Timothy S. Newman, Ph.D.
Professor of Computer Science
University of Alabama in Huntsville

Academic Specialties

Visualization, Computer Graphics, Computer Vision, Imaging, Big Data, Information Discovery, and Applications of High Performance Computing, especially to problems in these areas

Degrees

Ph.D. in Computer Science, August 1993
Michigan State University, East Lansing, Michigan
Dissertation topic: Experiments in 3D CAD-Based Inspection Using Range Images
Advisor: Dr. Anil K. Jain

Master of Science in Computer Science, June 1989
Michigan State University, East Lansing, Michigan

Bachelor of Science with majors in Mathematics and Computer Science, May 1986
Bowling Green State University, Bowling Green, Ohio
Graduated summa cum laude

Academic experience

Professor, (8/07 to present) Associate Professor (8/00 to 8/07), Assistant Professor (8/94 to 8/00), Univ. of Alabama in Huntsville Computer Science Dept.
Taught undergraduate (intro. programming, data structures, discrete structures, game design and development, computer architecture, operating systems, and computer graphics) and graduate courses (graphics, advanced computer graphics, computer geometry modeling, and architecture) and initiated/created and then taught graduate-level courses (two in visualization and one in human-computer interaction with emphasis on graphical user interfaces). Organized computer graphics and visualization research group and laboratory. Also advised undergraduate and graduate student and served on departmental committees. Supervised 3 undergraduate honors project, 25 M.S. theses, and 10 Ph.D. dissertations to conclusion. Currently supervising 4 active doctoral students. Conducting research in **visualization, computer vision, pattern recognition, large Data, imaging**, and **computer graphics**, and in the application of **high performance computing** to these areas.

Graduate Research Assistant, Pattern Recognition and Image Processing Laboratory, Michigan State University Computer Science Department (3/88 to 9/88, 12/88 to 8/93).
Conducted research in geometric reasoning and CAD-based object recognition and inspection with Dr. Anil Jain under grant from the Northrop Research & Technology Center and in image segmentation and object recognition in laser range images under a grant from Northrop Electromechanical Div. Also: worked as a computer systems manager. Investigated CAD-based inspection of castings in collaboration with General Motors' Saginaw Malleable Iron Plant and Northrop Research & Technology Center.

Graduate Teaching Assistant, Michigan State University Computer Science Dept. (9/87 to 3/88, 9/88 to 12/88).
Instructed novice computer users in the use of PCs, including hands-on instruction in the use of spreadsheets, word processors, and databases. Taught three laboratory sections and led one recitation section per term (Computer Science 100 course). Taught lab sections, graded, and occasionally guest-lectured in undergraduate data structures course (Computer Science 333).

Nonacademic professional experience

Postdoctoral Research Fellow, National Institutes of Health, Clinical Center Department of Nuclear Medicine and Division of Computer Research and Technology (joint appointment), Bethesda, Maryland (9/93 to 8/94).
Awarded National Research Council post-doctoral fellowship by the National Academy of Sciences to investigate visualization and registration of MR, CT, and PET images for computer-assisted surgery; fitting of surfaces to the left ventricle in cardiac SPECT images; and segmentation and visualization of the kidneys, renal collecting system, and renal cysts and tumors in CT images. Also developed algorithms to aid in planning nephron-sparing surgery for von Hippel Lindau (VHL) kidney disorders. Worked under the guidance of Dr. Stephen Bacharach.

Engineer, Artificial Intelligence Laboratory, General Dynamics Land Systems Division, Warren, Michigan (6/89 to 9/89).
Evaluated proposed Defense Mapping Agency uniform geographic information exchange format; developed map display tool; and implemented k-means-based Adaptive Clustering algorithm. Assisted in implementation of human-computer interface for M1A2 (tank) map display.

Software Engineer, Northrop Corporation Defense Systems Division, Rolling Meadows, Ill. (7/86 to 9/87).
Designed, developed, and tested software for a real-time embedded ECM (Electronic Counter Measures) system.

Computing Aide, University Computer Services, Bowling Green State University (6/83 to 5/86).
Presented seminars; debugged and analyzed programs; and assisted faculty and staff in the use of statistical packages, computer languages, and computer systems.

Applications Programmer, M & M Productions, Bowling Green, Ohio (5/85 to 12/85).
Updated and revised educational graphing package for computer literacy textbook. Adapted word processor for use on a new platform.

Also: **VISICU**, Maryland, 2006; **Sverdrup**, Huntsville, 2005; **NASA Nat'l Space Sciences and Technology Center Space Sciences**, Huntsville, 2001-02; **Huntsville Sciences Corp**, Huntsville, 1995.

Teaching Activities: Summary list of courses taught, theses advised

Taught undergraduate (intro. programming, data structures, discrete structures, game design and development, operating systems, intro. computer architecture and intro. computer graphics) and graduate courses (graphics, advanced computer graphics, computer geometry modeling, and architecture) and initiated and taught graduate-level course in human-computer interaction with emphasis on graphical user interfaces and graduate-level courses in information visualization and in volume rendering and visualization.

Thesis/Dissertation Oversight and Advising Activities:

- Jacob D. Hauenstein, Ph.D. dissertation, "On Determination of Curvature in Range Images and Volumes," April 2020.
- Manil Maskey, Ph.D. dissertation, "Measuring and Evaluating Directional Textures and Using Them in Visual Discovery," Dec. 2019.
- Sussan Einakian, Ph.D. dissertation, "Studies of Effective Color Combinations in Visualization," Dec. 2017.

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- Xiang Zhang, Ph.D. dissertation, "Automated Segmentation and Registration of the Kidney in CT Datasets ," March 2010.
- Cuilan Wang, Ph.D. dissertation, "New Tomographic Reconstruction and Visualization Techniques and Applications to the Plasmasphere," Jan. 2009.
- Jong Kwan Lee, Ph.D. dissertation, "On Efficient Opacity Correction for Over-Sampled Volume Ray Casting Visualization," July 2008.
- Chunguang "Ken" Cao, Ph.D. dissertation, "Advancing Data Discovery Through New Elliptic and Related Higher-Order Shape-Based Processing," July 2007.
- Hongtao Xu, Ph.D. dissertation, "New Quasi-Covariance and Torsion Spring Formulations and Their Applications to Mesh Simplification and Smoothing," June 2006.
- Huijuan Zhang, Ph.D. dissertation, "New Volume Reconstruction and Parallel Indirect Volume Rendering Methods," March 2004.
- Hong Yi, Ph.D. dissertation, "Model-Based Segmentation and Animative Visualization for Analysis of Anatomical Structures," July 2001.

- Jeren Suzuki, M.S. Thesis, "Information Discovery in Coronagraph Images," Aug. 2020.
- Sriraksha Nagaraj, M.S. Thesis, "A Novel Approach for Enhanced Accuracy in Isocontouring using 2D Marching Squares Subdivided into Triangles," July 2018.
- Matthew Couch, M.S. Thesis, "Client-Server View-Dependent Isosurfacing With Enhanced Interactivity," Dec. 2015.
- Lulu Zhao, M.S. Thesis, "Hough Based Strategy for Detecting Magnetic Field," May 2015.
- Sangeet Dahal, M.S. Thesis, "Parallel 2D Mesh Smoothing Using GPU Computing," Jan. 2014.
- Shailesh Khot, M.S. thesis, "Line and Circle Clipping Based on High Performance GPGPU and Multithreaded Computing," Dec. 2011.
- Manish Joshi, M.S. thesis, "Fast Correction of Internal Ambiguity in Marching Cubes using a Commodity Graphics Architecture," Dec. 2010.
- Irina Dodoukh, M.S. thesis, "A New Algorithm and Experiments for Reliable Extraction of Globe-like Proteins in AFM Images," March 2008.
- Vijaya Gummadi, M.S. thesis, "Exploring the Performance of GP-GPU-Based Marching Cubes," Jan. 2008.
- Phani Cherukuri, M.S. thesis, "Shadow Acceleration in Ray Tracing Using Cache Mechanisms," June 2007.
- Raghav Khokale, M.S. thesis, "Methods for Plasmapause Extraction and Determination of the Rotation Rate of the Earth's Plasmasphere," Oct. 2005.
- Manil Maskey, M.S. thesis, "Cumulus Cloud Rendering Techniques and Their Evaluation," Jan. 2005.
- Ravi Akkenapally, M.S. thesis, "Improving the Cohen-Sutherland Line Clipping Algorithm," Nov. 2004.
- Naveen Santhanam, M.S. thesis, "Exploiting Physical Constraints for Improved Limited Angle Tomographic Reconstruction of the Terrestrial Plasmasphere," June 2004.
- Pavan Emani, M.S. thesis, "Achieving Enhanced Performance for Vector-Parallel Isosurface Generation," March 2004.
- Jong-Kwan Lee, M.S. thesis, "Automated Solar Coronal Loop Identification," Oct. 2003.
- Hongtao Xu, M.S. thesis, "An Optimization Approach for 2D Finite Element Mesh Smoothing," April 2003.
- Will Lee, M.S. thesis, "New Techniques for Uncertainty Visualization," July 2002.
- Jonathan Bush, M.S. thesis, "Curve-Based Volume Warping on Workstation Clusters," Nov. 2000.
- Anuradha Lakshminarayana, M.S. thesis, "A Dimensional Reduction Analysis and Glyph-based Visualization of Object-Oriented Software Metrics," May 2000.
- Amit Narayanan, M.S. thesis, "Achieving Good Desktop Performance for Volume Visualization using Desktop SIMD and VRML," Feb. 2000.
- Kit-Cheng Ng, M.S. thesis, "A Blood Vessel Feature Based Elastic Registration Method for 3D MRA Brain Data," Oct. 1999.

