

Ross T. Whitaker

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EDUCATION

- 1/89 to 10/93 **The University of North Carolina** Chapel Hill, NC
Department of Computer Science: Ph.D. 1993, M.S. 1991.
 - Course work emphasized computer vision, graphics, visualization, and parallel systems.
 - Dissertation in nonuniform diffusion for image segmentation (advisor: S.M. Pizer).
 - University of North Carolina Alumni Fellowship 1992-93.
- 9/82 to 6/86 **Princeton University** Princeton, NJ
Electrical Engineering and Computer Science/Engineering Physics, B.S. June 1986.
 - G.P.A. 3.8/4.0.
 - Summa cum laude, Phi Beta Kappa, Tau Beta Pi.

WORK

EXPERIENCE

- 8/03–present **University of Utah** Salt Lake City, UT
Associate Professor—School of Computing
 - Research and teaching in image processing, computer vision, and visualization.
 - Executive member of the Scientific Computing and Imaging Institute (SCI).
- 8/00–8/03 **University of Utah** Salt Lake City, UT
Assistant Professor—School of Computing
- 3/96 to 7/00 **University of Tennessee** Knoxville, TN
Assistant Professor—Department of Electrical Engineering.
 - Research in image processing, computer vision, and visualization.
 - Built a research program of approximately \$360k/year.
- 1/94 to 3/96 **European Computer-Industry Research Centre (ECRC)** Munich, Germany
Research Scientist—User Interaction and Visualization Group
 - Developed new modeling methods for 3d segmentation and reconstruction.
 - Built an object-oriented image processing platform.
 - Researched and developed technologies for augmented reality.
 - Led a small group of researchers and developed funded European research collaborations in excess of 2M DM.
- 9/89 to 10/93 **The University of North Carolina** Chapel Hill, NC
Research Assistant—Medical Image Analysis and Display Group
 - Developed geometry-limited diffusion as a method for segmenting images on the basis of homogeneity in multiscale geometric structure.
 - Developed algorithms and interactive tools for hierarchical image segmentation on the basis of image geometry.
- 9/86 to 8/88 **The Boston Consulting Group** Boston, MA
Management Consultant
 - Responsible for structuring analysis of business problems in a variety of industries.
 - Responsible for conducting analysis, formulating conclusions, and presenting findings to clients.
- summer 1985 **M.I.T. Lincoln Laboratory** Lexington, MA
Intern—IC Laser Restructuring Research Group
 - Investigated feasibility of real-time image-processing system based on a wafer-scale parallel processor.
 - Created preliminary design for a microprocessor-controlled video processing system.

HONORS AND AWARDS

- NSF CAREER Award (Signal Processing Systems Program, 2000)
- University of Tennessee 1997, College of Engineering/Allied Signal Award for Outstanding Research and Teaching.
- University of North Carolina, Alumni Fellowship, 1993.
- Princeton University 1986: Summa Cum Laude, Phi Beta Kappa, Tau Beta Pi.

