MS patients enrolled in a clinical trial of estriol therapy.
Role: Subcontract PI.

Publications (peer reviewed research papers)

1. **Y. Shi**, W. C. Karl, D. A. Castañón, Dynamic tomography using curve evolution with spatial-temporal regularization, *Proc. ICIP*, vol.2, pp. 22-25, 2002.
2. **Y. Shi**, J. Konrad, W. C. Karl, Multiple motion and occlusion segmentation with a multiphase level set method, *Proc. VCIP*, pp. 189-197, 2004.
3. **Y. Shi**, W. C. Karl, Differentiable minimin shape distance for incorporating topological priors in biomedical imaging, *Proc. ISBI*, vol.2, pp. 1247-1250, 2004.
4. **Y. Shi**, W. C. Karl, Level set methods for dynamic tomography, *Proc. ISBI*, vol.1, pp. 620-623, 2004.
5. S. Venkatesh, **Y. Shi**, W. C. Karl, Performance guarantees in sensor networks, *Proc. ICASSP*, vol.2, pp. 269-272, 2004.
6. **Y. Shi**, W. C. Karl, Shape reconstruction from unorganized points with a data-driven level set method, *Proc. ICASSP*, vol.3, pp. 17-21, 2004.
7. **Y. Shi**, W. C. Karl, A fast level set method without solving PDEs, *Proc. ICASSP*, vol.2, pp. 97-100, 2005. (**Winner of Student Paper Competition**)
8. **Y. Shi**, W. C. Karl, Real-time tracking using level sets, *Proc. CVPR*, vol.2, pp. 34-41, 2005.
9. H. Shen, **Y. Shi**, Z. Peng, Applying prior knowledge in the segmentation of 3D complex anatomic structures, *Proc. International Workshop on Computer Vision for Biomedical Image Applications (CVBIA)*, pp. 189-199, 2006.
10. **Y. Shi**, A. L. Reiss, A. D. Lee, R. A. Dutton, U. Bellugi, A. Galaburda, J. Korenberg, D. Mills, I. Dinov, P. M. Thompson, A. W. Toga, Hamilton-Jacobi skeletons on cortical surfaces with applications in characterizing the gyrification pattern in Williams syndrome, *Proc. ISBI*, pp. 660-663, 2007.
11. **Y. Shi**, Z. Tu, A. L. Reiss, R. A. Dutton, A. D. Lee, A. Galaburda, I. Dinov, P. M. Thompson, A. W. Toga, Joint sulci detection using graphical models and boosted priors, *Proc. IPMI*, pp. 98-109, 2007.
12. **Y. Shi**, P. M. Thompson, I. Dinov, S. Osher, A. W. Toga, Direct cortical mapping via solving partial differential equations on implicit surfaces, *Medical Image Analysis*, 11(3), pp.207-223, 2007.
13. **Y. Shi**, P. M. Thompson, G. I. de Zubicaray, S. Rose, Z. Tu, I. Dinov, A. W. Toga, Direct mapping of hippocampal surfaces with intrinsic shape context, *NeuroImage*, 37(3), pp.792-807, 2007.
14. X. Liu, W. Mio, **Y. Shi**, I. Dinov, Xiuwen Liu, N. Lepore, F. Lepore, M. Fortin, P. Voss, M. Lassonde, P. Thompson, Models of normal variation and local contrasts in hippocampal anatomy, *Proc. MICCAI*, vol. 2, pp. 407-415, 2008.
15. **Y. Shi**, R. Lai, K. Kern, N. Sicotte, I. Dinov, A. W. Toga, Harmonic surface mapping with laplace-beltrami eigenmaps, *Proc. MICCAI*, vol. 2, pp. 147-154, 2008.
16. **Y. Shi**, R. Lai, S. Krishna, N. Sicotte, I. Dinov, A. W. Toga, Anisotropic Laplace-Beltrami eigenmaps: bridging reeb graphs and skeletons, *Proc. MMBIA*, 2008. (**Best Paper Award**)
17. **Y. Shi**, W. Clem Karl, A real-time algorithm for the approximation of level-set-based curve evolution, *IEEE Trans. Image Process.*, 17(5), pp. 645-657, 2008.
18. **Y. Shi**, P. M. Thompson, I. Dinov, A. W. Toga, Hamilton-Jacobi skeleton on cortical surfaces, *IEEE Trans. Med. Imag.*, 27(5), pp.664-673, 2008.