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- Min Dai, M.S. thesis, "Approaches for Hyperboloid and Paraboloid Surface Fitting, Segmentation, and Defect Detection," May 1999.
- John Nord, M.S. thesis, "Image Synthesis Methods for Modeling Partial Damage to Objects," Oct. 1998.
- Ning Tang, M.S. thesis, "HPMVS: A High Performance Medical Visualization System," July 1996.

Direct Supervision, In Progress Students:

Michael Caruso, MS. thesis draft done, but currently inactive.
Mark Reuter, M.S. thesis student, currently inactive.
Ted Satcher, M.S. thesis student, currently inactive.

Sui Gong, Ph.D. diss. completion exp. May 2021.
Brian Wood, Ph.D. diss. completion exp. May 2021.
Chun Dong, Ph.D. diss. completion exp. Aug. 2021.
J. Dirk Caudill, Ph.D. diss. completion exp. Dec 2022.
Elaine Acree, Ph.D. advisee, currently inactive.
Stephan Alban, Ph.D. student, currently inactive.
Ram Kandimalla, Ph.D. student, currently inactive.
Richard Nesbit, Ph.D. student, currently inactive.
Taras Ovsyankin Ph.D. student, currently inactive.

Committee memberships: John Rushing (Ph.D. completed August 1999)
Suk Seo (Ph.D. completed Nov. 2001)
Xiang Zhao (Ph.D. completed Mar. 2005)
Raed Shatnawi (Ph.D. completed Oct. 2006)
Soo Kim (Ph.D. completed Oct. 2007)
Jeremy Hughes (Ph.D. Math, completed Summer 2009)
John Wu (Ph.D. completed May 2015)
Sabin Timalsena (M.S. completed Dec. 2015)
Semih Dinc (Ph.D. completed July 2016)
Vaidya Shanthakumar (M.S. completed Mar. 2017)

Bryan Norris, Ph.D. student (status unknown)
Current member of 3 other doctoral committees of inactive students (A. Bhattnagar, P. Gollapalli, Y. Hua)
Santhosh Nandhakumar, M.S. student (switched to Ph.D. without completing thesis)

Advised 3 Undergraduate Honors project to completion; served on 4 (other) M.S. thesis defenses.
Served as University Observer for 8 other M.S./Ph.D. defenses.

Research:

Papers in Journals or Books:

"On Measuring and Employing Texture Directionality for Image Classification," by M. Maskey and T. S. Newman, sub. to *Pattern Analysis and Applications*, 2020 (under review).

"Descriptions and Evaluations of Methods for Determining Surface Curvature in Volumetric Data," By J. Hauenstein and T. S. Newman, *Computers & Graphics*, Vol. 86, Feb. 2020, pp. 52-70.

"Exhibition and Evaluation of Two Schemes for Determining Hypersurface Curvature in Volumetric Data," by J. Hauenstein and T.S. Newman, *J. WSCG*, Vol. 27, No. 2, 2019, 9 pp.

"An Examination of Color Theories in Map-Based Information Visualization," by S. Einakian and T.S. Newman, *J. Computer Languages*, Vol. 51, April 2019, pp. 143-153.

"Curvature Determination in Range Images: New Methods and Comparison Study," by J. D. Hauenstein and T. S. Newman, *Multimedia Tools and Applications*, Vol. 78, 2019, pp. 9247-9273.

"Isocontouring with Sharp Corner Features," by S. Gong and T. S. Newman, *Machine Graphics and Vision*, Vol. 27, No. 1 / 4, June 2018, pp. 21-46.

"Fine Feature Sensitive Marching Squares," by S. Gong and T. S. Newman, *IET Image Processing*, Vol. 11, No. 9, 2017, pp. 796-802.

"Isosurface Orientation Estimation in Sparse Grids using Tetrahedral Splines," by B. A. Wood and T. S. Newman, *J. WSCG*, Vol. 23, 2015, pp. 73-82.

"Exploring GPU- and Cluster-Based Improvements for Over-Sampled Volume Ray Casting Opacity Correction," by J.-K. Lee and T. S. Newman, *Int'l J. of Image and Graphics*, Vol. 12, No. 4, 1250025, 2012, 26 pp.

"Higher Order Approximating Normals and their Impact on Isosurface Shading Accuracy," by B. A. Wood, J.-K. Lee, M. Maskey, and T. S. Newman, *Machine Graphics and Vision*, Vol. 19, No. 2, 2010, pp. 201-221.

"Finding Software Metrics Threshold Values using ROC Curves," by R. Shatnawi, W. Li, J. Swain, and T. S. Newman, *Journal of Software Maintenance and Evolution:Research and Practice*, Vol. 22, No. 1, Jan. 2010, pp. 1-16.

"New Shape-Based Method for Auroral Oval Segmentation Driven by LLS-RHT," by C. Cao, T. S. Newman, and G. Germany, *Pattern Recognition*, Vol. 42, No. 5, 2009, pp. 607-618.

"Plasmapause Equatorial Shape Determination via the Minimum L Algorithm: Description and Evaluation," by C. Wang, T. S. Newman, and D. Gallagher, *J. Geophysical Research (Space Physics)*, Vol. 112, No. A12, A12201, doi:10.1029/2006JA012202, Dec. 2007.

"New Method for Opacity Correction in Oversampled Volume Ray Casting," by J.-K. Lee and T. S. Newman, *J. WSCG*, Vol. 15, 2007, pp. 1-8.

"Least-Squares-Based Fitting of Paraboloids," by M. Dai, T. S. Newman, and C. Cao, *Pattern Recognition*, Vol. 40, 2007, pp. 504-515.

"A Survey of the Marching Cubes Algorithm," by T. S. Newman and H. Yi, *Computers & Graphics*, Vol. 30, No. 5, 2006, pp. 854-879.

Publisher identified this paper as the Most-Cited paper in the journal during the period 2005-2010. Also identified by Science Direct as one of the Top 25 Hottest Articles in this journal for all but one quarterly period from July 2007 to December 2009. The paper was #1 on the hot articles list for the October to December 2008 period.

"An Angle-Based Optimization Approach for 2D Finite Element Mesh Smoothing," by H. Xu and T. S. Newman, *Finite Elements in Analysis and Design*, Vol. 42, No. 13, 2006, pp. 1150-1164.

"Oriented Connectivity-Based Method for Segmenting Solar Loops," by J.-K. Lee, T. S. Newman, and G. A. Gary, *Pattern Recognition*, Vol. 39, 2006, pp. 246-259.

"Cumulus Cloud Synthetic Rendering Techniques and Their Evaluation" by M. Maskey and T. S. Newman, *Machine Graphics and Vision*, Vol. 14, 2005, pp. 399-425.

"Stormtime Particle Energization with high temporal resolution AMIE Potentials," by G. V. Khazanov, M. W. Liemohn, M.-C. Fok, T. S. Newman and A. Ridley, *Journal of Geophysical Research*, Vol. 109, Article A05209, doi:10.1029/2003JA010186, 2004.

"On Visualizing Uncertainty in Volumetric Data: Techniques and their Evaluation," by T. S. Newman and W. Lee, *Journal of Visual Languages and Computing*, Vol. 15, Dec. 2004, pp. 463-491.

"Magnetosphere Convection Electric Field Dynamics and Stormtime Particle Energization: Case Study of the Magnetic Storm of May 4, 1998," by G. V. Khazanov, M. W. Liemohn, T. S. Newman, M.-C. Fok, and A. Ridley, *Annales Geophysicae*, Vol. 22, 2004, pp. 497-510

"High Performance SIMD Marching Cubes Isosurface Extraction on Commodity Computers," by T. S. Newman, J. Brad Byrd, P. Emani, A. Narayanan, and A. Dastmalchi, *Computers & Graphics*, Vol. 28, 2004, pp. 213-233.

"Correction to 'Self-Consistent Magnetosphere-Ionosphere Coupling: Theoretical Studies'," by G. V. Khazanov, M. W. Liemohn, T. S. Newman, M.-C. Fok, and R. W. Spiro, *Journal of Geophysical Research*, Vol. 108(A6), Article 1264, doi:10.1029/2003JA009966, 2004, p. SMP 14-1.

"Self-Consistent Magnetosphere-Ionosphere Coupling: Theoretical Studies," by G. V. Khazanov, M. W. Liemohn, T. S. Newman, M.-C. Fok, and R. W. Spiro, *Journal of Geophysical Research*, Vol. 108(A3), 2003, Article 1122, pp. SMP 14-1 to SMP 14-11.