PUBLICATIONS

Refereed Journals

1. G. Kindlmann, D. B. Ennis, R. Whitaker, C.-F. Westin, “Diffusion Tensor Analysis With Invariant Gradients and Rotation Tangents”, *IEEE Trans. Med. Imaging*, 26(11): 1483–1499, 2007.
2. M. Meyer, B. Nelson, R. Kirby, R. Whitaker, “Particle Systems for Efficient and Accurate High-Order Finite Element Visualization”, *IEEE Trans. Visualization and Computer Graphics*, 13(5): 1015–1026, 2007.
3. S. Awate, R. Whitaker, “Feature-Preserving MRI Denoising using a Nonparametric, Empirical-Bayes Approach”, *IEEE Trans. Medical Imaging*, 26(9):1242-1255, 2007.
4. G. Adluru, S. Awate, T. Tasdizen, R. Whitaker, E. Dibella, “Temporally Constrained Reconstruction of Dynamic Cardiac Perfusion MRI”, *Magnetic Resonance in Medicine*, 57:1027-1036, 2007.
5. S. Awate, T. Tasdizen, R. Whitaker, N. Foster, “Adaptive, Nonparametric Markov Modeling for Unsupervised, MRI Brain-Tissue Classification”, *Medical Image Analysis*, 10(5):726-739, 2006.
6. S. Awate, R. Whitaker, “Unsupervised, Information-Theoretic, Adaptive Image Filtering for Image Restoration”, *IEEE Trans. on Pattern Analysis and Machine Intelligence*, 28(3), 2005, pp. 364–376.
7. K. Museth, D.E. Breen, R.T. Whitaker, S. Mauch and D. Johnson, “Algorithms for Interactive Editing of Level Set Models,” *Computer Graphics Forum*, 24(4), pp. 821–841, 2005.
8. J. Cates, R. Whitaker, G. Jones, ”Case Study: An Evaluation of User-Assisted Hierarchical Watershed Segmentation”, *Medical Image Analysis*, 9(6), 2005.
9. R. Whitaker, “Modeling Deformable Surfaces with Level Sets”, *IEEE Computer Graphics and Applications*, 24(5), 2004, pp. 6–9.
10. J. Cates, A.E. Lefohn, R. Whitaker, “GIST: An Interactive GPU-Based Level-Set Segmentation Tool for 3D Medical Images”, *Medical Image Analysis*, 8(3), 2004, pp. 217–231.
11. A. E. Lefohn, J. M. Kniss, C. D. Hansen, R. T. Whitaker, ”A Streaming Narrow-Band Algorithm: Interactive Deformation and Visualization of Level Sets,” *IEEE Trans. Visualization and Computer Graphics*, 10(40), 2004, pp. 422–433.
12. T. Tasdizen, R. Whitaker, “Higher-order nonlinear priors for surface reconstruction”, *IEEE Trans. on Pattern Recognition and Machine Intelligence*, 26(7), 2004, pp. 878–891.
13. T. Tasdizen, R. Whitaker, P. Burchard, S. Osher, “Geometric surface processing via normal maps”, *ACM Trans. on Graphics*, 22(4), 2003, pp. 1012–1033.
14. L. Zhukov, K. Museth, D. Breen, R. Whitaker, A. Barr, “Level Set Modeling and Segmentation of DT-MRI Brain Data,” *Journal of Electronic Imaging*, 12(1), January 2003, pp. 125-133.
15. R. Whitaker, V. Elangovan, “A direct approach to estimating surfaces in tomographic data”, *Journal of Medical Image Analysis*, 6(3), 2002, pp. 235–249.

