

Joe Michael Kniss _____ December 2005

50 S. Central Campus Dr. MEB 3490 • Salt Lake City, UT, 84112
jmk@sci.utah.edu • Phone: 801-898-7977
<http://www.cs.utah.edu/~jmk>

Research Interests _____

I am currently conducting research on high-quality, interactive visualization of large, multivariate 3D datasets from science and medicine. My research emphasizes the visual representation of uncertainty arising from measurement, feature detection, rendering, and its use in quantitative judgment and decision making.

Education _____

- Ph.D.**, Computer Science, University of Utah, Spring 2006 (expected).
Dissertation Title: *Toward Quantitative Volume Visualization.*
- M.S.**, Computer Science, University of Utah, Fall 2002.
Thesis Title: *Interactive Volume Rendering Techniques.*
- B.S.**, Math and Computer Science, Idaho State University, Spring 1999.
Senior Project: *OCR using Artificial Neural Networks.*

Professional Experience _____

Fall 2003 - present	DOE HPCS Graduate Fellow	
Summer 2004	Lawrence Livermore National Lab	HPCS Practicum
Summer 2002	Nvidia	Dev-Tech Intern
Summer 2000, 2001, 2003	Los Alamos National Lab	Research Associate
Fall 1999 - Spring 2003	University of Utah	Research Assistant
Spring 1997 - Fall 1999	Idaho National Engineering Lab	Research Associate

Publications _____

Books

1. "Interactive Volume Rendering", Klaus Engel, Markus Hadwiger, Joe M. Kniss, Christof Rezk-Salama, Daniel Weiskopf. AK Peters. August 2006 (In press).

Book Chapters

2. "Multidimensional Transfer Functions for Volume Rendering", J. Kniss, G. Kindlmann, C. Hansen. In *The Visualization Handbook*, chapter 9. Edited by C.D. Hansen and C.R. Johnson, Elsevier, pp. 189-210. 2005.
3. "Implementing Efficient Parallel Data Structures on GPUs", A. Lefohn, J. Kniss, J. Owens. In *GPU Gems II: Programming Techniques for High-Performance Graphics and General-Purpose Computation*, chapter 33. Edited by Matt Pharr and Randima Fernando, Addison Wesley, pp. 521-545, 2005.

4. “Deferred Filtering: Rendering from Difficult Data Formats”, J. Kniss, A. E. Lefohn, N. Fout. In *GPU Gems II: Programming Techniques for High-Performance Graphics and General-Purpose Computation*, chapter 41. Edited by Matt Pharr and Randima Fernando, Addison Wesley, pp. 669-677, 2005.
5. “Volume Rendering Techniques”, M. Ikits, J. Kniss, A. E. Lefohn, C. Hansen. In *GPU Gems: Programming Techniques, Tips and Tricks for Real-Time Graphics*, chapter 39. Edited by Randima Fernando, Addison Wesley, pp. 667-692, 2004.

