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| <b>Education</b>           | <b>Doctor of Philosophy</b><br>Sept. 2004 – Sept. 2008        | <b>Electrical Engineering and Computer Science, Massachusetts Institute of Technology (MIT)</b><br>Cambridge, MA.<br>Advisor: Professors W. E. L. Grimson, W. M. Wells, and C.-F. Westin<br>Thesis: Tract-Oriented Quantitative Analysis of Cerebral White Matter Anatomy from Diffusion MRI.<br>GPA: 5.0/5.0   |
|                            | <b>Master of Science</b><br>Sept. 2000 – Sept. 2002           | <b>Electrical and Computer Engineering, University of Tehran,</b><br>Tehran, Iran.<br>Advisor: Professors H. Soltanian-Zadeh and A. Afzali-Kusha.<br>Thesis: Fast 3D Skeletonization and Quantification of Microvascular Structures.  |
|                            | <b>Bachelor of Science</b><br>Sept. 1996 – Sept. 2000         | <b>Electrical and Computer Engineering, University of Tehran,</b><br>Tehran, Iran.<br>Thesis: Implementation of Passive Elements in Microwave Integrated Circuits.  |
| <b>Research Experience</b> | <b>Computer Vision Scientist</b><br>Jan. 2009 – to date       | <b>Visualization and Computer Vision Laboratory, GE Global Research, Niskayuna, NY.</b> <ul style="list-style-type: none"><li>• Created software package for automatically analyzing diffusion MRI, and integrated it as a downloadable extension to 3D Slicer, an open source platform for analyzing medical images. This module uses machine-learning techniques to cluster trajectories and enables statistical analysis along the cluster centerlines.</li><li>• Developed the first physically meaningful method to construct virtual un-enhanced images from dual energy computed tomography.</li><li>• Designed software for analysis of contrast-enhanced computed tomography images to minimize user interaction, and automatically track respiratory motion. This had a significant effect on the reproducibility and 80% reduction in processing time.</li></ul> |
|                            | <b>Graduate Research Assistant</b><br>Sept. 2004 – Sept. 2008 | <b>Computer Science and Artificial Intelligence Laboratory, MIT,</b><br>Cambridge, MA. <ul style="list-style-type: none"><li>• Developed a new algorithm for probabilistic clustering of fiber trajectories, incorporating anatomical atlases as prior information in a Bayesian framework.</li><li>• Enabled statistical analysis along the arc-length of each bundle by introducing an efficient method to establish point correspondences between the trajectories.</li><li>• Conducted a diffusion MRI population study on Schizophrenia, from pre-processing the diffusion data to performing statistical analysis along the bundles of white-matter fiber trajectories.</li></ul>   |

**Graduate Research Assistant**

Sept. 2003 – Sept. 2008

**Surgical Planning Laboratory, Brigham and Women’s Hospital, Boston, MA.**

- Evaluated the accuracy of four automatic segmentation tools (SPM, KNN, EM and FSL) for medical images, using Simultaneous Truth and Performance Level Estimation (STAPLE).

**Graduate Research Assistant**

Sept. 2001 – Aug. 2003

**Signal and Image Processing, Institute of Theoretical Physics and Mathematics, Tehran, Iran.**

- Developed two new fully-automated centerline extraction methods based on path-planning and snake model.
- Performed quantitative analysis of vascular images using the extracted centerlines by the above methods.

**Journal Publications**

1. **M. Maddah**, W. E. L. Grimson, S. K. Warfield, W. M. Wells, “A unified framework for clustering and quantitative analysis of white matter fiber tracts,” *Medical Image Analysis*, vol. 12, no. 2, pp. 191-202, 2008.
2. D. Goldberg-Zimring, A. U. J. Mewes, **M. Maddah**, S. K. Warfield, “Diffusion tensor magnetic resonance imaging in multiple sclerosis,” *Neuroimaging*, vol. 15, pp. 68S-81S, 2005.
3. H. Soltanian-Zadeh, A. Shahrokni, M. Khalighi, Z. G. Zhang, R. A. Zoroofi, **M. Maddah** and M. Chopp, “3-D quantification and visualization of vascular structures from confocal microscopic images using skeletonization and voxel-coding,” *Computers in Biology and Medicine*, vol. 35, no. 9, pp. 791-813, 2005.
4. **M. Maddah**, H. Soltanian-Zadeh, A. Afzali-Kusha, A. Shahrokni and Z. G. Zhang, “Three-dimensional analysis of complex branching vessels in confocal microscopy images,” *Computerized Medical Imaging and Graphics*, vol. 29, no. 6, pp. 487-498, 2005.
5. **M. Maddah**, H. Soltanian-Zadeh and A. Afzali-Kusha, “Snake modeling and distance transform approach to vascular centerline extraction and quantification,” *Computerized Medical Imaging and Graphics*, vol. 27, no. 6, pp. 503-512, 2003.
6. S. Bolouki, **M. Maddah**, A. Afzali-Kusha and M. El Nokali, “A unified I-V model for PD/FD SOI MOSFETs with a compact model for floating body effects,” *Solid-State Electronics*, vol. 47, no. 11, pp. 1909-1915, 2003.
7. **M. Maddah**, A. Afzali Kushaa, H. Soltanian-Zadeh, “Efficient centerline extraction for quantification of vessels in confocal microscopy images,” *Medical Physics*, vol. 30, no. 2, pp. 204-211, 2003.