16. R. Whitaker, J. Gregor, "A maximum likelihood surface estimator for dense range data", *IEEE Trans. on Pattern Analysis and Machine Intelligence*, 24(10), October 2002, pp. 1372–1387.
17. R. Whitaker, E. L. Valdes-Juarez, "On the reconstruction of height functions and terrain maps from dense range data", *IEEE Trans. on Image Processing*, 11(7), 2002, pp. 704–716.
18. J. Gregor, R. Whitaker, "Indoor scene reconstruction for sets of noisy range images", *Graphical Models* 63(5), Sept. 2002, pp. 304–332.
19. D. Breen, R. Whitaker, "A level-set approach to 3D shape metamorphosis", *IEEE Trans. on Visualization and Computer Graphics*, 7(2), 2001, pp. 173–192.
20. R. Whitaker, "A level-set approach to image blending", *IEEE Trans. on Image Processing*, 9(11), Nov. 2000, pp. 1849–1861.
21. A. Mangan, R. Whitaker, "Partitioning 3D surface meshes using watershed segmentation", *IEEE Trans. on Visualization and Computer Graphics*, 5(4), Dec. 1999, pp. 308–321.
22. D. L. Elsner, R. Whitaker, and M. A. Abidi, "Volumetric modeling of objects and scenes using range images," *Digital Signal Processing: A Review Journal*, 9(2), April 1999, pp. 120–135.
23. S. G. Burgiss, R. Whitaker, and M. A. Abidi, "Range image segmentation through pattern analysis of the multi-scale wavelet transform," *Digital Signal Processing: A Review Journal*, 8(4), Oct. 1998, pp. 267–276.
24. R. Whitaker, "A level-set approach to 3D reconstruction from range data", *International Journal of Computer Vision*, 29(3), Oct. 1998, pp. 203–231.
25. G.J. Klinker, K.H. Ahlers, D.E. Breen, P.-Y. Chevalier, C. Crampton, D.S. Greer, D. Koller, A. Kramer, E. Rose, M. Tuceryan, R. Whitaker, "Confluence of computer vision and interactive graphics for augmented reality", *PRESENCE*, 6(4), Aug. 1997.
26. M. Tuceryan, D. Greer, R. Whitaker, D. Breen, C. Crampton, E. Rose, K. Ahlers, "Calibration requirements and procedures for a monitor-based augmented reality system", *IEEE Trans. on Visualization and Computer Graphics*, 1(3) Sept. 1995, pp. 255–273.
27. W. Snyder, Y.-S. Han, G. Bilbro, R. Whitaker, S.M. Pizer, "Image relaxation: restoration and feature extraction," *IEEE Trans. on Pattern Analysis and Machine Intelligence*, 17(6), June 1995, pp. 620–624.
28. R. Whitaker, "Geometry-limited diffusion in the characterization of geometric patches in images," *CVGIP: Image Understanding*, 57(1), Jan. 1993, pp. 99–110.
29. R. Whitaker, S.M. Pizer, "A multiscale approach to nonuniform diffusion," *CVGIP: Image Understanding*, 57(1), Jan. 1993, pp. 111–120.
30. T.S. Yoo, U. Nuemann, H. Fuchs, S.M. Pizer, T. Cullip, J. Rhoades, R. Whitaker, "Direct visualization of volume data," *IEEE Computer Graphics and Applications*, 12(4), July 1992, pp. 63–71.

