

CONTACT INFORMATION

Address:
Gordon Kindlmann
39 Lee St. #2
Cambridge, Boston MA 02115

Voice: 801-918-0281
Fax: 617-582-6033
E-mail: gk@bwh.harvard.edu
Web: <http://lmi.bwh.harvard.edu/~gk>

RESEARCH EXPERIENCE

Harvard Medical School (Brigham and Women's Hospital, Department of Radiology),
Boston, Massachusetts

Instructor, August 2007 to present

Post-doctoral Research Fellow, October 2004 to August 2007

Research Interests: Medical image analysis, scientific visualization, tensor-valued image processing and feature extraction, computer vision, visual computing

Advisor: Carl-Fredrik Westin

EDUCATION

University of Utah, Salt Lake City, Utah

Ph.D., Computer Science, December 2004

"Visualization and Analysis of Diffusion Tensor Fields"

Advisor: Christopher R. Johnson

Cornell University, Ithaca, New York

M.S., Architecture (Computer Graphics), January 1999

"Semi-Automatic Generation of Transfer Functions for Direct Volume Rendering"

Advisor: Donald P. Greenberg.

Cornell University, Ithaca, New York

B.A., Mathematics, May 1995

PUBLICATIONS

Refereed Journals

G. Kindlmann, D. B. Ennis, R. T. Whitaker, C.-F. Westin. "Diffusion Tensor Analysis with Invariant Gradients and Rotation Tangents." *IEEE Transactions on Medical Imaging*, 26(11):1483–1499, 2007.

G. Kindlmann, X. Tricoche, C.-F. Westin. "Delineating White Matter Structure in Diffusion Tensor MRI with Anisotropy Creases." *Medical Image Analysis*, 11(5):492–502, 2007.

G. Kindlmann and C.-F. Westin. "Diffusion Tensor Visualization with Glyph Packing." *IEEE Transactions on Visualization and Computer Graphics*, 12(5):1329–1336, October 2006. (*Cover Image*)

D. B. Ennis and G. Kindlmann. "Orthogonal tensor invariants and the analysis of diffusion tensor magnetic resonance images." *Magnetic Resonance in Medicine* 55(1):136–146, 2006.

G. Kindlmann, D. M. Weinstein, G. M. Jones, C. R. Johnson, M. R. Capecchi, C. Keller. “Practical vessel imaging by computed tomography in live transgenic mouse models for human tumors.” *Molecular Imaging*. 4(4):417–424, October–December 2005.

M. Magnor, G. Kindlmann, C. Hansen, N. Duric. “Reconstruction and Visualization of Planetary Nebulae.” *IEEE Transactions on Visualization and Computer Graphics*, 11(8):485–496, 2005.

D. B. Ennis, G. Kindlmann, I. Rodriguez, P. A. Helm and E. R. McVeigh. “Visualization of tensor fields using superquadric glyphs.” *Magnetic Resonance in Medicine* 53(1):169–176, 2005.

J. Kniss, G. Kindlmann, C. Hansen. “Multidimensional Transfer Functions for Interactive Volume Rendering.” *IEEE Transactions on Visualization and Computer Graphics*, 8(4):270–285, July 2002.

H. Pfister, W. Lorensen, C. Bajaj, G. Kindlmann, W. Schroeder, L. Sobeierajski Avila, K. Martin, R. Machiraju, and J. Lee. “The Transfer Function Bake-Off.” *IEEE Computer Graphics and Applications*, 21(3):16–22, May/June 2001.

A. L. Alexander, K. Hasan, G. Kindlmann, D. L. Parker, J. S. Tsuruda. “A Geometric Comparison of Diffusion Anisotropy Measures.” *Magnetic Resonance in Medicine* 44:283–91, 2000.

G. Kindlmann, D. Weinstein, and D. A. Hart. “Strategies for Direct Volume Renderings of Diffusion Tensor Fields.” *IEEE Transactions on Visualization and Computer Graphics*, 6(2):124–138, April–June 2000. (*Cover Image*)

C. R. Johnson, S. G. Parker, C. Hansen, G. Kindlmann, and Y. Livnat. “Interactive Simulation and Visualization.” *IEEE Computer*, 32(12):59–65, 1999.

S. J. Young, G. Y. Fan, D. Hessler, S. Lamont, T. T. Elvins, M. Hadida, G. Hanyzewski, J. W. Durkin, P. Hubbard, G. Kindlmann, E. Wong, D. Greenberg, S. Karin, M. H. Ellisman. “Implementing a Collaboratory for Microscopic Digital Anatomy.” *Supercomputer Applications and High Performance Computing*, 10(2/3):170–181, 1996.

