Patents Applications

[1] R. Shekhar, **V. Walimbe**, "Techniques for 3-D Elastic Spatial Registration of Multiple Modes of Measuring a Body," 2006.
[2] R. Shekhar, V. Zagrodsky, **V. Walimbe**, "Segmentation of Regions in Measurements of a Body based on a Deformable Model," 2006.
[3] R. Shekhar, **V. Walimbe**, "Quantitative, real-time 4D stress echo analysis," 2007.

Funded Grant Proposals

Funding Agency: The American Heart Association (Ohio Valley Affiliate)
Award: Predoctoral Fellowship/Portfolio (AHA #: 0415141B)
Role: Principal Investigator **Duration**: 07/2004 – 06/2006
Registration and Quantitative Analysis of 3D Echocardiography & SPECT for Improved Diagnosis of Coronary Artery Disease
Specific aims: (1) To develop techniques for automatic multimodality fusion of RT3D echo and cardiac SPECT images, (2) to develop algorithms for automatic quantitative analysis of myocardial function and perfusion from fused multimodality images, and (3) to evaluate the effectiveness of the image registration and quantitative analysis techniques for diagnosis of ischemic heart disease.
Short-term goal: To demonstrate technical feasibility and clinical utility of the proposed quantitative multimodality diagnostic procedure. *Long-term benefit*: The research will help reduce morbidity and mortality, patient discomfort and healthcare cost of cardiovascular disease through more accurate diagnosis of coronary artery disease.
Program description: The American Heart Association (AHA) is the largest funding agency for basic and clinical research in the field of cardiovascular science and medicine. The AHA Predoctoral Fellowship is a research-funding program for predoctoral candidates, wherein the funding is awarded based on competitive evaluation of applications by a peer-review committee. Applications are evaluated and ranked based on (1) quality of the research proposal submitted by the applicant, (2) potential of the applicant, and (3) quality of facilities provided by the candidate's sponsor (advisor) and institution.
Average merit score: 1.455 (scale of 1-5, best possible score of 1.0).
Percentile rank: 7.89 (0.01% - 99.99%, lowest percentile rank given to the most meritorious ranked application).

Journal Publications

[1] **V. Walimbe**, W.A. Jaber, R. Shekhar, "Interactive, Quantitative Multimodality Cardiac Stress Testing: A Novel Approach Combining Real-Time 3D Echocardiography and Myocardial Perfusion SPECT," *Journal of Nuclear Medicine*, 2008 (under review).
Journal Impact Factor: 5.362; Immediacy Index: 0.816

[2] **V. Walimbe**, M. Garcia, O. Lalude, J. Thomas, R. Shekhar, "Quantitative real-time three-dimensional stress echocardiography: A preliminary investigation of feasibility and effectiveness," *Journal of the American Society of Echocardiography*, **20(1):13-22, 2007**
Journal Impact Factor: 1.427; Immediacy Index: 0.185

[3] **V. Walimbe**, R. Shekhar, "Automatic elastic image registration by interpolation of 3D rotations and translations from discrete rigid-body transformations," *Medical Image Analysis*, **10: 899-914, 2006**.
Journal Impact Factor: 3.212; Immediacy Index: 0.389

[4] R. Shekhar, **V. Walimbe**, S. Raja, V. Zagrodsky, M. Kanvinde, G. Wu, B. Bybel, "Automated Three-Dimensional Elastic Registration of Whole-Body PET and CT from Separate or Combined Scanners," *Journal of Nuclear Medicine*, 46(9):1488-96, 2005.
Journal Impact Factor: 5.362; Immediacy Index: 0.816
Paper featured exclusively on the cover page of volume #46(9) of the journal.

[5] V. Zagrodsky, **V. Walimbe**, C.R. Castro-Pareja, J. Qin, J. M. Song, R. Shekhar, "Registration-assisted segmentation of real-time 3D echocardiographic data using deformable models," *IEEE Transactions on Medical Imaging*, 24(9):1089-99, 2005.
Journal Impact Factor: 3.922; Immediacy Index: 0.426

[6] **V. Walimbe**, V. Zagrodsky, S. Raja, W.A. Jaber, F.P. DiFilippo, M.J. Garcia, R.C. Brunken, J. D. Thomas, R. Shekhar "Mutual information-based multimodality registration of cardiac ultrasound and SPECT images: A Preliminary Investigation," *International Journal of Cardiovascular Imaging*, 19:483-94, 2003.
Journal Impact Factor: 0.789; Immediacy Index: 0.122