Conference proceedings—full paper review

1. W.-K. Jeong, P. Fletcher, R. Tao, R. Whitaker, "Interactive Visualization of Volumetric White Matter Connectivity in DT-MRI using a Parallel-Hardware Hamilton-Jacobi Solver", *Proc. IEEE Visualization*, 1480–1487, 2007
2. M. Meyer, R. Kirby, R. Whitaker, "Topology, Accuracy, and Quality of Isosurface Meshes Using Dynamic Particles". *Proc. IEEE Visualization*, 1704–1711, 2007.
3. S. Gerber, T. Tasdizen, R. Whitaker, "Robust non-linear dimensionality reduction using successive 1-dimensional Laplacian Eigenmaps", *Proc. Intl. Conf. on Machine Learning*, 281–288, 2007.

4. J. Cates, P. T. Fletcher, M. Styner, M. Shenton, R. Whitaker, "Shape Modeling and Analysis with Entropy-Based Particle Systems", *Proc. Information Processing in Medical Imaging*, 333–345, 2007.
5. P. T. Fletcher, R. Tao, W.-K. Jeong, R. T. Whitaker, "A Volumetric Approach to Quantifying Region-to-Region White Matter Connectivity in Diffusion Tensor MRI", *Proc. Information Processing in Medical Imaging*, 346–358, 2007.
6. S. Basu, P.T. Fletcher, R. Whitaker, "Rician Noise Removal in Diffusion Tensor MRI," *Medical Image Computing and Computer-Assisted Intervention*, pp. 117–125, 2006.
7. G. Adluru, E. Di Bella, R. Whitaker, "Automatic segmentation of cardiac short axis slices in perfusion", *Proc. IEEE Intl. Sym. on Biomedical Imaging*, 133–136, 2006.
8. S. Awate, T. Tasdizen, R. Whitaker, "Unsupervised Texture Segmentation with Nonparametric Neighborhood Statistics", *European Conference on Computer Vision*, pp. 494–507, 2005.
9. T. Tasdizen, S. Awate, R. Whitaker, N. Foster, "MRI Tissue Classification with Neighborhood Statistics: A Nonparametric, Entropy-Minimizing Approach", *Medical Imaging Computing and Computer-Assisted Intervention*, pp. 517–525, 2005.
10. S. Awate, R. Whitaker, "Nonparametric Neighborhood Statistics for MRI Denoising", *Information Processing in Medical Imaging*, pp. 677–688, 2005.
11. T. Tasdizen, R. Whitaker, R. Marc, B. Jones, "Enhancement of Cell Boundaries in Transmission Microscopy Images", *IEEE International Conference on Image Processing*, pp. 129–132, 2005.
12. S. Awate, R. Whitaker, "Image Denoising with Unsupervised Information-Theoretic Adaptive Filtering", *International Conference on Computer Vision and Pattern Recognition*, pp. 44–51, 2005.
13. M. Meyer, P. Georgel, R. Whitaker, "Robust Particle Systems for Curvature Dependent Sampling of Implicit Surfaces", *International Conference on Shape Modeling and Applications*, pp. 124–133, 2005.
14. S. Premoze, T. Tasdizen, J. Bigler, A. Lefohn, R. Whitaker, "Particle-Based Simulation of Fluids", *Proc. Eurographics' 2003*.
15. T. Tasdizen, R. Whitaker. "Cramer-Rao Bounds for Nonparametric Surface Reconstruction from Range Data", *Proc. Fourth International Conference on 3-D Imaging and Modeling*, pp. 70–77. October, 2003.
16. T. Tasdizen, R. Whitaker. "Anisotropic diffusion of surface normals for feature preserving surface reconstruction", *Proc. Fourth International Conference on 3-D Imaging and Modeling*, pp. 353–360. October, 2003.
17. A. Lefohn, J. Cates, R. Whitaker, "Interactive, GPU-Based Level Sets for 3D Segmentation", *Proc. Medical Imaging Computing and Computer-Assisted Intervention*, November 2003, pp. 564–572.
18. G. Kindlmann, R. Whitaker, T. Tasdizen, T. Möller, "Curvature-Based Transfer Functions for Direct Volume Rendering: Methods and Applications", *Proc. IEEE Visualization*, October 2003, pp. 513–520.
19. A. Lefohn, J. Kniss, C. Hansen, R. Whitaker, "Interactive Deformation and Visualization of Level Set Surfaces Using Graphics Hardware", *Proc. IEEE Visualization*, October 2003, pp. 75–82.
20. T. Tasdizen, R. Whitaker, P. Burchard, S. Osher, "Geometric Surface Smoothing via Anisotropic Diffusion of Normals", *Proc. IEEE Visualization 2002*, pp. 125–132.
21. K. Museth, D. Breen, L. Zhukov, R. Whitaker, "Level-Set Segmentation From Multiple Non-Uniform Volume Datasets", *Proc. IEEE Visualization 2002*, pp. 179–186.
22. K. Museth, D. Breen, R. Whitaker, A. Barr, "Level-Set Surface Editing Operators", in *SIGGRAPH 2002*, pp. 330–338.