19. **Y. Shi**, Z. Tu, A. L. Reiss, R. A. Dutton, A. D. Lee, A. Galaburda, I. Dinov, P. M. Thompson, A. W. Toga, Joint sulcal detection on cortical surfaces with graphical models and boosted priors, *IEEE Trans. Med. Imag.*, 28(3), pp.361-373, 2009.
20. X. Liu, **Y. Shi**, J. Morra, X. Liu, P. M. Thompson, W. Mio, Mapping hippocampal atrophy with a multi-scale model of shape, *Proc. ISBI*, pp. 879-882, 2009.
21. V. Patel, **Y. Shi**, P. M. Thompson, A. W. Toga, Mesh-based spherical deconvolution for physically valid fiber orientation reconstruction via diffusion-weighted MRI, *Proc. ISBI*, pp. 614-617, 2009.
22. R. Lai, **Y. Shi**, I. Dinov, T. F. Chan, A. W. Toga, LAPLACE-BELTRAMI nodal counts: a new signature for 3D shape analysis, *Proc. ISBI*, pp.694-697, 2009.
23. **Y. Shi**, J. Morra, P. M. Thompson, A. W. Toga, Inverse-consistent surface mapping with Laplace-Beltrami eigen-features, *Proc. IPMI*, pp. 467-478, 2009.
24. **Y. Shi**, I. Dinov, A. W. Toga, Cortical Shape Analysis in the Laplace-Beltrami Feature Space, *Proc. MICCAI*, pp. 208-215, 2009.
25. N. Lepore, **Y. Shi**, F. Lepore, M. Fortin, P. Voss, Y. Chou, C. Lord, M. Lassonde, I. Dinov, A. W. Toga, P. M. Thompson, Patterns of Hippocampal Shape and Volume Differences in Blind Subjects, *NeuroImage*, 46(4), pp. 949-957, 2009 .
26. X. Liu, **Y. Shi**, Y. Wang, P. M. Thompson, W. Mio, A Riemannian model of regional degeneration of the hippocampus in Alzheimer's disease, *Proc. ISBI*, pp. 237-240, 2010.
27. R. Lai, **Y. Shi**, K. Scheibel, S. Fears, R. Woods, A. W. Toga, T.F.Chan, Metric-Induced Optimal Embedding for Intrinsic 3D Shape Analysis, *Proc. CVPR*, pp. 2871-2878, 2010.
28. **Y. Shi**, B. Sun, R.Lai, I.Dinov, A.W.Toga, Automated Sulci Identification via Intrinsic Modeling of Cortical Anatomy, *Proc. MICCAI*, pp. 49-56, 2010.
29. X. Liu, **Y. Shi**, I. Dinov, W. Mio, A Computational Model of Multidimensional Shape, *International Journal of Computer Vision*, 89(1), pp. 69-83, 2010.
30. V. Patel, **Y. Shi**, P. M. Thompson, A. W. Toga, Mesh-Based Spherical Deconvolution: A Flexible Approach to Reconstruction of Non-Negative Fiber Orientation Distributions, *NeuroImage*, 51(3), pp. 1071-1081, 2010 .
31. **Y. Shi**, R. Lai, J. Morra, I. Dinov, P. M. Thompson, A. W. Toga, Robust Surface Reconstruction via Laplace-Beltrami Eigen-Projection and Boundary Deformation, *IEEE Trans. Med. Imag.*, 29(12), pp. 2009-2022, 2010.
32. S. G. Costafreda, I. Dinov, Z. Tu, **Y. Shi**, C. Liu, I. Klowzewska, P. Mecocci, H. Soininen, M. Tsolaki, B. Vellas, L. Walhund, C. Spenger, A. W. Toga, S. Lovestone, A. Simmons, Automated hippocampal shape analysis predicts the onset of dementia in Mild Cognitive Impairment. *NeuroImage*, 56(1), pp.212-219, 2011.
33. Y. Jin, **Y. Shi**, N. Jahanshad, I. Aganj, G. Sapiro, A.W. Toga, P.M. Thompson. 3D Elastic Registration Improves HARDI-Derived Fiber Alignment and Automated Tract Clustering. *Proc. ISBI*, pp. 822-826, 2011.
34. V. Patel, **Y. Shi**, P.M. Thompson, A. W. Toga. K-SVD for HARDI Denoising. *Proc. ISBI*, pp.1805-1808, 2011.
35. **Y. Shi**, R. Lai, A. W. Toga, CoRPORATE: Cortical Reconstruction by Pruning Outliers with Reeb Analysis and Topology-preserving Evolution. *Proc. IPMI*, pp. 233-244, 2011.

