
John C. Keyser

Department of Computer Science and Engineering
3112 Texas A&M University
College Station, TX 77843-3112
USA

office phone: (979)458-0167
fax: (979)847-8578
email: keyser@cs.tamu.edu
url: <http://faculty.cs.tamu.edu/keyser>

Education

- Ph.D. Computer Science University of North Carolina at Chapel Hill, August 2000
Dissertation: *Exact Boundary Evaluation for Curved Solids*
Advisor: Dinesh Manocha Committee: Pankaj Agarwal, Frederick P. Brooks, Jr.,
Ming Lin, Steven Molnar, Jack Snoeyink
- B.S. Computer Science
B.S. Applied Mathematics Abilene Christian University, May 1994
B.S. Engineering Physics

Experience

- Associate Department Head for Academics:** September 2011 – Present
Associate Professor (with tenure): September 2006 – Present
Assistant Professor: August 2000 – August 2006
Department of Computer Science, Texas A&M University
Research Assistant: 1995-2000
Department of Computer Science, University of North Carolina at Chapel Hill

Honors and Awards

- William Keeler Faculty Fellow Award (College Level award for Research, Teaching, and Service), 2010.
- Association of Former Students Distinguished Achievement Award in Teaching – College Level, 2007.
- Tenneco Meritorious Teaching Award, 2007.
- Named Montague Scholar from the Center for Teaching Excellence for 2003-2004 (Teaching award: 1 tenure-track selected from each college each year).
- Received Coalition to Diversify Computing Mentor Travel Award, 2003.
- Office of Naval Research Graduate Fellowship, 1994-1998.

Publications

* Indicates graduate Student

Journal Publications

(note: several conferences now publish proceedings as journal issues; conference acceptance rates denoted by AR)

- [J-1] Biggers, K*, Keyser, J., “Inference-based Surface Reconstruction of Cluttered Environments,” *IEEE Transactions on Visualization and Computer Graphics*, to appear, 2011.

- [J-2] Chung, J.*, Sung, C.*, Mayerich, D., Kwon, J., Miller, D.*, Huffman, T., Abbott, L., Keyser, J., Choe, Y., "Multiscale Exploration of Mouse Brain Microstructures Using the Knife Edge Scanning Microscope Brain Atlas," *Frontiers in Neuroinformatics*, to appear, 2011.
- [J-3] Mayerich, D., Kwon, J., Sugn, C.*, Abbott, L., Keyser, J., Choe, Y., "Fast Macro-Scale Transmission Imaging of Microvascular Networks Using KESM," *Biomedical Optics Express*, vol. 2, no. 10, pp. 2888-2896, 2011.
- [J-4] Biggers, K.*, Keyser, J., "Inference-based Procedural Modeling of Solids," *Computer Aided Design (Proceedings of Geometric and Physical Modeling, AR: ?)*, to appear, 2011.
- [J-5] Yuksel, C.*, Schaefer, S., Keyser, J., "Parameterization and Applications of Catmull-Rom Curves," *Computer Aided Design*, vol. 43, no. 7, pp. 747-755, 2011. (Note: this paper extends [C-3])
- [J-6] Hsu, S.*, Keyser, J., "Piles of Objects," *ACM Transactions on Graphics (Proceedings of ACM SIGGRAPH Asia, AR:18%)*, vol. 29, no. 6, article 155, 2010.
- [J-7] Yuksel, C.*, Keyser, J., House, D., "Mesh Colors," *ACM Transactions on Graphics*, vol. 29, no. 2, article 15, 2010.
- [J-8] Yuksel, C.*, Schaefer, S., Keyser, J., "Hair Meshes," *ACM Transactions on Graphics (Proceedings of ACM SIGGRAPH Asia, AR:25%)*, vol. 28, no. 5, article 166, 2009.
- [J-9] Mayerich, D.*, Keyser, J., "Hardware Accelerated Segmentation of Complex Volumetric Filament Networks," *IEEE Transactions on Visualization and Computer Graphics*, vol. 15, no. 4, pp. 670-681, 2009.
- [J-10] Yuksel, C.*, Keyser, J., "Fast Real-Time Caustics From Height Fields." *The Visual Computer (from Proceedings of Computer Graphics International, AR: 29%)*, vol. 25, no.5-7, pp. 559-564, 2009.
- [J-11] Mayerich, D.*, Abbott, L., Keyser, J., "Visualization of Cellular and Microvessel Relationships," *IEEE Transactions on Visualization and Computer Graphics (Proceedings of IEEE Visualization, AR: 25%)*, vol. 14, no.6, pp. 1611-1618, 2008.
- [J-12] Zinke, A., Yuksel, C.*, Weber, A., Keyser, J., "Dual Scattering Approximation for Fast Multiple Scattering in Hair," *ACM Transactions on Graphics (Proceedings of ACM SIGGRAPH, AR: 18%)*, vol. 27, no. 3, article 32, 2008.
- [J-13] Ouchi, K.*, Keyser, J., "Rational Univariate Reduction via Toric Resultants," *Journal of Symbolic Computation*, vol. 43, no. 11, pp. 811-844, 2008.
- [J-14] Yuksel, C.*, Keyser, J., "Deep Opacity Maps," *Computer Graphics Forum (Proceedings of Eurographics, AR: 19.3%)*, vol. 27, no. 2, pp. 675-680, 2008.
- [J-15] Hong, W.*, House, D., Keyser, J., "Adaptive Particles for Incompressible Fluid Simulation," *The Visual Computer (from Proceedings of Computer Graphics International, AR:17.7%)*, vol. 24, no. 7-9, pp. 535-543, 2008.
- [J-16] Yuksel, C.*, House, D., Keyser, J., "Wave Particles," *ACM Transactions on Graphics (Proceedings of ACM SIGGRAPH, AR: 24%)*, vol. 26, no. 3, article 99, 2007.
- [J-17] Melek, Z.*, Mayerich, D.*, Yuksel, C.*, Keyser, J., "Visualization of Fibrous and Thread-like Data," *IEEE Transactions on Visualization and Computer Graphics (Proceedings of IEEE Visualization, AR: 28%)*, vol. 12, no. 5, pp. 1165-1172, 2006.
- [J-18] Keyser, J., Culver, T., Foskey, M., Krishnan, S., Manocha, D., "ESOLID: A System for Exact Boundary Evaluation," *Computer Aided Design*, vol. 36, no. 2, pp. 175-193, 2004. (Note: this paper extends [C-13]).