23. T. Yoo, M. Ackerman, W. Lorensen, W. Schroeder, V. Chalana, S. Aylward, D. Metaxas, R. Whitaker, "Engineering and Algorithm Design for an Image Processing API: A Technical Report on ITK—the Insight Toolkit", in 10th Annual Medicine Meets Virtual Reality (MMVR), January 2002, pp. 586–592.
24. V. Elangovan, R. Whitaker, "From sinograms to surfaces: a direct approach to the segmentation of tomographic data", in Medical Image Computing and Computer-Assisted Intervention (MICCAI), October 2001, pp. 213–223.
25. A. Gothandaraman, R. Whitaker, J. Gregor, "Total variation for the removal of blocking effects in DCT based encoding", IEEE International Conference on Image Processing, October 2001, pp. 455–458.
26. R. Whitaker, "Reconstructing terrain maps from dense range data", IEEE International Conference on Image Processing, October 2001, pp. 165–168.
27. R. Whitaker, Xinwei Xue, "Variable-conductance, level-set curvature for image denoising", IEEE International Conference on Image Processing, October 2001, pp. 142–145.
28. D. Breen, S. Mauch, R. Whitaker, and J. Mao "3D metamorphosis between different types of geometric models" Eurographics 2001 Proceedings, September 2001, pp. 36-48.
29. R. Whitaker, D. Breen, K. Museth and N. Soni, "A framework for level set segmentation of volume datasets", Proceedings of ACM International Workshop on Volume Graphics, pp. 159-168, June 2001.
30. R. Whitaker, "Reducing aliasing artifacts in isosurfaces of binary volumes", *IEEE Volume Visualization And Graphics Symposium*, 2000, pp. 23–32.
31. R. Whitaker, J. Gregor, and P. Chen, "Indoor scene reconstruction from sets of noisy range images", *Second International Conference on 3-D Digital Imaging and Modeling*, Oct. 1999, pp. 348–357.
32. D. Breen, S. Mauch, R. Whitaker, "3D scan conversion of CSG models into distance volumes", *The 1998 Symposium on Volume Visualization*, Oct. 1998, pp. 7-14.
33. R. Whitaker, D. Breen, "Level-set models for the deformation of solid objects," in *Proceedings of Implicit Surfaces '98*, Eurographics/Siggraph, June 1998, pp. 19–35.
34. S. Burgiss, R. Whitaker, and M. Abidi, "Range image segmentation through pattern analysis of the multi-scale wavelet transform," *International Workshop on Image Analysis and Information Fusion 1997*, pp. 167–174.
35. D. Elsner, R. Whitaker, and M. Abidi, "A volumetric technique for 3-d modeling through fusing multiple noisy range images," *International Workshop on Image Analysis and Information Fusion 1997*, pp. 405–416.
36. D. Koller, G. Klinker, E. Rose, D.E. Breen, R. Whitaker, M. Tuceryan, "Real-time Vision-Based Camera Tracking for Augmented Reality Applications," *Proceedings of the ACM Symposium on Virtual Reality Software and Technology (VRST '97)*, September 1997, pp. 87–94.
37. D. Koller, G. Klinker, E. Rose, D.E. Breen, R. Whitaker, M. Tuceryan, "Automated Camera Calibration and 3D Egomotion Estimation for Augmented Reality," *Proceedings of the 7th International Conference on Computer Analysis of Images and Patterns (CAIP '97)*, September 1997, pp. 109-206.
38. R. Whitaker, "Algorithms for implicit deformable models," *Fifth International Conference on Computer Vision*, June 1995, pp. 822–827.
39. R. Whitaker, C. Crampton, D. Breen, M. Tuceryan, E. Rose, "Object calibration for augmented reality," in *Eurographics '95*.
40. K. Ahlers, D. Breen, C. Crampton, E. Rose, M. Tuceryan, R. Whitaker, D. Greer, "Distributed augmented reality for collaborative design," *Eurographics '95*.
41. E. Rose, D. Breen, K. Ahlers, C. Crampton, M. Tuceryan, R. Whitaker, D. Greer, "Annotating real-world

- objects using augmented vision,” *Computer Graphics International '95* (R. Earnshaw and J. Vince Ed.), pp. 357–370.
42. R. Whitaker, “Volumetric deformable models: active blobs,” *Visualization in Biomedical Computing* (R. Robb Ed.), Nov. 1994, pp. 122–134.
 43. D. Breen, E. Rose, K. Ahlers, C. Crampton, M. Tuceryan, R. Whitaker, D. Greer, “An augmented vision system for industrial applications,” *SPIE Conference on Photonics for Industrial Applications*, Vol. 2351, pp. 345–359, Oct. 1994.
 44. R. Whitaker, “Characterizing first and second-order patches using geometry-limited diffusion,” *Information Processing in Medical Images* (H. Barrett and A. Gmitro Ed.), Springer Verlag 1993, pp. 149–167.
 45. R. Whitaker, S.M. Pizer, “Geometry-based image segmentation using anisotropic diffusion,” *Shape in Picture: The Mathematical Description of Shape in Greylevel Images*. (Y-L 0, A. Toet, H. Heijmans, D. Foster, P. Meer, Ed.), Springer Verlag 1993 (Proceedings of NATO Advanced Research Workshop).
 46. T. Yoo, S. Pizer, H. Fuchs, T. Cullip, J. Rhoades, R. Whitaker, “Achieving direct volume visualization with interactive semantic region selection,” *Information Processing in Medical Imaging*, Springer Verlag 1991.
 47. M. Levoy, R. Whitaker, “Gaze-directed volume rendering,” *Computer Graphics*, 24(2), March 1990, pp. 217–223 (Proceedings of *ACM Symposium on Interactive 3D Graphics*).