Conference Papers– full paper review

G. Kindlmann, R. S. J. Estépar, M. Niethammer, S. Haker, C.-F. Westin. “Geodesic-Loxodromes for Diffusion Tensor Interpolation and Difference Measurement.” (*Podium presentation*), In *Proceedings MICCAI 2007*, pages 1–9, *Lecture Notes in Computer Science* 4792, October 2007.

M. Jolley, J. Stinstra, D. M. Weinstein, S. Pieper, R. S. J. Estépar, G. L. Kindlmann, R. S. MacLeod, D. H. Brooks, J. K. Triedman. “Open-Source Environment for Interactive Finite Element Modeling of Optimal ICD Electrode Placement.” *Proceedings 4th International Functional Imaging and Modeling of the Heart*, pages 373–382, *Lecture Notes in Computer Science* 4466, June 2007.

Ø. Bergmann, G. Kindlmann, S. Peled, C.-F. Westin. “Two-Tensor Fiber Tractography.” In Proceedings ISBI 2007, pages 796–799, April 2007.

G. Kindlmann, X. Tricoche, C.-F. Westin. “Anisotropy Creases Delineate White Matter Structure in Diffusion Tensor MRI.” (*Podium presentation*), In Proceedings MICCAI 2006, pages 126–133, Lecture Notes in Computer Science 4191, October 2006.

Ø. Bergmann, G. Kindlmann, A. Lundervold, C.-F. Westin. “Diffusion k -tensor Estimation from Q-ball Imaging Using Discretized Principal Axes.” In Proceedings MICCAI 2006, pages 268–275, Lecture Notes in Computer Science 4191, October 2006.

M. Magnor, G. Kindlmann, C. Hansen, N. Duric. “Constrained Inverse Volume Rendering for Planetary Nebulae.” In Proceedings IEEE Visualization 2004, pages 83–90, October 2004.

X. Tricoche, C. Garth, G. Kindlmann, E. Deines, G. Scheuermann, M. Ruetten, C. Hansen. “Visualization of Intricate Flow Structures for Vortex Breakdown Analysis.” In Proceedings IEEE Visualization 2004, pages 187–192, October 2004.

G. Kindlmann, D. M. Weinstein, A. D. Lee, A. W. Toga, P. M. Thompson. “Visualization of Anatomic Covariance Tensor Fields.” 26th Annual Conference of the IEEE Engineering in Medicine and Biology Society (EMBS), pages 1842–1845, September 2004.

G. Kindlmann. “Superquadric Tensor Glyphs.” In Proceedings IEEE TVCG/EG Symposium on Visualization 2004, pages 147–154, May 2004.

G. Kindlmann, R. Whitaker, T. Tasdizen, T. Möller. “Curvature-Based Transfer Functions for Direct Volume Rendering: Methods and Applications.” In Proceedings IEEE Visualization 2003, pages 513–520, October 2003. (*Cover Image*)

G. Kindlmann, E. Reinhard, S. Creem. “Face-based Luminance Matching for Perceptual Colormap Generation.” In Proceedings IEEE Visualization 2002, pages 299–306, October 2002.

J. Kniss, G. Kindlmann, C. Hansen. “Interactive Volume Rendering Using Multi-Dimensional Transfer Functions and Direct Manipulation Widgets.” In Proceedings IEEE Visualization 2001, pages 255–262, October 2001. (*Awarded Best Paper; Cover Image*)

G. Kindlmann and D. Weinstein. “Hue-Balls and Lit-Tensors for Direct Volume Rendering of Diffusion Tensor Fields.” In Proceedings IEEE Visualization 1999, pages 183–189, October (*Awarded Best Paper*)

D. Weinstein, G. Kindlmann, and E. Lundberg. “Tensorlines: Advection-Diffusion based Propagation through Diffusion Tensor Fields.” In Proceedings IEEE Visualization 1999, pages 249–253. October 1999

G. Kindlmann and J. W. Durkin. “Semi-Automatic Generation of Transfer Functions for Direct Volume Rendering.” In IEEE Symposium On Volume Visualization, pages 79–86, 1998. (*Awarded Best Paper*)

Book Chapters

A. Vilanova, S. Zhang, G. Kindlmann, D. Laidlaw. “An Introduction to Visualization of Diffusion Tensor Imaging and Its Applications.” In J. Weickert and H. Hagen, editors, “Visualization and Processing of Tensor Fields,” pages 121–153. Springer Verlag, 2006.

G. Kindlmann. “Tensor Invariants and their Gradients.” In J. Weickert and H. Hagen, editors, “Visualization and Processing of Tensor Fields,” pages 215–224. Springer Verlag, 2006.