"Slice-Adaptive Histogram for Improvement of Anatomical Structure Extraction in Volume Data," by T. S. Newman, N. Tang, C. Dong, and P. Choyke, *Pattern Recognition Letters*, Vol. 23, No. 1, 2002, pp. 25-38.

"A Taxonomy for Integrating Data Mining and Data Visualization," by T. Hinke and T. S. Newman, in *Information Visualization in Data Mining and Knowledge Discovery*, ed. by U. Fayyad, G. Grinstein, and A. Wierse, Morgan-Kaufmann, San Francisco, 2001, pp. 291-298.

"3D Visualization of Object-Oriented Software Design Metrics," by Anuradha Lakshminarayana and Timothy S. Newman, *J. Electronic Imaging*, Vol. 9, No. 4, 2000, pp. 368-374.

"Approaches that Exploit Vector-Parallelism for Three Rendering and Visualization Techniques," by Timothy S. Newman and Ning Tang, *Computers & Graphics*, Vol. 24, No. 5, 2000, pp. 755-774.

"HPMVS: A High Performance Visualization Tool Suite that Assists in Kidney Assessment," by Timothy S. Newman and Ning Tang, *Journal of Computing and Information Technology*, Vol. 8, No. 2, 2000, pp. 137-150.

"Effectively Utilizing 3DNow! in Linux," by Jonathan Bush and Timothy S. Newman, *Linux Journal*, Issue 68, Dec. 1999, pp. 32-36.

"Performance Comparison of Linux and Windows on x86," by Timothy S. Newman and Jonathan Bush, *Linux Journal*, Issue 67, Nov. 1999, pp. 98-104.

"CS 090: The Case for a Developmental Course in Computer Science," by T. S. Newman, Mary Ellen Weisskopf, and M. Morrison, *Journal of Teaching and Learning*, Vol. 4, No. 1, 1999, pp. 15-35.

"A System for CAD-Based Inspection Using Range Images," by Timothy S. Newman and Anil K. Jain, *Pattern Recognition*, Vol. 28, No. 10, Oct. 1995, pp. 1555-1574.

"A Survey of Automated Visual Inspection," by Timothy S. Newman and Anil K. Jain,

Computer Vision and Image Understanding, Vol. 61, No. 2, March 1995, pp. 231-262.

"Model-based Classification of Quadric Surfaces," by Timothy S. Newman, Patrick J. Flynn, and Anil K. Jain, *Computer Vision, Graphics, and Image Processing*: *Image Understanding*, Vol. 58, No. 2, Sept. 1993, pp. 235-249.

"Range-Intensity Histogram for Segmenting LADAR Images," by Anil K. Jain, Timothy S. Newman, and Michael Goulish, *Pattern Recognition Letters*, Jan. 1992, pp. 41-56.

Conference Papers :

"Assessing Potential Educational Use of Two 3D Scanners: Microsoft Kinect v2 and NextEngine 3D Scanner UltraHD," by J. D. Hauenstein and T. S. Newman, *Proc., Int'l Conf. on Computational Science and Computational Intelligence (CSCI) 2019*, Las Vegas, Dec. 2019, pp. 853-858.

"An Examination of the Effects of Noise Level on Methods to Determine Curvature in Range Images," by J. D. Hauenstein and T. S. Newman, *Proc., Image Quality and System Performance XVI,* Burlingame, CA, Jan. 2019, pp. 325-1 to 325-7.

"Fast and Accurate Volume Data Curvature Determination using GPGPU Computation," by J. D. Hauenstein and T. S. Newman, *Proc., ACM Southeast '18,* Richmond, KY, Mar. 29-31, 2018, Article 19, 8pp.

"Dual Marching Squares: Description and Analysis," by S. Gong and T. S. Newman, *Proc., IEEE Southwest Symp. on Image Analysis and Interpretation (SSIAI) 2016*, Santa Fe, Mar. 2016, 4 pp.

"Examining Classic Color Harmony versus Translucency Color Guidelines for Layered Surface Visualization," by S. Einakian and T. S. Newman,. *Proc.,11th Int'l Symp. on Visual Computing (ISVC) '15* (LNCS Vol. 9474), Las Vegas, pp. 318-327.

"More Usable V-EGI for Volumetric Dataset Registration," by C. Dong and T. S. Newman, *Proc., 11th Int'l Symp. on Visual Computing (ISVC) '15* (LNCS Vol. 9474), Las Vegas, pp. 511-520.

"Directional Texture for Visualization -- New Technique and Application Study," by. M. Maskey and T. S. Newman, *Proc., 19th Int'l Conf. on Information Visualisation '15 (iv15)*, Barcelona, July 2015, pp. 1-8.

"A Measure of Texture Directionality," by M. Maskey and T. S. Newman, *Proc., 10th Int'l Conf. on Computer Vision Theory and Application (VISAPP) '15*, Berlin, Mar. 2015, pp. 432-438.

"A Client-Server View-Dependent Isosurfacing Approach with Support for Local View Changes," by M. B. Couch and T. S. Newman, *Proc., Visualization and Data Analysis (VDA) '15*, (SPIE Vol. 9397), San Francisco, Feb. 2015, pp. 93970D-1 to 93970D-14.

"On Reliable Estimation of Curvatures of Implicit Surfaces,".by. J. D. Hauenstein and T. S. Newman, *Proc., IEEE Int'l Conf. on 3D Vision (3DV) '14*, Tokyo, Dec. 2014 pp. 697-704.

"Efficient, GPU-Based 2D Mesh Smoothing," by S. Dahal and T. S. Newman, *Proc., IEEE Southeastcon 2014*, Lexington, Kentucky, March 2014, 7 pp.

"New Metric for Evaluating the Accuracy of Marching Isosurfacing Algorithms," by C. Wang, and T.S. Newman, *Proc., ACM Southeast Conf. 2014*, Kennesaw, Georgia, March 2014, Article 22.

"Effective Color Combinations in Isosurface Visualization," by S. Einakian and T. S. Newman, *Proc., Conf. on Visualization and Data Analysis (VDA) '13 (SPIE Vol. 8654)*, San Jose, Feb. 2013, pp. 86540P-1 to 86540P-8.

"A Corner Feature Sensitive Marching Squares," by S. Gong and T. S. Newman, *Proc., IEEE Southeastcon '13*, Jacksonville, Fla., Apr. 2013, pp. 1-6.

"A Volumetric spin-off EGI for Registration of Volume Datasets," by. C. Dong and T. S. Newman, *Proc., Asian Conf. on Pattern Recognition (ACPR) '11,* Beijing, Nov. 2011, pp. 470-474.

"Self-Scheduled Distributed Parallel Isosurfacing using Distributed Span Space on Cell," by Michael R. Caruso and Timothy S.Newman *Proc., EG Symp. on Parallel Graphics and Visualization (EGPGV) '10*, Norrkoping, Sweden, May 2010, pp. 73-79.

"Experiments in Effective Color Combinations in Map-based Information Visualization," by Sussan Einakian and Timothy S. Newman, *Proc., Visualization and Data Analysis (VDA) '10*, SPIE Vol. 7530, San Jose, Jan. 2010, pp. 7530-05-1 to 7530-05-12.

"On Accuracy of Marching Isosurfacing Methods," by C. Wang, Timothy S. Newman, and J. K. Lee, *Proc., Volume and Point-Based Graphics '08*, Los Angeles, Aug. 2008, pp. 49-56.

"Very Fast Ellipse Detection using GPU-Based RHT," by J. K. Lee, B. Wood, and Timothy S. Newman, *Proc., Int'l Conf. on Pattern Recognition '08*, Tampa, Dec. 2008, pp. 1-4, doi:10.1109/ICPR.2008.4761168.

"Acceleration of Opacity Correction Mechanisms for Over-sampled Volume Ray Casting," by J. K. Lee and T. S. Newman, *Proc., Eurographics Symp. on Parallel Graphics and Visualization (EGPGV) '08*, Crete, April 2008, pp. 17-24.

"Evaluation of High Order Approximating Normals for Marching Cubes," by J. K. Lee, M. Maskey, T. S. Newman, B. Wood, and C. Wang, *Proc., IEEE Southeastcon 2008*, Huntsville, April 2008, pp. 593-598.

"New Hypothesis Distinctiveness Measure for Better Ellipse Extraction," by C. Wang, T. S. Newman, and C. Cao, *Proc., Int'l Conf. on Image Analysis and Recognition (ICIAR) 2007*, published as *Lecture Notes in Computer Science 4633, Image Analysis and Recognition*, Montreal, Aug. 2007, pp. 176-186.

"Voxel Averaging-based Opacity Correction for Oversampled Volume Ray Casting," by J. K. Lee, T. S. Newman, and C. Wang, *Proc., Int'l Conf. on Modeling, Simulation, and Visualization Methods (MSV) '07*, Las Vegas, June 2007, pp. 295-301.