Conference proceedings—abstract review

1. H.B. Henninger, C.J. Underwood, R.T. Whitaker, S.A. Maas, J.A. Weiss, “Fine structure and orientation of sulfated glycosaminoglycans in human knee ligament”, *Proc. 52nd Ann. Mtg. of the Orthopaedic Research Society*, 31:1115, 2006.
2. L. Zhukov, K. Museth, D. Breen, R. Whitaker, “3D Modeling and Segmentation of Diffusion Weighted MRI Data,” *Proc. of SPIE Medical Imaging 2001*, February 2001, pp. 401-412.
3. S. Burgiss, E. Lester, R. Whitaker, M. Abidi, “Scene segmentation from vector-valued images using anisotropic diffusion”, *SPIE International Conference on Intelligent Robots and Computer Vision XVI: Algorithms, Techniques, Active Vision, and Materials Handling*, Oct. 1998, pp. 527–538.
4. A. Mangan, R. Whitaker, “Surface segmentation using morphological watersheds”, *IEEE Visualization '98: Late Breaking Topics*, pp. 2932, Oct. 1998.
5. S. Burgiss, R. Whitaker, and M. Abidi, “Range image segmentation through pattern analysis of multi-scale difference information,” *SPIE International Conference on Intelligent Robots and Computer Vision XVI: Algorithms, Techniques, Active Vision, and Materials Handling 1997*, pp. 374–381. (abstract review).
6. D. Elsner, R. Whitaker, M. Abidi, “3D model creation through volumetric fusion of multiple range images,” *SPIE International Conference on Intelligent Robots and Computer Vision XVI: Sensor Fusion and Decentralized Control in Autonomous Robotic Systems 1997*, pp. 250–260. (abstract review).
7. E. Lester, R. Whitaker, M. Abidi, “Feature extraction, image segmentation, and scene reconstruction,” *SPIE International Conference on Intelligent Robots and Computer Vision XVI: Sensor Fusion and Decentralized Control in Autonomous Robotic Systems 1997*, pp. 261–271. (abstract review).
8. R. Whitaker, D. Chen, “Embedded active surfaces for volume visualization,” *SPIE Medical Imaging VIII*, 2167, Feb. 1994, pp. 340–352.

Book Contributions

1. D. Breen, R. Whitaker, K. Museth and L. Zhukov, "Level Set Segmentation of Biological Volume Datasets," in *Handbook of Medical Image Analysis, Volume I: Segmentation Part A*, (ed. J. Suri), Kluwer, 2005, pp. 415-478.
2. R. Whitaker, "Isosurfaces and Level Sets" in *Visualization Handbook* (eds. C. Johnson and C. Hansen), 2005.
3. R. Whitaker, "Nonlinear Image Filtering With Partial Differential Equations" in *Insight into Images* (ed. T. Yoo), 2004.
4. R. Whitaker, "Isosurfaces and Level Sets" in *Insight into Images* (ed. T. Yoo), 2004.
5. K. Museth, D. Breen, A. Barr, R. Whitaker, "Geometric Models Editing Within a Level-Set Framework" in *Geometric Level Set Methods in Imaging, Vision, and Graphics*, (S. Osher, N. Paragios, Ed.) Springer Verlag, August 2002
6. D. Breen, S. Mauch, R. Whitaker, "3D scan conversion of csg models into distance, closest-point and color volumes," in *Volume Graphics* (M. Chen and A. Kaufman, Ed.), Springer, 1999.
7. R. Whitaker, G. Gerig, "Vector-valued diffusion," in *Geometry-Driven Diffusion* (B. ter Haar Romeny, Ed.), Kluwer 1994, pp. 93-134.
8. E. Rose, D. Breen, K. Ahlers, C. Crampton, M. Tuceryan, R. Whitaker, D. Greer, "Annotating real-world objects using augmented reality", in *Computer Graphics: Developments in Virtual Environments* (R. Earnshaw, J. Vince, Ed.), Academic Press 1995, pp. 357-370.

UNPUBLISHED WORKS

1. R. Whitaker, "Geometry-limited diffusion", Ph.D. dissertation, Department of Computer Science, University of North Carolina Chapel Hill 1993. Technical report TR94-037.

PROFESSIONAL SERVICE

Program Committees

- Eurographics, 2002.
- IEEE Symposium on Volume Visualization, 2002.
- International Workshop Visualization and Mathematics, 2002 (Berlin).
- International Conference on Vision, Modeling, and Visualization, 2002.
- IEEE Conference on Virtual Reality, 1999, 2000, 2002, 2003.
- IEEE Conference on Visualization, 2003, 2004, 2005.
- International Conference on Computer Vision and Pattern Recognition, 2004, 2005.