36. **Y. Shi**, R. Lai, R. Gill, D. Pelletier, D. Mohr, N. Sicotte, A. W. Toga, Conformal Metric Optimization on Surface (CMOS) for Deformation and Mapping in Laplace-Beltrami Embedding Space, *Proc. MICCAI*, Vol 2, pp. 327-34, 2011.
37. Y. Jin, **Y. Shi**, S. Joshi, N. Jahanshad, L. Zhan, G. de Zubicaray, K. McMahon, N. Martin, M. Wright, A. W. Toga, P. Thompson, Heritability of White Matter Fiber Tract Shapes: A HARDI Study of 198 Twins, *Proc. MBIA*, pp.35-43, 2011.
38. R. Lai, **Y. Shi**, N. Sicotte, A. W. Toga, Automated Corpus Callosum Extraction via Laplace-Beltrami Nodal Parcellation and Intrinsic Geodesic Curvature Flows on Surfaces, *Proc. ICCV*, pp. 2034-2040, 2011.
39. S. M. Gold, M. F. O'Connor, R. Gill, K. C. Kern, **Y. Shi**, R. G. Henry, D. Pelletier, D. C. Mohr, N. L. Sicotte, Detection of altered hippocampal morphology in multiple sclerosis associated depression using automated surface mesh modeling. *Human Brain Mapping*, 2012, in press.
40. Y. Jin, **Y. Shi**, L. Zhan, J. Li, G. de Zubicaray, K. McMahon, N. Martin, M. Wright, P. Thompson, Automatic Population HARDI White Matter Tract Clustering by Label Fusion of Multiple Tract Atlases, *Proc. MBIA 2012*:147-156.
41. J. Li, **Y. Shi**, G. Tran, I. Dinov, D. J. Wang, A. W. Toga, Fast Diffusion Tensor Registration with Exact Reorientation and Regularization, *Proc. MICCAI*, 15(2):138-145,2012.
42. **Y. Shi**, R. Lai, A. W. Toga, Unified Geometry and Topology Correction for Cortical Surface Reconstruction with Intrinsic Reeb Analysis, *Proc. MICCAI*, 15(1):610-608, 2012.
43. J. Li, Y. Jin, **Y. Shi**, I. Dinov, D. J. Wang, A. W. Toga, and P. M. Thompson, Voxelwise Spectral Diffusional Connectivity and its Applications to Alzheimer's Disease and Intelligence Prediction, *Proc. MICCAI*, 2013, in press.
44. J. Li, **Y. Shi**, I. Dinov, and A. W. Toga, Locally weighted multi-atlas construction, *Proc. MBIA*, 2013, in press.
45. J. Li, **Y. Shi**, G. Tran, I. Dinov, D. J. Wang, and A. W. Toga, Fast Local Trust Region Techniques for Diffusion Tensor Registration using Exact Reorientation and Regularization, *IEEE Trans. Med. Imag.*, 2013, in press.
46. J. Zhan, I. Dinov, J. Li, Z. Zhang, S. Hobel, Y. Shi, X. Lin, A. Zamanyan, L. Feng, G. Teng, F. Fang, Y. Tang, F. Zang, A. W. Toga, and S. Liu, Spatial-temporal Atlas of Human Fetal Brain Development During the Early Second Trimester, *NeuroImage*, 82:115-126, 2013.
47. **Y. Shi**, R. Lai, A.W. Toga, and ADNI, Cortical Surface Reconstruction via Unified Reeb Analysis of Geometric and Topological Outliers in Magnetic Resonance Images, *IEEE Trans. Med. Imag.*, 32(3):511-530, 2013.
48. **Y. Shi**, R. Lai, and A.W. Toga, Conformal Mapping via Metric Optimization with Application for Cortical Label Fusion. *Proc. IPMI 2013*: 244-255.
49. G. Tran and **Y. Shi**, Adaptively Constrained Convex Optimization for Accurate Fiber Orientation Estimation with High Order Spherical Harmonics. *Proc. MICCAI*, 2013, in press.
50. **Y. Shi**, R. Lai, D. J. Wang, D. Pelletier, D. Mohr, N. Sicotte, A. W. Toga, Metric Optimization for Surface Analysis in the Laplace-Beltrami Embedding Space, *submitted to IEEE Trans. Med. Imag.*, 2013.

TEACHING EXPERIENCE

- Lead the Special Interest Group on Connectomics at LONI
- The Ph.D. students and PostDocs I co-advise and their research projects
 - **Yan Jin (Ph.D. student)**: Automated algorithms for fiber bundle clustering from high angular resolution diffusion imaging (HARDI) data.

- **Nic Novak (Ph.D. student):** White matter shape analysis using diffusion imaging data.
- **Giang Tran(Ph.D. student):** HARDI reconstruction and analysis.
- **Junning Li (PostDoc):** DTI registration and connectivity analysis.

PROFESSIONAL ACTIVITIES

- Reviewer for: NeuroImage, IEEE Transactions on Medical Imaging, IEEE Transactions on Biomedical Engineering, Cerebral Cortex, Brain Imaging and Behavior, NeuroInformatics, PLoS ONE, IEEE Transactions on Pattern Analysis and Machine Intelligence, IEEE Transactions on Image Processing, IEEE Transactions on Signal Processing, IEEE Signal Processing Letters, Machine Vision and Applications Journal, SIAM Journal on Scientific Computing, CVPR, ISBI, MICCAI