**Peer-Reviewed Conference Papers**

1. **M. Maddah**, P. Mendonca, R. Bhotika, “Physically meaningful virtual unenhanced image reconstruction from dual-energy CT,” to be presented at *IEEE Int. Symp. Biomedical Imaging (ISBI)*, Netherland, April 2010.
2. **M. Maddah**, M. Kubicki, W.M. Wells, C.-F. Westin, M.E. Shenton, and W.E.L. Grimson, “Findings in schizophrenia by tract-oriented DTI analysis,” presented at *Medical Image Computing and Computer-Assisted Intervention (MICCAI)*, New York, NY, Sept. 2008.

3. **M. Maddah**, L. Zöllei, W.E.L. Grimson, and W.M. Wells, "Modeling of anatomical information in clustering of white matter fiber trajectories using Dirichlet distribution," *Mathematical Methods in Biomedical Image Analysis (MMBIA)*, Anchorage, AK, June 2008.
  4. **M. Maddah**, L. Zöllei, W.E.L. Grimson, C.-F. Westin, and W.M. Wells, "A mathematical framework for incorporating anatomical knowledge in DT-MRI analysis," *IEEE Int. Symp. Biomedical Imaging (ISBI)*, Paris, France, May 2008.
  5. **M. Maddah**, W.M. Wells, S.K. Warfield, C.-F. Westin, and W.E.L. Grimson, "Probabilistic clustering and quantitative analysis of white matter fiber tracts," *Information Processing in Medical Imaging (IPMI)*, Netherlands, 2007.
  6. **M. Maddah**, W.E.L. Grimson, and S.K. Warfield, "Statistical modeling and EM clustering of white matter fiber tracts," *IEEE Int. Symp. Biomedical Imaging (ISBI)*, pp. 53-56, 2005.
  7. **M. Maddah**, A.U.J. Mewes, S. Haker, W.E.L. Grimson, and S.K. Warfield, "Automated atlas-based clustering of white matter fiber tracts from DTMRI," *Medical Image Computing and Computer-Assisted Intervention (MICCAI)*, Palm Spring, CA, pp. 188-195, 2005.
  8. **M. Maddah**, K.H. Zou, W.M. Wells, R. Kikinis, and S.K. Warfield, "Automatic optimization of segmentation algorithms through simultaneous truth and performance level estimation (STAPLE)," *Medical Image Computing and Computer-Assisted Intervention (MICCAI)*, Saint-Malo, France, pp. 274-282, 2004.
  9. **M. Maddah**, A. Afzali Kushaa, and H. Soltanian-Zadeh, "Efficient medial curve extraction of microvascular structures in confocal microscopy images," *Int. Conf. Diagnostic Imaging and Analysis*, Shanghai, China, pp. 119-124, August, 2002.
  10. **M. Maddah**, A. Afzali Kushaa, and H. Soltanian-Zadeh, "Fast centerline extraction for quantification of vessels in confocal microscopy images," *IEEE Int. Symp. Biomedical Imaging (ISBI)*, pp. 461-464, Washington, D.C., July 2002.
- Other Selected Publications**
1. **M. Maddah**, M. Kubicki, C.-F. Westin, W.E.L. Grimson, "Analysis of white matter integrity and brain asymmetry in schizophrenia: a diffusion MRI study," *Human Brain Mapping (HBM)*, San Francisco, CA, 2009.
  2. **M. Maddah**, A.U.J. Mewes, H. Als, G. McAnulty, W.E.L. Grimson, and S.K. Warfield, "Investigation of neonate brain development enabled by tract-oriented quantification," *Proceedings of International Society for Magnetic Resonance in Medicine Eleventh Scientific Meeting and Exhibition (ISMRM)*, Toronto, Canada, May 2008.
  3. **M. Maddah**, W. M. Wells, S. K. Warfield, C-F. Westin, and W. E. L. Grimson, "A spatial model of white matter fiber tracts," *Proceedings of International Society for Magnetic Resonance in Medicine Eleventh Scientific Meeting and Exhibition (ISMRM)*, Berlin, Germany, 2007.

- Oral Presentations**
- “Diffusion MRI”, (to) GE Healthcare, Niskayuna, 2009.
  - “DTI tract-oriented analysis and findings in Schizophrenia”, Psychiatry Neuroimaging Laboratory, Harvard, 2008.
  - “Probabilistic clustering and quantitative analysis of white matter fiber tracts”, *Information Processing in Medical Imaging(IPMI)*, Netherlands, 2007.
  - “An EM approach for fiber clustering from Diffusion MRI”, Computation Radiology Laboratory, Children’s Hospital, Boston, 2007.
  - “Atlas-based clustering of white matter fiber tracts”, MIT, Boston, 2005.
  - “Automatic optimization of segmentation algorithms through simultaneous truth and performance level estimation (STAPLE)”, *Medical Image Computing and Computer-Assisted Intervention (MICCAI)*, Saint-Malo, France, 2004 (presented by Simon Warfield).
  - “Fast centerline extraction for quantification of vessels in confocal microscopy images”, *IEEE Int. Symp. Biomedical Imaging (ISBI)*, Washington, D.C., 2002 (presented by Hamid Soltanian-Zadeh).
  - “Centerline extraction methods for vascular structures”, Institute of Theoretical Physics and Mathematics, Tehran, Iran, 2002.
- Teaching Experience**      **Teaching Assistant**      Probabilistic Systems Analysis and Applied Probability (Graduate Course), Electrical Engineering and Computer Science, MIT.  
Sept. 2007 – Dec. 2007
- Professional Activities**      **Reviewer**
- IEEE Transaction on Visualization and Computer Graphics
  - NeuroImage
  - Medical Image Computing and Computer-Assisted Intervention