"Cell-by-cell Compression for Faster Parallel Isosurfacing for Structured Grid Datasets," by B. Wood and T. S. Newman, *Proc., Eurographics Parallel Graphics and Visualization 2007 – Short Papers*, Lugano, May 2007, CD-ROM, 4 pp.

"A New Method for Auroral Oval Detection in FUV Imagery," by C. Cao, T. S. Newman, G. Germany, and J. Spann, *Proc., IAPR Conf. on Machine Vision Applications (MVA) '07*, Toyko, May 2007, pp. 583-586.

"Techniques for Computerized Cloud Rendering: A User Study," by M. Maskey and T. S. Newman, *Proc., Graphics and Visualization in Engineering (GVE) '07*, Clearwater, Fla., Jan. 2007, pp. 125-130.

"Shape-Based Mechanisms for Content-Based Retrieval of Aurora Images" by C. Cao, T. S. Newman, and G. Germany, *Proc., Wavelet Apps. in Ind. Proc. IV* (SPIE Vol. 6383), Boston, Oct. 2006, pp. 63830T-1 to 63830T-12.

"New RHT-Based Ellipsoid Recovery Method" by C. Cao and T. S. Newman, *Proc., 18th Int'l Conf. on Pattern Recog. '06*, Hong Kong, Aug. 2006, pp. I-622 to I-625.

"An Analysis of Errors in Feature-Preserving Mesh Simplification Based on Edge Contraction," by H. Xu and T. S. Newman, *Proc., 3D PVT '06.*, Raleigh, June 2006, pp. 671-678.

"Synthesis of 3D Model of a Magnetic Field-Influenced Body from a Single Image," by C. Wang, T. Newman, and D. Gallagher, *Proc., 3D PVT '06*, Raleigh, June 2006, pp. 1018-1025.

"Piggybacking for More Efficient Parallel Out-of-Core Isosurfacing," by T. S. Newman and W. Ma, *Proc., EG Symp. on Parallel Graphics and Visualization*, Braga, Portugal, June 2006, pp. 145-152.

"Accurate Workload Estimation for Fast Parallel RMT," by T. S. Newman and W. Ma, Proc., *EG Symp. on Parallel Graphics and Visualization – Short Papers*, Braga, Portugal, June 2006, pp. 13-16.

"Dynamic Aperture-Based Solar Loop Segmentation" by J-K. Lee, T.S. Newman, and G. A. Gary, *Proc., 7th Southwest Symp. on Image Anal. and Interp. (SSIAI) '06* , Denver, Mar. 2006, pp. 91-94.

"New Quasi-Covariance-Based 2D Quad Mesh Smoothing," by H. Xu and T. S. Newman, *Proc., Huntsville Simulation Conf. '05*, CD-ROM, 7 pp.

"Cumulus Cloud Rendering Techniques," by M. Maskey and T. S. Newman, *Proc., Computer Graphics and Imaging '05 Conf.,* Honolulu, Aug. 2005, pp. 25-30.

"Validation of Texture Measures for Cumulus Cloud Image Classification," by M. Maskey and T. S. Newman, *Proc., Signal and Image Processing '05 Conf.*, Honolulu, Aug. 2005, pp. 394-399.

"Mesh Simplification Using Quasi-Covariance," by H. Xu and T. S. Newman, *Proc., 9th Int'l Conf. on Numerical Grid Generation in Computational Field Simulations*, San Jose, CA, June 2005, on CD-ROM, 10 pp.

"2D FE Quad Mesh Smoothing via Angle-Based Optimization," by Hongtao Xu and Timothy S. Newman, *Proc., Int'l Conf. on Computational Science 2005*, Atlanta, May 2005 (published in *Lecture Notes in Computer Science, Vol. 3514*, pp. 9-16).

"Efficient Feature-Based Model Editing Through Reuse of Intermediate Tool Bodies," by Dennis M. Weldy and Timothy S. Newman, *Proc., Int'l Conf., on Advances in Computer Science and Technology (ACST 2004)*, St. Thomas, US Virgin Islands, Nov. 2004, pp. 64-69.

"Automated Detection of Solar Loops by the Oriented Connectivity Method," by Jong K. Lee, Timothy S. Newman, and G. Allen Gary, *Proc., 17th Int'l Conf. on Pattern Recognition (ICPR)*, Cambridge, U.K., Aug. 2004, pp. IV-315 to IV-318.

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"Directions in Visualization Research," Faculty Colloquium, University of Alabama in Huntsville Dept. of Computer Science, Dec. 9, 1994.
Panelist, "Future Directions in Visualization and Machine Vision," IEEE Workshop on Visualization and Machine Vision, Seattle, WA, June 24, 1994.
"A System for CAD-Based Inspection," National Institute of Standards and Technology, Gaithersburg, MD, April 7, 1994.
"CAD-Based Inspection of 3D Objects Using Range Images," Second IEEE CAD-Based Vision Workshop, Champion, PA, February 11, 1994.
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"Tracking of Swine Kidneys in Time-Series MR Data," National Institutes of Health Department of Nuclear Medicine Colloquium, Bethesda, MD, January 1994.
"Experiments in 3D CAD-Based Inspection," Invited Presentation at Oak Ridge National Laboratory, Oak Ridge, TN, August 10, 1993.
"3D Object Recognition: Interpretation Tree Search on a MIMD Machine," Eleventh Int'l Conference on Pattern Recognition, the Hague, the Netherlands, September 1992.
"3D CAD-Based Inspection I: Coarse Verification," Eleventh International Conference on Pattern Recognition, the Hague, the Netherlands, September 1992.
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Proposals

Funded Proposals**:**

"Coronal Mass Ejections and Space Weather: Synergy of Observations and Modeling," sponsored by UAH IIDR Program, Co-I (N. Pogorelov, PI), for 24 mo. period starting June 2018, $49,576.

"Aiding Humans in Investigating Images Task Order," sponsored by Army Research Laboratory, PI for March to December 2016, $35,000.

"Entertainment and Game Computing Lab and Lab Support," UAH, PI, funded July 2014, $96,943.

"Strategic Leadership: Entertainment Arts at UAH," UAH Strategic Leadership Areas Inititiative, Selected Spring 2013, approx. $300K/yr commitment if fully implemented.

"Equipment for UAH Computer Science Parallel Volumetric Visualization Laboratory," TVA Local Discretionary Funds, funded Nov. 2012, $7,492.

"Enabling Supercomputer-Fast Numerical Computation and Visualization work with Near-Commodity-Level Equipment," UAH Research Infrastructure Investment Program, funded May 2008 for 12 mo. period, $1,751.

"UAH Ph.D. Teaching Assistantship Enhancement Program Application for the Department of Computer Science," UAH Graduate Studies, PI (R. Aygun, H. Zhang, Co-PIs), funded May 2008 for 24 mo. period, about $20,000.

"Solid Rocket Combustion Model Optimization," Center for Modeling, Simulation, and Analysis, PI, awarded Jan. 2007 for 5 mo. period, about $53,000.

"Auroral Phenomenon Localization, Classification, and Temporal Evolution Tracking," NASA, PI (G. Germany, C.C. Hung, and J. Spann, Co-Is), funded Jan. 2006 for 36 mo. Period (extended for 12 more mo.), $354,667.

"Robust Localization, Classification, and Temporal Evolution Tracking in Auroral Data," NASA, PI (G. Germany, C. C. Hung, and J. Spann, Co-Is), funded Oct. 2004 for 12 mo. period (extended for 12 more mo.), $80,000.

"Directed Energy Educational Initiative," Directed Energy Professional Society, Co-I (R. Fork, PI), funded March 2004 for 12 mo. period, $10,000.

"REU: Efficient Out-of-Core Isosurface Extraction from Large Datasets," National Science Foundation, PI, submitted 2002 (funded Feb. 2003) for 9 mo. period, $7,500.

"Efficient Out-of-Core Isosurface Extraction from Large Datasets," National Science Foundation, PI, funded Sept. 2002 for 36 mo. period (extended for 24 more mo.), $153,282.

"Terrestrial Plasmaspheric Feature Tracking and Volume Visualization via Tomographic Back Projection," NASA, PI (D. Gallagher, M. Adrian, Co-Is), funded April 2002 for 36 mo. period (extended for 12+ mo.), $242,607.

"Tomographic Inversion for Space Plasma Visualization," NASA, PI, funded Dec. 2001 for 45 mo. period, $6,000.

"Training Alabama K-12 Teachers in Computational Science Using Earth and Space Science Datasets," Alabama Space Grant Consortium, PI, funded May 2001 for 8 mo. period, $5,536 ($3,200 agency).

"REU/Industrial Collaboration Supplement (Year Four) for CAREER: Parallel Feature Extraction," National Science Foundation, PI, funded Jan. 2001 for 9 mo. period, $17,720.

"Exploiting 3DNow! for High Performance Volume Visualization on the Desktop (White Paper/Pre-proposal)," Advanced Micro Devices, PI, funded Dec. 2000, approx. $2750 (equipment).