- [J-19] Culver, T., Keyser, J., Manocha, D., “Exact Computation of the Medial Axis of a Polyhedron,” *Computer Aided Geometric Design*, vol. 21, no. 1, pp. 65-98, 2004.
- [J-20] Culver, T., Keyser, J., Manocha, D., Krishnan, S. “A Hybrid Approach for Determinant Signs of Moderate-Sized Matrices,” *International Journal of Computational Geometry and Applications*, vol. 13, no. 5, pp. 399-417, 2003.
- [J-21] Keyser, J., Culver, T., Manocha, D., Krishnan, S. “Efficient and Exact Manipulation of Algebraic Points and Curves,” *Computer Aided Design*. Special Issue on Robustness. Vol 32, No. 11. pp. 649-662. 2000. (Note: this paper extends [C-16])
- [J-22] Krishnan, S., Manocha, D., Gopi, M., Culver, T., Keyser, J. “BOOLE: A Boundary Evaluation System for Boolean Combinations of Sculptured Solids,” *International Journal of Computational Geometry and Applications*, Vol 11, No. 1, pp 105 -144, 2001.
- [J-23] Keyser, J., Krishnan, S., Manocha, D., “Efficient and Accurate B-rep Generation of Low Degree Sculptured Solids Using Exact Arithmetic: I – Representations,” *Computer Aided Geometric Design*. Vol 16, No. 9. pp. 841-859. October, 1999. (Note: this paper extends [C-18], and is part of one paper, split into two for space reasons.)
- [J-24] Keyser, J., Krishnan, S., Manocha, D., “Efficient and Accurate B-rep Generation of Low Degree Sculptured Solids Using Exact Arithmetic: II – Computation,” *Computer Aided Geometric Design*. Vol 16, No. 9. pp. 861-882. October, 1999. (Note: this paper extends [C-18], and is part of one paper, split into two for space reasons.)

Volumes, and Selective (i.e. Peer reviewed with lower acceptance ratio) Conference Papers
(acceptance rates denoted by AR)

- [C-1] Huang, R.*, Melek, Z., Keyser, J., “Preview-based Sampling for Controlling Gaseous Simulations,” *Proceedings of Symposium on Computer Animation*, pp. 177-186, 2011. AR: 39%.
- [C-2] Hsu, S.*, Keyser, J., “Statistical Simulation of Rigid Bodies,” *Proceedings of ACM SIGGRAPH/Eurographics Symposium on Computer Animation*, pp. 139-148, 2009. AR: 39%
- [C-3] Yuksel, C.*, Schaefer, S., Keyser, J., “On the Parameterization of Catmull-Rom Curves,” *Proceedings of SIAM/ACM Joint Conference on Geometric and Physical Modeling*, pp. 47-53, 2009. AR: 28%
- [C-4] Han, D.*, Keyser, J., Choe, Y., “A Local Maximum Intensity Projection Tracing of Vasculature in Knife-Edge Scanning Microscope Volume Data,” *Proceedings of IEEE International Symposium on Biomedical Imaging*, pp. 1259-1262, 2009. (selected for oral presentation) AR: 31.9% (for oral presentation; overall AR unknown)
- [C-5] Melek, Z.*, Keyser, J., “Driving Object Deformations from Internal Physical Processes,” *Proceedings of ACM Symposium on Solid and Physical Modeling*. pp. 51-59, 2007. AR: 27%
- [C-6] Mayerich, D.*, McCormick, B., Keyser, J., “Noise and Artifact Removal in Knife-Edge Scanning Microscopy.” *Proceedings of IEEE International Symposium on Biomedical Imaging*. pp. 556-559, 2007. (selected for oral presentation) AR: 24% (for oral presentation; overall AR: 65%)
- [C-7] Lien, J.*, Keyser, J., Amato, N., “Simultaneous Shape Decomposition and Skeletonization,” *Proceedings of ACM Symposium on Solid and Physical Modeling*. pp. 219-228, 2006. AR: 37.5%