[7] R. Shekhar, V. Zagrodsky, C. R. Castro-Pareja, **V. Walimbe**, J. M. Jagadeesh, "High-speed 3D and 4D medical image registration using voxel similarity," *Radiographics*, 23(6): 1673-1681, 2003.
Journal Impact Factor: 2.494; Immediacy Index: 0.399

Referred Conference Proceedings

[8] J. Wu, O. Dandekar, **V. Walimbe**, W. D'Souza, and R. Shekhar, "Automatic prostate localization using elastic registration of planning CT and daily 3D ultrasound images," *Proceedings of SPIE (Medical Imaging 2007, San Diego, California, USA)*, 2007.

[9] **V. Walimbe**, V. Zagrodsky, R. Shekhar, "Fully automatic segmentation of left ventricular myocardium in real-time three-dimensional echocardiography", *Proceedings of SPIE (Medical Imaging 2006, San Diego, California, USA)*, 2006. **(Cum Laude poster award)**

[10] **V. Walimbe**, O. Dandekar, F. Mahmood, R. Shekhar, "Automated 3D elastic registration for improving tumor localization in whole-body PET-CT from combined scanner", *Proceedings of the 28th Annual International Conference of the IEEE: Engineering in Medicine and Biology Society*, 2006.

[11] O. Dandekar, **V. Walimbe**, and R. Shekhar, "Hardware Implementation of Hierarchical Volume Subdivision-based Elastic Registration," *Proceedings of the 28th Annual International Conference of the IEEE: Engineering in Medicine and Biology Society*, 2006.

[12] O.Dandekar, K. Siddiqui, **V. Walimbe**, R. Shekhar, "Image registration accuracy with low-dose CT: How log can we go?", *Proceedings of International Symposium on Biomedical Imaging (ISBI 2006, Arlington, Virginia, USA)*, 2006.

[13] **V. Walimbe**, V. Zagrodsky, S. Raja, B. Bybel, M. Kanvinde, R. Shekhar, "Elastic registration of three-dimensional whole body CT and PET images by quaternion-based interpolation of multiple piecewise linear rigid-body registrations", *Proceedings of SPIE (Medical Imaging 2004, San Diego, California, USA)*, 5370: 119-128, 2004.

[14] R. Shekhar, V. Zagrodsky, **V. Walimbe**, "3D Stress Echocardiography: Development of novel visualization, registration and segmentation algorithms," *Proceedings of Computer Assisted Radiology and Surgery (CARS 2004)*, 1072-77, 2004.

Abstracts/Presentations

[15] **V. Walimbe**, W.A. Jaber, M.G. Martin, J.K. Drinko, R. Young, R. Shekhar, "Registration of Real-Time 3D Echocardiography & SPECT: Towards Multimodality Stress Testing for Improved Diagnosis of Coronary Artery Disease", *Radiological Society of North America (RSNA 2006)*.

[16] **V. Walimbe**, O. Lalude, M. Garcia, R. Shekhar, "Quantitative three-dimensional stress echocardiography: Development of a novel software suite of visualization and fully automatic quantitative analysis tools," *American Heart Association Scientific Sessions 2005 (AHA 2005)*.

[17] R. Shekhar, **V. Walimbe**, S. Raja, M. Kanvinde, G. Wu, B. Bybel, "Improving registration of combined whole-body PET/CT," *Radiological Society of North America (RSNA 2005)*.

[18] V. Zagrodsky, **V. Walimbe**, C. R. Castro-Pareja, J. Qin, J.M. Song, R. Shekhar, "Automatic segmentation of real-time 3-D echocardiographic data sequence by registration-initialized deformable models," *Radiological Society of North America (RSNA 2005)*.

[19] R. Shekhar, P. Lei, **V. Walimbe**, C. Yu, W. D'Souza, "A novel algorithm to register phase-correlated lung CT images," *47th Annual Meeting of American Association of Physicists in Medicine (AAPM 2005)*.

[20] R. Shekhar, V. Zagrodsky, C. R. Castro-Pareja, **V. Walimbe**, and J. M. Jagadeesh, "High-speed 3D and 4D medical image registration using voxel similarity," *Radiological Society of North America (RSNA 2002)*.