"Investigating Automatic Feature and Landmark Extraction in Cephalograms," SAIC, PI, funded October 2000 for 2 mo. period, $5,070.

"Additional Experiments III and Comparison for Ascertaining Suitability of Extracted Statistical Features," Kudikalu Universal, Inc., PI, funded October 2000 for 3 mo. period, $613.

"Additional Experiments II and Comparison for Ascertaining Suitability of Extracted Statistical Features," Kudikalu Universal, Inc., PI, funded August 2000 for 2 mo. period, $536.

"Graduate Student Supplement Support for Participation in International Component of CAREER Parallel Feature Extraction Research," National Science Foundation, PI, funded March 2000 for 12 mo. period, $3,900.

"Additional Experiments for Ascertaining Suitability of Extracted Statistical Features," Kudikalu Universal, Inc., PI, funded March 2000 for 3 mo. period, $1,500.

"REU/Industrial Collaboration Supplement for CAREER: Parallel Feature Extraction," National Science Foundation, PI, funded Dec. 1999 for 1 yr. period, $13,513.

"Statistical Feature Extraction and Summary II in Spatial Variable Distribution Array," Kudikalu Universal, Inc., PI, funded Oct. 1999 for 2 mo. period, $1,203.

"Key Statistical Feature Extraction and Summary I in Spatial Variable Distribution Array for Archived Datasets," Kudikalu Universal, Inc., PI, funded July 1999 for 3 mo. period, $1,060.

"K-12 Computational Science Teacher Training and Class Projects using Earth and Space Sciences Datasets from the Web," Alabama Space Grant Consortium, PI, funded May 1999 for 5 mo. period, $6,925 ($3,987 agency).

"Agency Visitation," Alabama NSF EPSCoR, PI, funded April 1999, $1,138.

"REU Supplement (2): CAREER Parallel Feature Extraction and Dataset Registration for Volumetric Visualization," National Science Foundation, PI, funded Dec. 1998 for 9 mo. period, $6,250.

"Left Ventricular Function Determination using SPECT GBP Imaging," ALVIS Center Pilot Project, PI, funded Sept. 1998 for 12 mo. period, $15,000.

"Research Equipment for Software Engineering and Performance Measurement and Visualization," Acxiom Corp., Co-PI (Wei Li, PI), funded August 1998, $28,000 (equipment).

"Secondary School Projects in Computational Science using Earth and Space Sciences Datasets on the Internet," Alabama Space Grant Consortium, PI, funded May 1998 for 5 mo. period, $5,830 ($3,597 agency).

"SUN AEG: A 3D Graphics and Imaging Workstation for Biomedical Volumetric Visualization, Research, Education, and Outreach," Sun Microsystems, Inc., PI, funded March 1998, $23,045 (equipment).

"Determination of Bounding Surface Parameters for CAD Model Recovery (Reverse Engineering)," Alabama Space Grant Consortium, PI, funded Feb. 1998 for 10 mo. period, $21,640 ($10,000 agency).

"A Testbed for a Multi-network Infrastructure for Research," National Science Foundation, Co-PI (Sara Graves, PI), funded Feb. 1998 for 24 mo. period, $350,000 plus $100,000 EPSCoR supplement (for equipment).

"REU Supplement: CAREER Parallel Feature Extraction and Dataset Registration for Volumetric Visualization," National Science Foundation, PI, funded Sept. 1997 for 11 mo. period, $6,250.

"Extraction of Surface Features from AFM Images of Globular Proteins for Support of Biomaterials Technology Transfer," Alabama NSF EPSCoR Young Faculty Career Enhancement Program, PI, funded July 1997 for 12 mo. period, $51,286 ($25,247 agency).

"Computational Science Projects for K-12 Classrooms Using Internet Access to Earth an Space Sciences Datasets," Alabama Space Grant Consortium, PI (Carl Davis, Co-PI), funded May 1997 for 4 mo. period, $8,266 ($4,997 agency).

"Improving Student Success in the CS I and CS II Courses," UAH Instructional Mini-Grant, PI (Mary Ellen Weisskopf, Co-PI), funded April 1997 for 12 mo. period, $2000.

"CAREER: Parallel Feature Extraction and Dataset Registration for Volumetric Visualization," National Science Foundation, Faculty Early Career Award Program, PI, funded Feb. 1997 for 48 mo. period (extended to 57 mo.), $265,800 ($259,800 from agency including $25,000 supplement of August 1998).

"Classification and Visualization of Tissue in Multiple Modalities of Brain MR," U.S. Air Force Office of Scientific Research, PI, funded Feb. 1997 for 12 mo. period, $25,000.

"Development of a Feature Extraction Algorithm for Synthetic Aperture Radar Images," Alabama Space Grant Consortium, funded Feb. 1997 for 6 mo. period, $20,210 ($10,000 agency).

"Quadric Surface Segmentation and Classification Through 3D Object Model Exploitation (Extension)," UAH Research Grant, unsolicited award, PI, funded Nov. 1996 for 12 mo. period, $2,000.

Microsoft Instructional Lab Grant, Co-PI (M. Weisskopf, PI), submitted April 1996, funded Sept. 1996 for 24 mo. period, $68,800 (equipment).

"Quadric Surface Segmentation and Classification Through 3D Object Model Exploitation," UAH Research Mini-Grant, PI, submitted Oct. 1995, funded Jan. 1996 for 12 mo. period, $2,000.

"Efficient Visualization Algorithms for Image-Guided Intervention in von Hippel Lindau Renal Disorders," Cray Research, Inc., PI, funded Feb. 1995 for 12 mo. period, $15,000.

"Establishment of a Computer Vision Laboratory for Automated Visual Inspection of Industrial Parts," UAH Research Mini-Grant, PI, funded Dec. 1994 for 12 mo. period, $2,000.

Submitted Proposals:

"III:Small: Supporting Sensemaking and Visual Analysis through Display Ecologies," Co-PI (H. Chung, PI), sub. to NSF Nov. 2017 for 36 mo. Period of performance, $500,000.

"Phase I UCRC The University of Alabama in Huntsville: Southern Alliance for Advanced Vehicle (SAAV) Manufacturing Center," Senior Personnel (P. Farrington, PI; 5 Co-PIs), sub. to NSF Feb. 2017 for 36 mo. period of performance, $750,000.

"Fast, Accurate Techniques for Automated Visual Inpsection of a Wider Range of Shape-Related Defects (late)," PI, for SAAV Center Initiative / NSF, sub. March 2016 for 12 mo. period of performance, $65,000

"Fast, Accurate Techniques for Automated Visual Inspection (AVI) of a Wider Range of Shape-Related Defects (early)," PI (S. Canfield, Supporting I), for SAAV Center Initiative / NSF, sub. Oct. 2014 for 12 mo. period of performance, $65,000.

"High-speed Automated Visual Inspection of Manufactured Automotive Part Shape," PI, for SAAV Center Initiative / NSF, sub. Oct. 2014 for 12 mo. period of performance, $52,000.

"Development of Reconstruction Techniques for Space-Based Muon Radiography Applications," UAH IIDR, Co-PI, (R. Miller, PI), sub. Feb. 2014 for 12 mo. period of performance, $30,175.

"Asteroid Rendezvous Interior Structure Experiment (ARISE)," NASA, Senior Personnel (R. Miller, PI), sub. May 2013 for 36 mo. period of performance, $410,028.

"MRI: Acquisition of a Cave Automatic Virtual Environment," National Science Foundation, Co- PI (M. Petty, PI), sub. Jan. 2011 for 36 mo. period of performance, $818,144.

"Random Number Generation for High Performance Computing (STTR)," decibel Research, PI, sub. Mar. 2010 for 6 mo. period, $34,987.

"MRI: Acquisition of a Cluster-Driven Tiled Display for Science Data Exploration," National Science Foundation, Co-PI (S. Graves, PI), sub. Apr. 2010 for 36 mo. period, $489,894

"Cyber-Infrastructure for High Performance Computational Modeling of Fuels and Data Dissemination," National Science Foundation, Co-PI (R. Frederick PI), sub. Aug. 2009 for 36 mo. period, $1,851,320.

"Gaming Curriculum Enhancement Options at UAHuntsville," jointly submitted by T. Newman, R. Aygun, H. Ranganath, F. Zhu, to UAH provost, sub. 2009, apparently rejected.

"Commodity Real-Time Interactive Exploration and Visualization of Auroral Data (CreaTE)," NASA, PI (G. Germany, J. Spann, C.C. Hung, Co-Is) sub. August 2008 for 36 mo. period, $405,851.

"Reconstruction and Visualization of the Plasmasphere Plasma Density Distribution from a Short Sequence of EUV Images," NASA Earth and Space Science Fellowship Program, PI, for graduate student C. Wang, sub. Feb. 2007 for 12 mo. period, $24,000.

"High Performance Visualization of Gamma Ray Burst Simulation Datasets," Alabama Space Grant Consortium Space Grant Fellowship Program, PI, for graduate student Brian Wood, sub. Mar. 2007 for 12 mo. period, $24,000.