- [C-8] Ong, T.*, Saunders, R.*, Keyser, J., Leggett, J., "Terrain Generation Using Genetic Algorithms," *Proceedings of Genetic and Evolutionary Computation Conference*. pp. 1463-1470, 2005. AR: 46%
- [C-9] Jones, N.*, Keyser, J., "Geometric Motion Blur for a Deforming Polygonal Mesh," *Proceedings of Computer Graphics International*. pp. 26-31,260, 2005. AR: 32%
- [C-10] Melek, Z.*, Keyser, J., "Multi-Representation Interaction for Physically-Based Modeling," *Proceedings of ACM Symposium on Solid and Physical Modeling*. pp 187-196,299, 2005. AR: 39%
- [C-11] Keyser, J., Ouchi, K.*, Rojas, J.M. "The Exact Rational Univariate Representation and its Application," *Geometric and Algorithmic Aspects of Computer-Aided Design and Manufacturing*, DIMACS series in Discrete Mathematics and Theoretical Computer Science, vol. 67, pp. 299-328, 2005. AR: n/a
- [C-12] Beaudoin, J.*, Keyser, J., "Simulation Levels of Detail for Plant Motion," *Proceedings of SIGGRAPH/Eurographics Symposium on Computer Animation*, pp. 297-304,401, 2004. AR: 31%
- [C-13] Keyser, J., Culver, T., Foskey, M., Krishnan, S., Manocha, D., "ESOLID: A System for Exact Boundary Evaluation," *Proceedings of Seventh ACM Symposium on Solid Modeling and Applications (ACM Solid Modeling '02)*, pp. 23-34, 2002. AR: 28%
- [C-14] Hoff, K., Culver, T., Keyser, J., Lin, M., Manocha, D., "Interactive Motion Planning Using Hardware-Accelerated Computation of Generalized Voronoi Diagrams," *Proceedings of IEEE International Conference on Robotics and Automation*. pp. 2931-2937. April 2000. AR: ?
- [C-15] Hoff, K., Culver, T., Keyser, J., Lin, M., Manocha, D., "Fast Computation of Generalized Voronoi Diagrams Using Graphics Hardware," *Computer Graphics Annual Conference Series (SIGGRAPH '99)*, pp. 277-286, 1999. AR: 16%
- [C-16] Keyser, J., Culver, T., Manocha, D., Krishnan, S., "MAPC: A library for Efficient and Exact Manipulation of Algebraic Points and Curves," *Proceedings of 15th Annual Symposium on Computational Geometry*, pp. 360-369, 1999. AR: 43%
- [C-17] Culver, T., Keyser, J., Manocha, D., "Accurate Computation of the Medial Axis of a Polyhedron," *Proceedings of 5th Symposium on Solid Modeling and Applications (ACM Solid Modeling '99)*, pp. 179-190, 1999. AR: <30%
- [C-18] Keyser, J., Krishnan, S., Manocha, D., "Efficient and Accurate B-rep Generation of Low Degree Sculptured Solids using Exact Arithmetic," *Proceedings of 4th Symposium on Solid Modeling and Applications (ACM Solid Modeling '97)*, pp. 42-55, 1997. AR: ?, prob. <30%

Short Papers published (selectively determined by peer review of full paper):

(FAR/SAR/OAR indicates acceptance rate of full papers (FAR), and then of short papers (SAR) after the full paper acceptance rate, and then overall acceptance rate (OAR=FAR+SAR))

- [S-1] Mayerich, D.*, Keyser, J., "Filament Tracking and Encoding for Complex Biological Networks," *Proceedings of ACM Symposium on Solid and Physical Modeling*, pp. 353-358, 2008. FAR/SAR/OAR: 31.6/22.8%/54.4%,
- [S-2] Yuksel, C.*, Akleman, E., Keyser, J., "Practical Global Illumination for Hair Rendering." *Proceedings of Pacific Graphics*, 2007. pp. 415-418. FAR/SAR/OAR: 22%/10%/32%
- [S-3] Landreneau, E.*, Akleman, E., Keyser, J., "Interactive Face-Replacements for Modeling Detailed Shapes," *Proceedings of Geometric Modeling and Processing (GMP2006), Lecture*

Notes in Computer Science, volume 4077, pp. 602-608, Springer, Berlin/Heidelberg, 2006.
FAR/SAR/OAR: 43%/25%/67%