Review Panels

- NSF Panel, ITR (February 2002)
- NIH Panel, Human Brain Project (September 2004)

Paper Reviews

Peer reviewed for the following journals and conferences:

- *IEEE Trans. on Image Processing*
- *IEEE Trans. on Medical Imaging*
- *IEEE Trans. on Pattern Analysis and Machine Intelligence*
- *IEEE Trans. on Comp. Graphics and Visualization*
- *IEEE Trans. on Robotics and Automation*
- *Journal of Mathematical Imaging and Vision*
- *Robotics and Autonomous Systems*
- *Computer Vision and Image Understanding*
- *ACM Trans. on Graphics*
- *ACM SIGGRAPH*
- *IEEE Conf. on Visualization*
- *Eurographics*

Memberships

- IEEE Computer Society, ACM.

INVITED TALKS

- “Universal, Information-Theoretic Adaptive Filtering”, General Electric Research and Development, Schenectady, NY. December 12, 2004.
- “Surface Processing and Reconstruction”, Rochester Polytechnic Institute, Dept. of Computer Science (Colloquium), Troy, NY. December 13, 2004.
- **Siemens Corporate Research**, March 2004, “Geometric Surface Processing”, SCR Distinguished Lecture Series.
- **University of Kentucky**, March 2002, “Maximum Likelihood Surface Estimation”, Seminar, High Performance Scientific Computing and Computer Simulation Laboratory (HiPSSCCS).
- **Conference on Vision, Modeling, and Visualization**, November 2001, “Maximum Likelihood Surface Estimation”, Plenary talk.
- **University of Pennsylvania**, November 2001, “From Sinograms to Surfaces: A Direct Approach to Tomographic Surface Reconstruction”, Seminar for the General Robotics, Automation, Sensing, and Perception Laboratory (GRASP).
- **Cal Tech**, August 1997, “A Level-Set Approach to 3D Surface Reconstruction” Seminar for the Cal Tech Graphics Group.
- **Brown University**, September 1997, “A Level-Set Approach to 3D Surface Reconstruction”, Seminar for the Laboratory for Engineering Man/Machine Systems (LEMS).

WORKSHOPS AND PROFESSIONAL COURSES

- “Image Processing for Volume Graphics” SIGGRAPH 2002

- “Beyond Blobs” SIGGRAPH, 2002
- “PDEs for Graphics and Image Processing” SIGGRAPH, 2002
- “Image Processing for Volume Graphics” IEEE Visualization, 2002
- “Image Processing for Volume Graphics” SIGGRAPH 2001
- “Image Processing for Volume Graphics” IEEE Visualization, 2001
- “Multiscale Geometric Image Analysis—Diffusion and Cores” Visualization in Biomedical Computing (VBC), 1994

SUPPORT—Current

NIH: “National Center for Integrative Biological Computing” (co-PI) \$5,675,073:2005–2010
An NIH NCCR for the development of software tools for biological analysis and simulation.

NIH: “Large-scale computational reconstruction of three dimensional neural connectivity from serial-section microscopy”, (co-PI) \$1,193,402:2005–2009
The development of algorithms and software tools for extracting 3D neuron models for serial-section microscopy.

General Electric: “Intraoperative 3D Tomography” (PI) \$50,000:2004–2005
Develop methods for recovering 3D information from sequences of Xrays and preoperative models and volumes. Investigate the use of multi-grid reconstruction techniques for intraoperative, cone-beam reconstruction.

Exxon-Mobil: “Image Processing of Large Seismic Data Sets” (PI) \$70,000:2004–2005
Develop methods for analysis of seismic data to help in oil exploration.

NIH: “National Alliance for Medical Image Computing” (PI) \$1,014,834:2004–2009
One of four *NIH National Centers for Biomedical Computing*, one of approximately 10 institutions (subcontract through Harvard University). Develop methods for the analysis of MRI and other data in the study of schizophrenia.