"More Efficient Analysis of Large (Particle-in-Cell) Gamma Ray Burst Simulation Datasets," NASA, PI (K.-I. Nishikawa, G. Richardson, M. Watson, Co-Is), sub. Jan. 2007 for 36 mo. period, $349,401.

"An online Search Tool for Plasmaspheric Images," NASA, Co-I (G. Germany, PI), sub. July 2005 for 36 mo. period, $418,225.

"Computational Steering for Magnetospheric Dynamic Simulations," NSSTC, PI (G. Khazanov, Co-I), submitted Aug. 2004 for 12 mo. period, $53,055.

"Advanced Efficient Visualization for Aiding Study of Relativistic Jet Formation," NSSTC, PI (G. Richardson, K. Nishikawa, Co-Is), submitted Aug. 2004 for 12 mo. period, $53,388.

"Kinetic Studies Synthesizing Auroral Acceleration Processes," NASA, Co-I (N. Singh, PI), submitted April 2004 for 36 mo. period, $1,371,724.

"ITR Collaborative Research: Systematic and Comprehensive Studies of Gamma Ray Burst and Other Emissions in Astrophysical Systems," NASA, Co-I (K. Nishikawa, PI), submitted March 2004 for 35 mo. period, $346,839.

"Alabama Center for Computational Simulations" sub-proposal, Co-PI (S. Graves, PI), submitted to UAB for inclusion in their NSF EPSCoR proposal under the same name, B. Soni (PI), submitted May 2003 for Sept. 2003-Aug. 2008 period of performance, component at UAH: $606,150 ($404,100 agency).

"Improved Biomediccal Polarimetric Imaging," NIH, Co-PI (A. Lompado, PI), submitted March 2003 for Sept. 2003-Sept. 2005 period of performance, $389,369.

"Collaborative Research: ITR: A Versatile Computational Scheme for Finite Element Processing," NSF, Co-PI (R. Preece, PI and J. Hakkila, Co-PI), submitted Feb. 2003 for Sept. 2003-Aug. 2008 period of performance, $2,404,159.

"Small and Large Scale Ring Current Electrodynamic Coupling," NASA, Co-PI (G. Khazanov, PI), submitted July 2002 for 36 mo. period, $256,234.

"High Performance Isosurface Rendering to aid Observation and Discovery in Large Time-Varying Space Sciences Datasets," NASA, PI (N. Singh, B. Wells, Co-Is), submitted Sept. 2001 for 36 mo. period, $247,341.

"Improving Success in Introductory Computer Science," Greater Huntsville Community Foundation, PI, submitted May 2001 for 1 year period, $1,164 ($800 agency).

"Structures and Cross-Scale Coupling in the Auroral Acceleration Region," NASA, Co-I (N. Singh, PI), submitted April 2001 for 36 mo. period, $1,083,177.

"Thunderstorm Observations (Phase 2-6) – Computer Science Project Component," NASA, PI (component of UNESS/THOR proposal of Bateman, Christian, et al.), sub. Feb. 2001 for 65 mo. period, $188,829.

"ITR/SY: A Meter on Metrics: Comparison, Validation, and Interoperation Across the OO Life Cycle," National Science Foundation, PI (L. Etzkorn, W. Li, C. Davis, Co-PIs), sub. Jan. 2001 for 36 mo. period, $473,453.

"Assessing and Assuring Large Object-Oriented Software System Quality Across Multiple Development Stages," Office of Naval Research (DOD URI program), Co-PI (L. Etzkorn, PI), submitted August 2000 for 3 year period, $544,838.

"Complex Systems Analysis and Modeling in Engineering and Science using Modern Computing Techniques," National Science Foundation IGERT program, Investigator (T. Chung, PD), submitted July 2000 for 3 year period, $1,500,000.

"Achieving High Performance in Visualization Through Leverage of Cluster and SMP Computation and Microprocessor SIMD Extensions (White Paper/Prospectus)," Army Research Labs, PI, submitted Feb. 2000, for 18 mo. period, $40,000.

"ITR: Handshake Technology for Data and Process Interoperability," National Science Foundation ITR pre-proposal, Co-PI (S. Graves, PI), submitted Jan. 2000 for 3 yr. period, $1,780,031.

"ITR/SW: Quality Visualization for Assessing Large Object-Oriented Software Systems Across Multiple Development Stages," National Science Foundation ITR pre-proposal, PI (L. Etzkorn, W. Li, J. Bansiya, Co-PIs), submitted Jan. 2000 for 3 yr. period, $608,659.

"Experiments in Extraction and Visualization of Key Statistical Features from Spatial Variable Array," Kudikalu Universal, Inc., PI, submitted Dec. 1999 for 3 mo. period, $509.

"Large Object-Oriented Software System Quality Visualization Across Multiple Development Stages," National Science Foundation, PI (L. Etzkorn, W. Li, Co-PIs), submitted July 6, 1999 for 3 yr. period, $555,948.

"Life, Earth, and Atmospheric Sciences ResearchNetwork (LEARN)," National Science Foundation, Co-PI (Sara Graves, PI), submitted May 15, 1999 for 3 yr. period, $1,916,802.

"Detection, Monitoring, and Volumetric Visualization of VHL Renal Cysts and Tumors," Murray Foundation, PI, submitted March 1999 for 18 mo. period, PI, $37,696.

"Functional Magnetic Resonance Imaging of Human LGN and Pulvinar," Alabama Vision and Imaging Sciences (ALVIS) Center, Co-PI (Rosalyn Weller, PI) submitted March 1998 for 1 yr. period, $14,975.

"STC: Alabama Vision and Imaging Science (ALVIS)," National Science Foundation, Co-I (Paul Gamlin, PI), submitted Feb. 1998 for 5 yr. period, $14,470,694.

"AASERT: Classification of Tissue for Computer-Aided Minimally Invasive Surgery (CAMIS)," US Air Force Office of Scientific Research, PI, submitted Oct. 1997 for 3 yr. period, $107,901.

"An Experimental Research Testbed for the Development and Performance Measurement of Distributed Multithreaded Applications," NSF EPSCoR, Co-PI (Krishna Kavi, PD), submitted September 1997 for 24 mo. period, $921,213 ($499,898 agency).

"Structural Complexity Visualization in ROSE/C++," Rational Software Corp., Co-PI (Wei Li, PI), submitted May 1997 for 12 mo. period, $78,417.

"Visualization of Structural Complexity in UML", National Science Foundation, Co-PI (Wei Li, PI), submitted Nov. 1996 for 18 mo. period, $198,367.

"Extraction of Surface Features for Volumetric Visualization," Office of Naval Research, PI, submitted October 1996 for 48 mo. period, $323,792 ($246,345 agency).

"High Performance Visualization for the Classroom and Operating Room: an Educational Program incorporating Visualization in the Undergraduate and Graduate Curricula and a Research Program for Efficient Visualization for Image-Guided Interventions," PI, submitted Sept. 1996 (for 60 mo. period), $417,011, as a part of a multi-institutional response to NSF Partnerships for Adv. Computational Infrastructure for a Computational Research and Education Center in California.

"Renovations of Atmospheric and Hydrologic Research and Research Training Laboratories," National Science Foundation, Academic Research Infrastructure Program, Co- Investigator (Dave Brown, PD), submitted Mar. 1996, $358,000 (withdrawn by institution, 1997).

"A Hierarchical Representation for Efficient Storage and Multi-Resolution Generation of Images," Alabama Space Grant Consortium, PI, submitted January 1996 for 12 mo. period, $24, 735 ($10,000 agency).

"Expanded Visualization Tools for Image Exploitation," U.S. Air Force Office of Scientific Research, PI, submitted Oct. 1995 for 12 mo. period, $32,266 ($24,999 agency).

"The Recognition and Inspection of 3D Objects Composed of Free-Form Surfaces," National Science Foundation, CAREER program, PI, submitted Oct. 1995 for 60 mo. period, $267,623 ($259,323 agency).

"A Vector Graphics Image Conversion Utility," McDonnell Douglas Aerospace, PI, submitted October 1995 for 10 mo. period, $6,338.

"Center for Fundamental Image Understanding," through University of Arizona to Army Research Office, Co-PI (John Dimmock, PI), submitted April 1995 for 60 mo. period, $1,155,925.

"Three Dimensional CAD-Based Automated Visual Inspection of Small Manufactured Parts," National Science Foundation, CAREER program, PI, submitted Oct. 1994 for 36 mo. period, $129,651.

Service Activities

President, Faculty Senate, 2020-21.
President-Elect, Faculty Senate, 2019-20.
President-Elect, Faculty Senate, 2010-11.
President, Faculty Senate, 2011-12
Past-President, Faculty Senate, 2012-13.
Parliamentarian, Faculty Senate, 2013, 2015-16, 2016-17, 2017-18, 2018-19.

Faculty Representative to University of Alabama System Board of Trustees, 2011-12, 2020-21.