- [S-4] Radikovic, A.*, Leggett, J., Ulrich, R., Keyser, J. “Artificial Window View of Nature,” *CHI Extended Abstracts (Proceedings of CHI 2005)*, pp. 1993-1996, 2005. FAR/SAR/OAR: 18%/9%/27%
- [S-5] Ouchi, K.*, Keyser, J., “Handling Degeneracies in Exact Boundary Evaluation” *Proceedings of 9th ACM Symposium on Solid Modeling and Applications*, pp. 321-326, 2004. FAR/SAR/OAR: 33%/33%/66%
- [S-6] McCormick, B., Busse, B.*, Melek, Z.*, Doddapaneni, P.*, Keyser, J., “Compression, Segmentation, and Modeling of Filamentary Volumetric Data” *Proceedings of 9th ACM Symposium on Solid Modeling and Applications*, pp. 333-338, 2004. FAR/SAR/OAR: 33%/33%/66%.
- [S-7] Melek, Z.*, and Keyser, J. “Interactive Simulation of Burning Objects,” *Proceedings of 11th Pacific Conference on Computer Graphics and Applications*, pp. 462-466, 2003. FAR/SAR/OAR: 19%/13%/32%
- [S-8] Melek, Z.*, Keyser, J., “Interactive Simulation of Fire,” *Proceedings of 10th Pacific Conference on Computer Graphics and Applications*, pp. 431-432, 2002. FAR/SAR/OAR: 24%/16%/40%
- [S-9] Overby, D.*, Melek, Z.*, Keyser, J., “Interactive Physically-based Cloud Simulation,” *Proceedings of 10th Pacific Conference on Computer Graphics and Applications*, pp. 469-470, 2002. FAR/SAR/OAR: 24%/16%/40%

Other publications (limited peer review, less selective, posters with abstracts in separate proceedings, book chapters, etc.):

- [O-1] Overby, D.*, Wall, J., Keyser, J., “Interactive Analysis of Situational Awareness Metrics,” *Proceedings of Visualization and Data Analysis, to appear*, 2012 (AR: 48%)
- [O-2] Choe, Y., Mayerich, D., Kwon, J., Miller, D.*, Sung, C.*, Huffmann, T., Keyser, J., Abbott, L., “Knife-Edge Scanning Microscopy for Large-scale, High Resolution Volume Imaging of the Brain,” *Journal of Visualized Experiments, to appear*, 2011. (note: considered a journal, but uses a video format to document procedures).
- [O-3] Choe, Y., Mayerich, D., Kwon, J., Miller, D.*, Chung, J.*, Sung, C.*, Keyser, J., Abbott, L., “Knife-Edge Scanning Microscopy for Connectomics Research,” *Proceedings of the International Joint Conference on Neural Networks, to appear*, 2011.
- [O-4] Mayerich, D., Kwon, J., Panchal, A., Keyser, J., Choe, Y., “Fast Cell Detection in High-Throughput Imagery Using GPU-Accelerated Machine Learning,” *Proceedings of International Symposium on Biomedical Imaging*, pp. 719-723, 2011. (selected for poster presentation: AR: 18% for oral presentation, 46% for poster presentation)
- [O-5] Keyser, J., Kim, M-S., “Guest Editors’ Introduction to Special Issue: Selected papers from Solid and Physical Modeling 2010,” *Computer Aided Design*, vol. 43, no. 10, pp. 1211-1212, October 2011.
- [O-6] Bronsvort, W., Gravesen, J., Keyser, J., “Guest Editor’s Introduction: Special Section on the Joint Conference on Geometric Design and Solid and Physical Modeling (GDSPM),” *IEEE Transactions on Visualization and Computer Graphics*, vol, 17, no. 6, pp. 713-714, June 2011. (Guest editor introduction)