Refereed Conferences - Papers

6. “Glift : Generic, Efficient Random-Access GPU Data Structures”, A. Lefohn, J. Kniss, R. Strzodka, S. Sengupta, J. Owens. In *ACM Transactions on Graphics*. January, 2006.
7. “Statistically Quantitative Volume Visualization”, J. Kniss, R. Van Uiter, A. Stephens, G. Li, T. Tasdizen, C. Hansen. In *Proceedings IEEE Visualization 2005*, pp. 0-0, 2005.
8. “High Quality Rendering of Compressed Volume Data Formats”, N. Fout, H. Akiba, K. Ma, A. E. Lefohn, J. Kniss. In *Proceedings of The Joint EUROGRAPHICS-IEEE VGTC Symposium on Visualization 2005*, 2005.
9. “Medical Applications of Multi-field Volume Rendering”, J. Kniss, J. Schulze, U. Wossner, P. Winkler, U. Lang, C. Hansen. In *Proceeding of The Joint Eurographics - IEEE VGTC Symposium on Visualization 2004*, pp. 249-254, 2004.
10. “Interactive Deformation and Visualization of Level Set Surfaces using Graphics Hardware”, A. Lefohn, J. Kniss, C. Hansen, R. Whitaker. In *Proceedings IEEE Visualization 2003*, pp. 75-82, 2003. (*Nominated for 'Best Paper'*)
11. “Gaussian Transfer Functions for Multi-Field Volume Visualization”, J. Kniss, S. Premoze, M. Ikits, A. Lefohn, C. Hansen, E. Praun. In *Proceedings IEEE Visualization 2003*, pp. 497-504, 2003.
12. “Interactive Translucent Volume Rendering and Procedural Modeling”, J. Kniss, S. Premoze, C. Hansen, D. Ebert. In *Proceedings IEEE Visualization 2002*, pp.109-116, 2002. (*Nominated for 'Best Paper' Award*)
13. “Volume Rendering Multivariate Data to Visualize Meteorological Simulations: A Case Study”, J. Kniss, C. Hansen, M. Grenier, T. Robinson. In *Proceedings of The Joint Eurographics - IEEE VGTC Symposium on Visualization 2002*, pp. 189-194, 2002.
14. “Interactive Volume Rendering Using Multi-Dimensional Transfer Functions and Direct Manipulation Widgets”, J. Kniss, G. Kindlmann, C. Hansen. In *Proceedings IEEE Visualization 2001*, pp. 255-262, 2001. (*Awarded 'Best Paper'*)

Refereed Journals

15. “A Streaming Narrow-Band Algorithm: Interactive Deformation and Visualization of Level Sets”, A. Lefohn, J. Kniss, C. Hansen, R. Whitaker. In *IEEE Transactions on Visualization and Computer Graphics*, vol. 10, no. 40, July/August, pp. 422-433, 2004. (*Nominated for 'Best Paper'*)

16. "A Model for Volume Lighting and Modeling", J. Kniss, S. Premoze, C. Hansen, P. Shirley, A. McPherson. In *IEEE Transactions on Visualization and Computer Graphics*, vol. 09, no. 2, pp. 150-162, April-June, 2003.
17. "Multi-Dimensional Transfer Functions for Interactive Volume Rendering", J. Kniss, G. Kindlmann, C. Hansen. In *IEEE Transactions on Visualization and Computer Graphics*, vol. 8, no. 4, pp. 270-285, July, 2002.
18. "Interactive Texture-Based Volume Rendering for Large Data Sets", J. Kniss, P. McCormick, A. McPherson, J. Ahrens, J. Painter, A. Keahey, C. Hansen. In *IEEE Computer Graphics and Applications*, vol. 21, no. 4, pp. 52-61, July/August, 2001.

Technical Reports

19. "Interactive Deformation and Visualization of Level Set Surfaces using Graphics Hardware." A. Lefohn, J. Kniss, C. Hansen, R. Whitaker. University of Utah School of Computing Technical Report, UUCS-03-005, 2003.
20. "Closed Form Solution to the Volume Rendering Integral with Gaussian Transfer Functions". J. Kniss, S. Premoze, M. Ikits, A. E. Lefohn, C. Hansen. University of Utah School of Computing Technical Report, UUCS-03-013, 2003.

Talks and Presentations

Dagstuhl Workshop on Scientific Visualization, 2005.

"Dynamic Adaptive Shadow Maps on Graphics Hardware", Technical Sketch at ACM SIGGRAPH 2005. A. Lefohn, S. Sengupta, J. Kniss, R. Strzodka, J. Owens.

"Octree Textures on Graphics Hardware", Technical Sketch at ACM SIGGRAPH 2005. J. Kniss, A. Lefohn, R. Strzodka, S. Sengupta, J. Owens.

"Real-Time Volume Graphics", Course 28 at ACM SIGGRAPH 2004. K. Engel, M. Hadwiger, J. Kniss, A. Lefohn, C. Rezk-Salama, D. Weiskopf.

"Interactive Visualization of Volumetric Data on Consumer PC Hardware", Tutorial 1 at IEEE Visualization 2003. K. Engel, M. Hadwiger, J. Kniss, A. Lefohn, D. Weiskopf.

"High-Quality Volume Graphics on Consumer PC Hardware", Course 42 at ACM SIGGRAPH 2002. Tutorial 2 at IEEE Visualization 2002. K. Engel, M. Hadwiger, J. Kniss, G. Kindlmann, C. Rezk-Salama, R. Westermann.