Chair, Faculty Activities Database Committee, 2016-17.
Chair, Faculty Senate Ad Hoc Committee on the Faculty Handbook, 2015-16, 2016-17, 2017-18.
Chair, Faculty Senate Academic Realignment Committee, 2009.
Chair, Faculty Senate Undergraduate Scholastic Affairs Committee, 2009.

Member, Ad Hoc Committee on IT Policy Review for the Faculty Senate, 2017-18.
Member, University Campus Planning Committee, 2019-20.
Member, University Commencement Committee, 2020-21.
Member, University Communicable Disease Management Team, 2020-21.

Member, Faculty Senate Finance and Resources Committee, 2013.
Member, Faculty Senate Undergraduate Scholastic Affairs Committee, 2009-10.
Member, Faculty Senate Executive Committee, 2009, 2010-13, 2015-present.

Member, Charger Innovation Fund Review Panel, 2013.
Member, Faculty Senate, 2000-01, 2003-2005, 2009-2013, 2015-present.
Member, Faculty-Staff Alliance, 2001-2005.
Member, Graduate Dean Selection Committee, 2004.
Member, Provost Search Committee, 2007-08.
Member, Research Mini Grant Proposal Evaluation Committee, 2005, 2006, 2007, 2008, 2009.
Pre-submission Evaluator, University's NSF CAREER Proposals, 2008.
Member, University Budget Planning Committee, 2011-12.
Member, University Compliance Committee, 2013.
Member, University Strategic Planning Steering Committee, 2011-13.
Also served on two sub-committees (for identifying research potential and for Identifying faculty line pool size enhancement opportunities)

Member, University Undergraduate Curriculum Committee, 2000-01, 2003-2005.
Member, University Health-Related Programs Task Force, 2008.
Member, University Judicial Board, 2000-01, 2001-02.
University Life 101 Lecture, 2004 (same lecture material presented to 4 sections).

Member, College of Science Promotion and Tenure Advisory Comm., 2003, 2007, 2009, 2010-11, 2015, 2017-18.
Alt. Member, College of Science Curriculum Comm., 2003-2005, 2010-11.
Member, College Dean Evaluation Comm., 2004.
Member, External Evaluation Team, UAH Dept. of Atmospheric Sciences, Fall 2005.
Co-wrote evaluation report.
Lecturer ("What's Inside?"), College Lecture Demonstration Day, Mar. 2006.
Presenter, SCI 100, Sept. 2006.

Member, Peer Evaluation and Reappointment Committee, UAH Dept. of Physics, 1995, 2000, 2009.
Member, Peer Evaluation and Reappointment Committee, UAH Management Info. Systems, Spring 2003, Fall 2003.
Member, Peer Evaluation and Reappointment Committee, UAH Art and Art History Dept., 2016, 2019.
Member, Peer Promotion Committee, UAH Dept. of Physics, 2012.
Member, Peer Promotion Committee, UAH Management Info. Systems, 2014, 2016.
Member, Peer Promotion Committee, UAH Dept. of English, 2014, 2015.

Undergraduate Mentor, UAH College of Science, 1996-97.

Chair, Department Computer Gaming / Entertainment Arts Study Group, 2012-14.
Chair, Department Entertainment Computing Curriculum Comm., 2018-19.
Co-lead, AI for Games Subcommittee Curriculum Coordination, 2018.

Member, Dept. Modeling and Simulation Certificate Organization Committee, 2003.
Author, Laser Lab Equipment Evaluation and Upgrade Recommendation Report, 2003.
Chair, Dept. TA Recruiting/Selection Committee, 2000-2015.
Member, UAH Comp. Science TA Recruiting/Selection Committee, Jan. 1997-Aug. 2000.
Coordinator, Graduate Comprehensive Exam Architecture Component, Sept. 2003, Jan. 2004, June 2004, Sept. 2004, Jan. 2005, Sept. 2005, Jan. 2006, Sept. 2006, Jan. 2007, Sept. 2007, Jan. 2008, June 2008, Sept. 2008, Jan. 2009, Sept. 2009, Jan. 2010, Sept. 2010, Jan 2011., Sept. 2011, Jan. 2012, Sept. 2012, Jan. 2013, Sept. 2013, Sept. 2015.
Coordinator, Graduate Comprehensive Modeling and Simulation Exam Graphics Component, 2010-2017
Member, Department Undergraduate Committee, 2000-01, 2001-02.
Member, Department Architecture Committee (and Arch. Course Review from 2014 on), 2001-02, 2011, 2014, 2015-16, 2018.
Member, Department Electives Course Review Committee, 2018.

Member, Peer Evaluation and Reappointment Committee (I), UAH Dept. of Comp. Science, 1994, 2001.
Chair, Department Elective Evaluation Committee, 2005.
Chair, Peer Evaluation and Reappointment Committee (I), UAH Dept. of Comp. Science, 1999, 2000, 2002, 2003, 2004, 2005, 2006, 2008, 2016, 2017, 2018, 2019.
Chair, Peer Evaluation and Reappointment Committee (II), UAH Dept. of Comp. Science, 2000, 2019.
Member, Peer Evaluation and Reappointment Committee (II), UAH Dept. of Comp. Science, 1999, 2001, 2002, 2004, 2005, 2007.
Coordinator, Graduate Comprehensive Examination, 1998, Sept. 2016.
Lab Overseer, UAH Computer Science Volumetric Visualization Laboratory, 1998-present.

Member, Faculty Search Committee, UAH Dept. of Comp. Science, 1996,1998, 2003, 2005, 2007, 2008, 2012, 2014, 2016, 2017, 2018-19 (co-chair 2017 and 2018-19), 2019-20.
Member, Faculty Search Committee, UAH Dept. of Civil and Environmental Engg., 2013.

Member, Visiting Faculty Search Committee, UAH Dept. of Comp. Science, 1997.

Originator, Designer, and Coordinator, UAH Dept. of Comp. Science Graduate Recruiting Brochure, 1997.
Member, UAH Comp. Science Student Success Committee, 1997-1998.
Member, Equipment Evaluation Committee, UAH Dept. of Computer Science, 1996.
Coordinator, Annual Secretarial Appreciation Gifts, UAH Dept. of Comp. Sci, 1995, 1996, 1999.
Member, System Administrator Evaluation and Hiring Committee, UAH Dept. of Comp. Science, 1995.
Department Coordinator of United Way Fund Drive, UAH Dept. of Computer Science, 1995.
Member, Undergraduate Curriculum Committee, UAH Dept. of Computer Science, 1994-2000.
Member, Department ABET Evaluation of Architecture Classes Committee, 2018.
Member, Department ABET Evaluation of Electives Committee, 2015, 2018.
Member, Department ABET Evaluation of Theory Classes Committee, 2015.

Database Designer and Maintainer, Alabama State Science Fair, Huntsville, AL, Jan. 1996-April 1998.
Judge, Student Paper Competitions, ACM Mid-Southeast Fall Meeting, Gatlinburg, 1997.
Judge, Alabama State Science Fair, Huntsville, AL, April 1996, April 2004.
Judge, Student Paper Competition, Alabama High School Supercomputing Expo, April 1995.
Judge, Student Research Paper Competition National Finals, National Junior Science and Humanities Symposium, May 1995.

Elected Treasurer of All-University Graduate Student Government, the Council of Graduate Students (COGS), at Michigan State University (MSU) , 1988-89.
Proposed and implemented financial control procedures; developed and implemented new funding guidelines for student organizations; balanced budget by reducing expenditures 20%; oversaw successful campaign to increase organization's future funding; organized forum on pros and cons of TA unionization; made presentation on graduate tuition costs to Michigan's Governor's aides; negotiated contracts for Student Legal Services and Graduate Loan Funds; spearheaded successful lobby of administration for introduction of tuition waivers for graduate assistants.

COGS Parliamentarian, 1989-90, 1990-91.
- Negotiated contract for Student Legal Services
- Served on committee to upgrade computing equipment
- Organized state-wide meeting of representatives of Michigan Graduate Assemblies

MSU University Graduate Council graduate representative, 1988-89.
Elected representative, Academic Council, the highest body of MSU academic governance, 1989-90.
Member, MSU University Graduate Judiciary, 1988-91.
Member, MSU Student Council, 1989-90
Member, MSU University Committee on Academic Governance, 1990-91.
- Served on subcommittee for Revision of University By-Laws governing University Secretary of Academic Governance.

Editorial Board Member, *Rapid Communications in Pattern Recognition*, 1999-2000.
Associate Editor, *Pattern Recognition*, 1999-2015.
Editorial Board Member, *Pattern Recognition*, 2000-2006.

Textbook Reviewer, Pearson Education, 2009.
Textbook Reviewer, IEEE Press, 2008.
Textbook Mini-Review, Morgan Kaufmann, 2005.

Textbook Reviewer, Prentice-Hall, 2003.
Manuscript/Textbook Reviewer, *Interactive Comp. Graphics with OpenGL, 2nd Edition* (by E. Angel), 1998.