- [O-7] Bronsvort, W., Gravesen, J., Keyser, J., "Theory and Practice of Geometric and Physical Modeling," *Computer Aided Design*, vol, 43, no. 7, pp. 739-740, July 2011. (Guest editor introduction)
- [O-8] Biggers, K.*, Keyser, J., Wall, J., "Inference-based Generative Modeling of Complex Cluttered Environments," *Proceedings of the Interservice/Industry Training, Simulation, and Education Conference*, NTSA, 2174-2184, 2010.
- [O-9] Mayerich, D., Keyser, J., "GPU-based Dynamic Tubular Grids for Sparse Volume Rendering," *IEEE Visualization*, 2010. (poster)
- [O-10] Overby, D.*, Keyser, J., Wall, J., "ProDV: A Case Study in Delivering Visual Analytics," *IEEE Symposium on Visual Analytics Science and Technology (VAST)*, 2010. (poster)
- [O-11] Overby, D.*, Keyser, J., Wall, J., "Asynchronous View-Dependent Data Retrieval for Interactive Out-of-Core Terrain Visualization," *IEEE Visualization*, 2010. (poster)
- [O-12] Choe, Y., Abbott, L., Han, D., Huang, P.*, Keyser, J., Kwon, J., Mayerich, D., Melek, Z., McCormick, B., "Knife-Edge Scanning Microscopy: High-Throughput Imaging and Analysis of Massive Volumes of Biological Microstructures," in *High-Throughput Image Reconstruction and Analysis: Intelligent Microscopy Applications*, Series on Bioinformatics and Biomedical Imaging, Artech House Publishers, 11-34, 2009.
- [O-13] Biggers, K.*, Keyser, J., Wall, J., "Automated Reconstruction of Synthesized Environments from Complex Point Cloud Datasets," *Proceedings of the Interservice/Industry Training, Simulation, and Education Conference*, NTSA, 508-522, 2009.
- [O-14] Overby, D.*, Keyser, J., Wall, J., "Interactive Visual Analysis of Location Reporting Patterns," *Proceedings of IEEE Symposium on Visual Analytics Science and Technology (VAST)*, pp 223-224, 2009. (poster)
- [O-15] Hong, W.*, House, D., Keyser, J., "An Adaptive Sampling Approach to Particle-Based Fluid," *Proceedings of Theory and Practice of Computer Graphics Conference*, pp. 69-76, 2009.
- [O-16] Mayerich, D.*, Kwon, J.*, Choe, Y., Abbott, L., Keyser, J., "Constructing High-Resolution Microvascular Models," *Proceedings of Microscopic Image Analysis with Applications in Biology (MIAAB)*, 2008.
- [O-17] Overby, D.*, Keyser, J., Wall, J., "Multi-View Visualization of Simulated Network Data," *Virginia Modeling and Simulation Center (VMASC) Capstone Conference*, 2008. Second-place award for American Systems/Homeland Security/Military Modeling and Simulation Track.
- [O-18] Melek, Z.*, Keyser, J. "Bending Burning Matches and Crumpling Burning Paper." *SIGGRAPH*, 2006. (poster). *Second-place winner, Student Research Competition*
- [O-19] Sutherland, B.*, Keyser, J. "Particle-Based Enhancement of Terrain Data." *SIGGRAPH*, 2006. (poster)
- [O-20] McCormick, B., Mayerich, D.*, Busse, B.*, Melek, Z.*, Koh, W.*, Abbott, L., Choe, Y., Keyser, J., Kim, E-J. "The Whole Mouse Brain: The Spatial Distribution and Morphology of its Neurons," *Proceedings of Microscopy and Microanalysis*. 11 (Suppl. 2), pp. 640-641, 2005.
- [O-21] McCormick, B., Busse, B.*, Mayerich, D.*, Abbott, L., Choe, Y., Keyser, J., Smith, S., Denk, W. "Biologically Accurate Modeling of Mouse Brain Requires Biologically Accurate Networks." *Proceedings of Microscopy and Microanalysis*. 11 (Suppl. 2), pp. 66-67, 2005.

- [O-22] Dingle, B.*, Keyser, J., “Keyframing Particles of Physically-Based Systems”, *Proceedings of 3rd Theory and Practice of Computer Graphics Conference*, 2005, Winner of Robert Fletcher Prize for Best Application Paper and Presentation.
- [O-23] McCormick, B., Koh, W.*, Choe, Y., Abbott, L., Keyser, J., Mayerich, D.*, Melek, Z.*, Doddapaneni, P.*, “Construction of Anatomically Correct Models of Mouse Brain Networks” *Neurocomputing*, vol.58-60, 2004, pp. 379-386.
- [O-24] Melek, Z.*, Keyser, J., “Modeling Decomposing Objects under Combustion,” *IEEE Visualization*, 2004. (poster)
- [O-25] McCormick, B., Busse, B.*, Melek, Z.*, Doddapaneni, P.*, Keyser, J., “Compression, Segmentation, and Modeling of Large-Scale Filamentary Volumetric Data,” *IEEE Visualization*, 2004. (poster)
- [O-26] Jones, N.*, Keyser, J., “Real-Time Geometric Motion Blur for a Deforming Polygonal Mesh,” *SIGGRAPH/Eurographics Symposium on Computer Animation*, 2004. (poster)
- [O-27] Melek, Z.*, Keyser, J., “Interactive Simulation of Burning Objects,” *SIGGRAPH/Eurographics Symposium on Computer Animation*, 2004. (poster)
- [O-28] Foskey, M., Manocha, D., Culver, T., Keyser, J., Krishnan, S., “Reliable Geometric Computations with Algebraic Primitives and Predicates”, *Proceedings of the Workshop on Uncertainty in Geometric Computations, Sheffield, 2002*.
- [O-29] Krishnan, S., Foskey, M., Culver, T., Keyser, J., Manocha, D., “PRECISE: Efficient Multiprecision Evaluation of Algebraic Roots and Predicates for Reliable Geometric Computation”, UNC-CH Technical report, Department of Computer Science, University of North Carolina at Chapel Hill. A version of this paper appeared in the 2001 *Proceedings of Symposium on Computational Geometry* (pp. 274-283), however this technical report has more complete and correct references. It can be downloaded from <https://wwwx.cs.unc.edu/~geom/papers/documents/technicalreports/tr00008.pdf>
- [O-30] Hoff, K., Culver, T., Keyser, J., Lin, M., Manocha, D., “Interactive Motion Planning Using Hardware-Accelerated Computation of Generalized Voronoi Diagrams”, *Proceedings of International Conference on Robotics and Automation*, pp. 2931-2937, 2000.
- [O-31] Hoff, K., Culver, T., Keyser, J., Lin, M., Manocha, D., “Fast Computation of Generalized Voronoi Diagrams Using Graphics Hardware”, *Proceedings of Sixteenth Annual Symposium on Computational Geometry*, pp. 375-376, 2000. (Refereed video)
- [O-32] Keyser, J., Krishnan, S., Manocha, D., Culver, T., “Fast and Accurate Boundary Evaluation of Low-Degree Sculptured Solids,” *Proceedings of IMA Conference on Mathematics of Surfaces*, vol. 8, pp. 139-160, 1998.