"Commodity Graphics Accelerators for Scientific Visualization Panel", Visualization 2001. R. Stevens, M. Papka, T. Funkhouser, G. Humphreys, J. Kniss, D. Manocha. (*Awarded 'Best Panel'*)

Fellowships and Honors

DOE High Performace Computer Science Fellowship, Krell Instutite, Fall 2003-present.

Best Paper Nomination “Interactive Deformation and Visualization of Level Set Surfaces using Graphics Hardware”, A. Lefohn, J. Kniss, C. Hansen, R. Whitaker. In *Proceedings IEEE Visualization 2003*, pp. 75-82, 2003.

Best Paper Nomination “Interactive Translucent Volume Rendering and Procedural Modeling”, J. Kniss, S. Premoze, C. Hansen, and D. Ebert. In *Proceedings IEEE Visualization 2002*, pp.109-116, 2002.

Best Paper Award “Interactive Volume Rendering Using Multi-Dimensional Transfer Functions and Direct Manipulation Widgets”, J. Kniss, G. Kindlmann, C. Hansen. In *Proceedings IEEE Visualization 2001*, pp. 255-262, 2001.

Best Panel Award “Commodity Graphics Accelerators for Scientific Visualization Panel”, Panel Participant, *Visualization 2001*. R. Stevens, M. Papka, T. Funkhouser, G. Humphreys, J. Kniss, D. Manocha.

Sigma Xi Scientific Research Society Outstanding Student Invitation, 1999.

Honorable Mention, *Mathematical Contest in Modeling*, 1999.

Professional Activities

Committee Member:

Graduate Student Advisory Committee, Fall 2000-Spring 2001.

ACM Siggraph Technical Sketches Committee, 2005 and 2006.

Reviewer:

ACM Siggraph

IEEE Visualization

IEEE Transactions on Visualization and Computer Graphics

IEEE Transactions on Computers

IEEE Computer Graphics and Applications

Eurographics-IEEE VGTC EuroVis

Eurographics

Eurographics Symposium on Rendering

Graphics Interface

Journal of Graphics Tools

Volume Graphics

GPU Gems I and II

Other:

Member, IEEE Computer Society

Member, ACM, ACM Siggraph

Member, Sigma Xi Scientific Research Society

References

Dr. Charles D. Hanson

University of Utah, School of Computing
50 S. Central Campus Drive, RM 3190
Salt Lake City, UT 84112
Email: hansen@cs.utah.edu
Phone: 801-581-3154 fax: 801-581-5843
URL: <http://www.cs.utah.edu/~hansen>

Dr. Ross T. Whitaker

University of Utah, School of Computing
50 S. Central Campus Drive, RM 3190
Salt Lake City, UT 84112
Email: whitaker@cs.utah.edu
Phone: 801-587-9549 fax: 801-581-5843
URL: <http://www.cs.utah.edu/~whitaker>

Gregory M. Jones MBA, Ph.D.

State Science Advisor
Governors Office of Economic Development
State of Utah
324 South State
Salt Lake City, UT 84111
Email: gmjones@utah.gov
Phone: 801-538-8783 fax: 801-538-8888
URL: <http://goed.utah.gov/science/SAC/>

Dr. Peter S. Shirley

University of Utah, School of Computing
50 S. Central Campus Drive, RM 3190
Salt Lake City, UT 84112
Email: shirley@cs.utah.edu
Phone: 801-581-1883 fax: 801-581-5843
URL: <http://www.cs.utah.edu/~shirley>

Dr. Christopher R. Johnson

University of Utah, School of Computing
50 S. Central Campus Drive, RM 3490
Salt Lake City, UT 84112
Email: crj@cs.utah.edu
Phone: 801-581-7705 fax: 801-585-6513
URL: <http://www.cs.utah.edu/~crj>

Dr. Kenneth I. Joy

Institute for Data Analysis and Visualization
Computer Science Department
University of California
One Shields Avenue
Davis, CA 95616-8562
Email: kijoy@ucdavis.edu
Phone: 530-752-1077 fax: 530-752-4767
URL: <http://graphics.cs.ucdavis.edu/~joy>