Scientific Organizing Committee, International Conference on Quality Control by Artificial Vision, 1997, 1998, 1999, 2001, 2003, 2008, 2011.
Program Committee Member, Computer Graphics and Visualization 2006, 2007, 2008, 2010, 2011 Conferences.
Program Committee Member, Computer Graphics, Visualization, Computer Vision and Image Processing Conf. (CGVCVIP), 2020.
Program Committee, Graphics and Visualization in Engineering (GVE) '07 Conference, 2007.
Program Committee, EG Parallel Graphics and Visualization Conf. (EGPGV), 2007, 2008.
Program Committee, Int'l Conf. on Info. Vis. Theory and Apps., 2016.
Organizing Committee, Computer Graphics and Imaging 2000, 2001 Conferences.

Session Chair, EG Parallel Graphics and Visualization '06 Conf., Braga, Portugal, 2006.
Session Co-Chair, VIIP '02, Malaga, Spain, September 2002.
Session Co-Chair, EMBS/BMES '99, Atlanta, October 1999.

Panel Reviewer, National Science Foundation, 2000 (two panels), 2002, 2003, 2004, 2008.
Proposal Reviewer, Austrian Science Fund, 2012.
Proposal Reviewer, National Science Foundation, 2006, 2009, 2010.
Proposal Reviewer, King Fahd University, 2009, 2019.

Reviewer, *ACM Transactions on Sensor Networks*, 2015.
Reviewer, *Computational and Mathematical Methods in Medicine*, 2013, 2014.
Reviewer, *Computer Animation and Virtual Worlds*, 2013, 2017-18.
Reviewer, *Computer Graphics Forum*, 2020.
Reviewer, *Computer Vision, Graphics and Image Processing: Image Understanding*, 1994.
Reviewer, *Computer Vision and Image Understanding*, 2002, 2013, 2014.
Reviewer, *Computerized Medical Imaging and Graphics*, 2010, 2013, 2014, 2015, 2017, 2018, 2020.
Reviewer, *Computers and Graphics*, 2007, 2008, 2010, 2016.
Reviewer, *Computers and Industrial Engineering*, 2000, 2006..
Reviewer, *IEEE Transactions on Automation Science and Engineering*, 2004, 2006.
Reviewer, *IEEE Transactions on Fuzzy Systems*, 2016.
Reviewer, *IEEE Transactions on Geoscience and Remote Sensing*, 2014, 2017, 2018.
Reviewer, *IEEE Transactions on Image Processing*, 2006.
Reviewer, *IEEE Transactions on Medical Imaging*, 2006.
Reviewer, *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 1996, 2000, 2001
Reviewer, *IEEE Transactions on Visualization and Computer Graphics*, 2009
Reviewer, *Image and Vision Computing*, 1994, 1995, 2003.
Reviewer, *Imaging Science Journal*, 2004.
Reviewer, *Iranian Journal of Electrical and Computer Engineering*, 2005.
Reviewer, *Journal of Electronic Imaging*, 2007, 2012, 2015.
Reviewer, *Journal of Geophysical Research*, 2009.
Reviewer, *Journal of Visual Communications and Image Representation*, 2009.
Reviewer, *Journal of Zhejiang University Science*, 2006, 2007.
Reviewer, *Machine Vision Applications*, 2002, 2003.
Reviewer, *Pattern Recognition*, 2000-2020 (several papers most years).

Reviewer, *Pattern Recognition Letters*, 1997, 1998, 1999 (two papers in 1999), 2000, 2002, 2004, 2005, 2010, 2019.
Reviewer, *PLOS One*, 2020.
Reviewer, *Remote Sensing Letters*, 2018 (3 reviews).

Reviewer, *Results in Physics*, 2016.
Reviewer, *Sensors*, 2015.
Reviewer, *The Visual Computer Journal*, 2020.
Reviewer, *Theoretical Computer Science*, 2015.
Reviewer, ACM SIGGRAPH Asia Conf., 2016, 2018.
Reviewer, ACM Southeast Conf., 2004 (multiple papers).
Reviewer, Computer and Robot Vision 2016 Conf. , 2016 (multiple papers)
Reviewer, EG Parallel Graphics and Visualization Conf., 2006, 2007, 2008 (multiple papers).
Reviewer, Joint Symp. on Viz. (VisSym), 2004.
Reviewer, Visualization '03, '05, '06, '07, '09
Reviewer, Volume Visualization '04.
Reviewer, Real-Time Ray Tracing (RT) '06 (two papers)
Reviewer, Int'l Conf. on Par. and Dist. Computing Systems, 2003 (two reviews plus two coord.).
Reviewer, Southern Computing Conference, 2000.
Reviewer, Computer Graphics and Visualization (CGV/CGVCVIP) Conf., 2006, 2007, 2008, 2010, 2015, 2018, 2019, 2020 (multiple papers each year).
Reviewer, Computer Graphics and Imaging Conference, 2000.

Reviewer, International Conference on Quality Control by Artificial Vision Conference '97, '99, '01, '03, '09, '11.
Reviewer, 14th International Conference on Pattern Recognition, 1996.
Reviewer, National Educational Computing Conference, Washington, DC, 1995.
Reviewer, IEEE Computer Vision and Pattern Recognition Conference, 1994.

External Tenure Evaluator, New York Institute of Technology, Nov. 1996.
External Tenure/Promotion Evaluator, SUNY-Binghamton, 2004, 2005.
External Tenure Evaluator, IUPU-I, July 2006.
External Tenure Evaluator, University of Memphis, 2007.

Summer Faculty Researcher, NASA Marshall Space Flight Center, Huntsville, AL, May-Aug. 1998, May-Aug. 2001, May-July 2002.
Summer Faculty Researcher, US Air Force Office of Summer Research Programs, Wright Laboratory, Wright-Patterson Air Force Base, Dayton, OH, June-August 1996.
Summer Faculty Researcher, US Air Force Office of Summer Research Programs, Rome Laboratory, Griffiss Air Force Base, NY, May-August 1995.
Organizer, Univ. of Alabama-Huntsville Department of Computer Science Visualization and Graphics Interest Group, 1995 – present.

Senior Member, Association for Computing Machinery (ACM).
Senior Member, Inst. for Electrical and Electronics Engineers (IEEE) and IEEE Computer Society.
Membership Chair, IEEE Computer Society Huntsville Section, 2002-2003.
Member-at-Large, IEEE Computer Society Huntsville Section, 2003.
Member, ACM Special Interest Group on Graphics (SIGGRAPH).
Member, IEEE Pattern Analysis and Machine Intelligence Technical Committee.
Member, IEEE Computer Society Technical Committee on Computer Graphics.
Numerous public presentations of research to MSU Pattern Recognition and Image Processing Research

Honors, Awards, and Special Recognitions:

Best Researcher/Scholar in Computer Science at UAH for 2014-15, FacultyAwards.org, awarded Mar. 2015.

Recipient of University of Alabama System Board of Trustees Board Service Commendation Resolution, 2012.

Most-cited paper Award, from *Computers & Graphics* journal considering years 2005-2010, awarded 2011.

"Hottest Article" in *Computers & Graphics* journal for Oct.-Dec. 2008, determined by Science Direct.

Member, Sigma Xi, the Scientific Research Society, 2005-present.
Peer-**nominated** for University Outstanding Teaching Award (did not receive award), 2000, 2001.
Outstanding Presentation Award, Young Faculty Research Symposium, Huntsville, AL, October 1996**.**

National Science Foundation Summer Institute In Japan, June-August 1992.
One of 50 science and engineering Ph.D. students selected to participate. Host scientist: Dr. Yukio Fukui of the Ministry of International Trade and Industry's (MITI) Industrial Products Research Institute at Tsukuba Science City. Conducted research in 3D shape representation and manipulation. Other facets of program included Japanese language training; visits to government, industrial, and university research laboratories; and lectures on the Japanese research environment and Japanese culture and history.

MSU Graduate Office Fellowship (1993).
MSU Graduate Recruiting Fellowships (1987-88 and 1989-90).

Who's Who in Medicine and Biotechnology, 1997 edition.
Who's Who in the East, 1995-96 edition.
Men of Achievement, Sixteenth Edition, 1995.
1988-89 COGS runner-up for "MSU Outstanding Student Organization for Enhancement of Student Welfare" award.

BGSU Dean's List each semester (1982-1986).
Won 1981 Greater Toledo Council of Teachers of Mathematics Math IV Competition.

Attended Ohio (Buckeye) Boys' State (elected senator) and 4-H Citizenship-Washington Focus, 1981.

National Honor Society Memberships:

Phi Kappa Phi	Golden Key	Kappa Mu Epsilon	Phi Beta Kappa
Alpha Lambda Delta		Phi Eta Sigma	Omicron Delta Kappa

Undergraduate Academic scholarships and awards:
Frank C. Ogg Memorial Scholarship (for Mathematics Achievement)
Robert and Gretchen Overman Memorial Scholarship (for Mathematics Achievement)
Modern Woodmen Scholarship (four year scholarship)
Ohio Academic Scholarship (four year scholarship)
BGSU President's Achievement Scholarship (four year scholarship)

Outstanding Graduating Computer Science Major, Bowling Green State University, 1986.