Significant Software Releases:

- **ESOLID:** Exact Boundary Evaluation for Curved Solids. First system to perform boundary evaluation with curved surfaces using exact computation. Last update November, 2004.
- **MAPC:** Library for Manipulation of Algebraic Points and Curves. First library to combine algebraic plane curve geometric operations with exact computation. Last update 1999.

Research Grants

External:

Competitive

- *HCC: Small: Rethinking Simulation in Computer Graphics.* NSF Grant #0917286. PI: J. Keyser, 9/1/09 – 8/31/12, \$469,010.

- *CRCNS Data Sharing: Whole Mouse Brain Neuronal Morphology and Neurovasculature Browser*. NSF Grant #0905041. PI: Y. Choe, co-PIs: L. Abbott, J. Keyser, 9/1/09 – 8/31/11, \$114,024.
- *MSM: Multiscale Imaging/Analysis/Integration of Brain Networks*. NIH – National Institute for Neurological Disease and Stroke Grant #R01 NS 54252. PI: Y. Choe, co-PIs: L. Abbott, B. McCormick, J. Keyser, S. Smith, 9/1/05-8/31/09, \$965,992.
- *ITR: Accurate and Robust Operations on Curved Geometry*, NSF Grant# CCF-0220047. PI: J. Keyser, 9/1/02-8/31/08, \$497,705.
- *Exploring the Brain Forest*, Texas Higher Education Coordinating Board ATP Grant# 000512-0146-2001, PI: J. Keyser, co-PI: B. McCormick, 1/1/02-12/31/03, \$199,644.
- *CARGO – Degeneracy Detection for Curved Solids*, NSF/DARPA Grant# DMS-0138446. PI: J. Keyser, co-PI: J.M. Rojas, 3/1/02-8/31/03, \$100,000.

Non-Competitive

- *Implementing Wave Particles on Microsoft Surface*. Microsoft Corporation. PI: J. Keyser, 4/16/08 – 8/31/08, \$13,145.

Internal:

- *A Next Generation Immersive Visualization Facility*, Texas A&M University Telecommunications and Informatics Task Force, PI: F. Parke, co-PIs: E. Akleman, N. Amato, J. Chen, G.V. de Velasco, J. Keyser, 8/31/02-8/31/05, \$165,000.

Teaching and Student Advising

Courses Taught

Undergraduate:

- CSCE 481 – Seminar (S10)
- CPSC 315 – Programming Studio (S08, F08,F09)
- CPSC 311 – Analysis of Algorithms (F03-Honors, F04-Honors, S07)
- CPSC 289 – Introduction to Computing (later CSCE 181) (S07)
- CPSC 441 – Computer Graphics (S01, S02, S03, S04, S05, F05, S06, F07,F11)

Graduate:

- CPSC 649/VIZA 659 – Physically-Based Modeling (F08,F09,F10,F11)
- CSCE 689/VIZA 679 – Advanced Topics in Physically Based Modeling (S09,S11)
- CPSC 641 – Computer Graphics (F01, F03, F05)
- CPSC 645 – Geometric Modeling (F00, F02, S05, F06)
- CPSC 689 – Robust Numeric and Geometric Computation (S03)

Course Development

- In Spring of 2010, I revised our undergraduate Junior/Senior-level seminar course (CSCE 481) to include a major writing component, in order to meet University “W” course requirements.
- I developed (and taught for the first few times) the Programming Studio course, CSCE 315. This course, focusing on programming and software development, serves as a “capstone” for our lower-level computer science students, before they begin taking more specialized upper-level computer science classes.

- I developed the class in Robust Numeric and Geometric Computation as a way of merging various topics in mathematics and computer science in a way that would be understandable to those (in computer science) without a deep mathematical background. This course was offered along with one in mathematics (developed by Maurice Rojas) taking a similar approach for mathematicians, as one component of an NSF research grant.
- Though the course designations existed before I arrived here, I have essentially developed the curricula for all of these classes myself; exceptions are CPSC 311 (I more closely followed an existing text/approach, here), and CSCE 649/VIZA 659 (I followed a prior instructor's outline and general course format, though I added and modified several parts).
- As part of my Montague award, I developed a new online prerequisite testing system for linear algebra concepts necessary for CSCE 441. This has proven very successful in preparing students for the math concepts in that class, and has been used by 3 other faculty in their teaching of the course.
- As part of my service on the 2005-2006 Undergraduate Curriculum Committee, I was closely involved with a major overhaul of our undergraduate program, including in the initial specification for new courses.