NSF: “ITR/CCR: Geometric Surface Processing Tools for Analysis of Biological Data”, (PI) \$505,536: 2003–2006
The goal of this project is to develop a new set of computational tools for processing and analyzing surfaces that are extracted from complex biological data sets.

NSF: “Collaborative Proposal: Assembling Visible Neurons for Simulations: Merging of High-through put 3D Microscopies with Advanced Computational Tools” (subcontract–UCSD) \$505,483: 2002–2006
A joint project with Mark Elisman, at UCSD, to develop better tools for visualizing data from electron tomography by both surface modeling and direct volume rendering.

ARO: “Virtual Parts Engineering Research Center (VIPER)” (Investigator) \$1.9M: 2000–2005
Development of technologies to achieve integrated software infrastructure for CAD—from design to manufacture.

SUPPORT—Past

NSF: “CAREER: A Statistical Framework for Reconstructing 3D Manifolds from Range Data” (PI) \$215,000: 2000–2004
Developing the foundations of estimating 3D surfaces from noisy signals. National Science Foundation.

- NIH:** “Fourth-Order Flows for Segmentation and Surface Processing in the Insight Toolkit” (PI) \$60,000: 2002-2003
A year-long project for integrating some of our recent advances in surface processing into the NIH-funded Insight Toolkit.
- NIH:** “Program for Computational Functional Imaging and Visualization” (PI is C. Johnson) Approx. \$2.1M
A program of excellence for training scientists in computational imaging. I am one of several “project leaders”, responsible for the image processing component of this program.
- ONR:** “A Statistical Approach to 3D Terrain Reconstruction” (PI) \$360,000: 2000–2003
Development of methods and tools for constructing high-resolution terrain maps from a fusion of noisy range measurements and digital photographs. Office of Naval Research.
- NSF:** “Interactive Level-Set Modeling for Visualization of Biological Datasets” (PI) \$240,000: 2000–2003
Development of parallel algorithms and human-computer-interaction techniques for real-time modeling using level-set surfaces. National Science Foundation.
- NIH:** “Geometry-Based Image Processing Tools for Segmentation and Visualization of The Visible Human Datasets” (PI) \$672,000: 1999–2002
For the development, testing, and distribution of software tools for processing 2D and 3D medical images associated with the visible-human datasets. National Library of Medicine.
- NSF:** “Multiresolution Visualization Tools for Interactive Analysis of Large-Scale N-Dimensional Data Sets” (subcontract–CalTech) \$120,000: 1999–2002
For the development of level-set models for segmentation of large data sets including development of techniques and algorithms as well as software tools. National Science Foundation.
- UTK:** “3D Visualization Tools for Pattern-Recognition Instruction” (PI) \$10,000: 1997
For the development of web-based 3D instructional aides for use in teaching image processing and pattern recognition. Innovative Technologies Center, University of Tennessee.
- SARIF:** “Sonographic Surface Reconstruction” (PI) \$3000: 1998
For research in surface reconstruction from sonar data. Research incentive award, University of Tennessee, Knoxville.
- ONR:** “Volumetric Models for 3D Reconstruction” (PI) Approx. \$291,000: 1997-2000
For the study and development of level-set models for reconstructing and visualizing complex scenes. Office of Naval Research.
- ESPRIT:** “Visualization Across Networks of Uncalibrated Acquired Real Data (VANGUARD)” (Co-PI) Approx. 2.4M DM: 1995-1998
An interdisciplinary effort combining research in computer vision, computer graphics, and distributed computing. Five partners: Oxford University, University of Leuven, Sharp Electronics Research (UK), Hebrew University of Jerusalem, and ECRC. (Involvement terminated in 1996 due to change of jobs and country of residence). European Commission.
- NSF:** “Variable-conductance diffusion” (subcontract–CalTech) Approx. \$15,000:1993-1997
An international collaboration that includes the following partners: J. Malik (Berkeley), B. ter Haar Romeny (Utrecht), T. Lindeberg (Stockholm), P. Perona (Cal Tech), D. Mumford (Harvard), O. Kubler (ETH Zurich), S. K. Mitter (MIT), J.-M. Morel (Paris), S. Pizer (North Carolina), L. Alvarez (Los Palmas). For the study of variable conductance diffusion as a technique for low level computer vision and as a possible model of natural vision. National Science Foundation.