Student Research Advising

Ph.D. Students graduated:

- Keith Biggers (Ph.D., May 2011). Dissertation: *Inference-Based Geometric Modeling for the Generation of Complex Cluttered Virtual Environments*.
- Cem Yuksel (Ph.D., August 2010). Dissertation: *Real-Time Water Waves with Wave Partricles*. (Don House co-chair)
- David Mayerich (Ph.D., May 2009). Dissertation: *Imaging and Computational Methods for Exploring Sub-cellular Anatomy*.
- Woo-Suck Hong (Ph.D., May 2009). Dissertation: *An Adaptive Sampling Approach to Incompressible Particle-Based Fluid*. (Don House co-chair)
- Zeki Melek (Ph.D., December 2007). Dissertation: *Interactive Simulation of Fire, Burn, and Decomposition*.
- Brent Dingle (Ph.D., May, 2007). Dissertation: *Volumetric Particle Modeling*.
- Koji Ouchi (Ph.D., December, 2006). Dissertation: *Exact Polynomial System Solving for Robust Geometric Calculation*. (Don Friesen co-chair)

M.S. Students graduated:

- Aswin D'Souza (M.S., December, 2007). Thesis: *Automated Counting of Cell Bodies Using Nissl Stained Cross Sectional Images*.
- Ryan Saunders (M.S., December, 2006). Thesis: *Terrainosaurus: Realistic Terrain Generation Using Genetic Algorithms*.
- Swapnil Sinvhal (M.S., December, 2005). Thesis: *Mapping Textures on 3D Terrains: A Hybrid Cellular Automata Approach*.
- Eric Landreneau (M.S., May, 2005). Thesis: *Crystal-Like Geometric Modeling*.
- Jacob Foshee (M.S., August 2004). Thesis: *Resolution Independent Curved Seams in Clothing Animation Using a Regular Particle Grid*.
- Paul Edmondson (M.S., May 2004). Thesis: *Hierarchical Occlusion Culling for Arbitrarily Meshed Height Fields*.

- Nathan Jones (M.S., May 2004). Thesis: *Real-time Geometric Motion Blur for a Deforming Polygonal Mesh*.
- David Mayerich (M.S., December 2003). Thesis: *Acquisition and Reconstruction of Brain Tissue Using Knife Edge Scanning Microscopy*.
- Derek Overby (M.S., May 2002). Thesis: *Interactive Physically-Based Cloud Simulation*.

Undergraduate Research Fellows finished:

- Chad Wellington (2005-2006)
- Jacob Beaudoin (2003-2004)
- Kevin Walkington (2003-2004)
- Rebecca Flannery (2002-2003)

Currently supervising as committee chair:

Ph.D.: Shu-Wei Hsu
 Ruoguan Huang
 Daniel Miller
 Derek Overby
 M.S.: Billy Clack
 Andrew Echols

Committee member for many other M.S. and Ph.D. students.

Service

Editorial Work

Associate Editor:

- *IEEE Transactions on Visualization and Computer Graphics* (2011-present).
- *Graphical Models* (2010-present)

Guest Editor:

- *Computer Aided Geometric Design, to appear*. (with Myung-Soo Kim; Special issue with selected papers from Solid and Physical Modeling 2010)
- *Computer Aided Design*, October 2011. (with Myung-Soo Kim; Special issue with selected papers from Solid and Physical Modeling 2010)
- *Computer Aided Design*, July 2011. (with Wim Bronsvoort, Jens Gravesen; Special section with selected papers from Geometric and Physical Modeling 2009)
- *IEEE Transactions on Visualization and Computer Graphics*, June 2011. (with Wim Bronsvoort, Jens Gravesen; Special section with selected papers from Geometric and Physical Modeling 2009)

Review of Journal papers and/or Research Proposals

- NSF Proposal Review Panelist (4 times).
- Peer review for various journals: *ACM Transactions on Graphics*, *IEEE Transactions on Visualization and Computer Graphics*, *Computer Aided Design*, *Computer Aided Geometric Design*, *Computational Geometry Theory and Applications*, *International Journal of Computational Geometry and Applications*, *IEEE Transactions on Computers*, *IEEE*

Transactions on Robotics and Automation, Computer Graphics and Applications, The Computer Journal, The Visual Computer, International Journal of Document Analysis and Recognition, Journal of Computing and Information Science in Engineering

- Peer review for various conferences: SIGGRAPH, SIGGRAPH Asia, Eurographics, Solid Modeling (SMA and SPM), Symposium on Computer Animation, Pacific Graphics, Symposium on Computational Geometry, Virtual Reality/Virtual Reality Annual International Symposium, Graphics Hardware, Interactive 3D Graphics and Games, Computer Animation and Social Agents, International Symposium on Symbolic and Algebraic Computation.

Other External

- Solid Modeling Association Executive Committee member (elected position), 2010-present.
- General co-Chair, Shape Modeling International (2012)
- Program co-Chair, ACM Symposium on Solid and Physical Modeling (2010)
- Program co-Chair, SIAM/ACM Joint Conference on Geometric and Physical Modeling (2009)
- Program Committee Member, SIGGRAPH Asia (2009, 2010)
- Program Committee Member, Symposium on Computer Animation (2010, 2011)
- Program Committee Member, ACM Symposium on Solid and Physical Modeling (2007,2008)
- Program Committee Member, Computer Graphics International (2012)
- Program Committee Member, Computer Animation and Social Agents (2005,2008)
- Program Committee Member, Pacific Graphics (2005, 2007, 2011)
- TEXGRAPH (regional graphics meeting) organizer, 2005
- Visiting Committee member, Abilene Christian University School of Information Technology and Computing (2010-present)

University and Community Service

University Service

- University Honor Council member, 2010–present.
- Immersive Visualization Center organizing committee

College Service

- College of Engineering Strategic Planning Committee member, 2008–2011.

Department-level Service

- Associate Department Head for Academics: 2011-present
- Department Committees served on:
 - Advisory Committee (elected committee): 2001-2006, 2007-2008, 2009- 2011
 - Department Head Search Committee: 2010-2011
 - Undergraduate Curriculum Committee: 2005-present, 2007-2008(chair), 2009-present (chair)

- Colloquium Coordinator: 2007-2008
- Department Space Committee: 2006-2007
- Faculty Search Committee: 2004-2006
- Library Committee: 2003-2004 (chair)
- Computer Services Advisory Committee (CSAC): 2002-2003
- Undergraduate Awards and Fellowships: 2001-2003
- Colloquium: 2000-2002
- Graduate Admissions and Awards: 2000-2001
- Computer Science Program ABET accreditation coordinator, 2008–present.
- Faculty advisor for Texas Aggie Game Developers (TAGD) student group. 2003(inception)-2004, 2007-present.
- Coach for ACM Student Programming Contest – Wrote questions for local contests, coached team and accompanied team to ACM Regional Contests, 2000-present.
 - Team won first place in South Central U.S. Region, 2004; competed in international finals April, 2005.
- Faculty advisor for Texas A&M Computing Society (TACS) student group. 2001-2005
- Coordinator for Computer Science Department High School contest – Games 2007, Graphics 2008.

Consulting

Expert Witness

- *Abstrax v. Dell, Inc., Sun, Inc.* Expert witness on behalf of Abstrax. Reference: Dovel & Luner LLP, Santa Monica, CA. 5/08–present.
- *CooperVision v. Ciba Vision.* Expert witness on behalf of CooperVision. Reference: Irell & Manella LLP, Los Angeles, CA. 10/07-11/07.

Professional Outreach

Invited Seminars

- *Interactive Physically-Based Simulation*, Seoul National University, Seoul, South Korea, December 14, 2010.
- *Reconstruction of the Brain Using High-Throughput Microscopy: Imaging, Segmentation, and Visualization*, Computer Graphics and Multimedia Lab seminar, Technion, Israel, August 30, 2010.
- *Interactive Physically-Based Simulation*, Graphics Lab Seminar, Carnegie-Mellon University, June 8, 2010.
- *Interactive Physically-Based Simulation*, Ohio State University, June 4, 2010.
- *Visualization and Computational Challenges from High-Throughput Microscopy*, University of Tennessee, July 7, 2009.
- *Interactive Physically-Based Simulation*. Computer Science Department Seminar, University of Houston, October 1, 2007.
- *Interactive Physically-Based Simulation*. Seminar, Microsoft Research – Asia, Beijing, China, June 6, 2007.
- *Exact Computation in Geometric Modeling*. CISE Department Colloquium, University of Florida, Gainesville, November 30, 2005.

- *Interactive Physically-Based Fire Simulation*. Seminar, State Key Lab for Computer Aided Design and Computer Graphics, Zhejiang University, Hangzhou, China, April 8, 2005.
- *Interactive Physically-Based Simulation*. Seminar, Department of Computer Science, State University of New York at Stony Brook, March 14, 2005.
- *Algebraic Number Comparisons for Robust Geometric Computations*. Fall Workshop on Computational Geometry, Massachusetts Institute of Technology, November 19-20, 2004.
- *Exact Computation in Solid Modeling*. Design Lab Seminar, Department of Ocean Engineering, Massachusetts Institute of Technology, November 18, 2004.
- *Implementing Algebraic Routines in Exact Solid Modeling*. MSRI Workshop on Algorithmic, Combinatorial, and Applicable Real Algebraic Geometry, Mathematical Sciences Research Institute, Berkeley, CA, April 12-16, 2004.
- *Exact Computation in Solid Modeling*. CRI Seminar, Purdue University, March 31, 2004.
- *Detecting Degenerate Object Configurations with the Rational Univariate Reduction*. DIMACS Workshop on Computer Aided Design and Manufacturing, Rutgers University, October 7-9, 2003.
- *The Real World in Real Time: Interactive Physically-Based Simulation*. New York University, Media Research Lab, October 6, 2003.
- *Robust Solid Modeling Using Exact Computation*. Drexel University, October 10, 2003.
- *Exact Boundary Evaluation for Curved Solids in Reasonable Time*. 8th International Conference on Applications of Computer Algebra (ACA'02). Volos, Greece, June 25-28, 2002.
- *Robust Operations on Curved Solids*. DIMACS Workshop on Implementation of Geometric Algorithms. DIMACS Center, Rutgers University, December 4-6, 2002.