J. Kniss, G. Kindlmann, C. Hansen. “Multidimensional Transfer Functions for Volume Rendering.” In C. Johnson and C. Hansen, editors, “The Visualization Handbook,” pages 189–210. Academic Press, 2004.

S. Zhang, G. Kindlmann, D. Laidlaw. “Diffusion Tensor MRI Visualization.” In C. Johnson and C. Hansen, editors, “The Visualization Handbook,” pages 327–340. Academic Press, 2004.

C. R. Johnson, Y. Livnat, L. Zhukov, D. Hart, and G. Kindlmann. “Computational Field Visualization.” In B. Engquist and W. Schmid, editors, “Mathematics Unlimited - 2001 and Beyond,” volume 2, pages 605–630. Springer-Verlag, 2001.

Invited Papers

G. Kindlmann, R. A. Normann, A. Badi, C. Keller, G. M. Jones, C. R. Johnson. “Scientific Visualization in Small Animal Imaging.” ACM SIGGRAPH Computer Graphics Quarterly, 38(2):4-7, May 2004.

C. Johnson, D. Brederson, C. Hansen, M. Ikits, G. Kindlmann, Y. Livnat, S. Parker, D. Weinstein, R. Whitaker. “Computational Field Visualization.” ACM SIGGRAPH Computer Graphics Quarterly, 35(4):5-9, November 2001.

Conference Abstracts and Posters

D. B. Ennis, G. Kindlmann, M. Mogensen, T. Vertinsky, S. W. Atlas, R. Bammer. “Application of Novel Directionally Encoded Colormaps for Isolating Linear Anisotropic Structures in Human Brain Diffusion Tensor Magnetic Resonance Imaging.” In Proceedings 14th Annual Meeting of International Society for Magnetic Resonance in Medicine (ISMRM), page 3164, 2006.

D. B. Ennis and G. Kindlmann. “Orthogonal tensor decomposition for analysis of DTMRI anisotropy.” In Proceedings 13th Annual Meeting of International Society for Magnetic Resonance in Medicine (ISMRM), page 627, 2005.

G. Kindlmann, A. L. Alexander, M. Lazar, J. Lee, T. Tasdizen, R. Whitaker. “Moment-Based Global Registration of Echo Planar Diffusion-Weighted Images.” In Proceedings 12th Annual Meeting of International Society for Magnetic Resonance in Medicine (ISMRM), page 2200, May 2004.

D. B. Ennis, G. Kindlmann, P. A. Helm, I. Rodriguez, H. Wen, E. R. McVeigh. “Visualization

of high-resolution myocardial strain and diffusion tensors using superquadric glyphs.” In Proceedings 12th Annual Meeting of International Society for Magnetic Resonance in Medicine (ISMRM), page 2487, May 2004.

SOFTWARE

Principal Developer, **Teem** (<http://teem.sourceforge.net>) 1998 - present
A set of libraries and command-line tools for analyzing and visualizing raster data, including diffusion-weighted and diffusion tensor images. Now a component of 3D Slicer (www.slicer.org), SCIRun (<http://software.sci.utah.edu/scirun.html>), and the NA-MIC Toolkit (<http://www.na-mic.org>).

RESEARCH GRANT

University of Utah Research Foundation Seed Grant PID 2107127 “Comprehensive Analysis and Imaging of White Matter Structure from Diffusion Tensor Magnetic Resonance Imaging (MRI)”, 2002.

INVITED PRESENTATIONS

“Recent Developments in the Analysis and Interpolation of Diffusion Tensor Images”, Institute for Computational Engineering and Sciences, University of Texas at Austin, August 2007

“Visualization of Diffusion Image Data and its Models”, Dagstuhl Seminar 07291, “Scientific Visualization”, (D. E. Ebert, H. Hagen, K. I. Joy, D. A. Keim, organizers), Germany, July 2007.

“Recent Developments in the Visualization, Interpolation, and Analysis of Diffusion Image Data and its Models”, Technische Universiteit (TU) Eindhoven, TU Delft, and Visual Interactive Effective Worlds (VIEW) Workshop, The Netherlands, June 2007.

“Novel Mathematical Approaches to Feature Detection in Diffusion Tensor Images”, First Monday Seminar Lecture Series, Department of Radiology, Brigham and Women’s Hospital, May 2007.

“Anisotropy Creases and Extremal Surfaces in Diffusion Tensor Images”, Visualization Research Lab, Brown University, February 2007.

“Anisotropy Creases and Extremal Surfaces”, Dagstuhl Seminar 07022, “Visualization and Image Processing of Tensor Fields,” (J. Weickert and D. Laidlaw, organizers), Germany, January 2007.

“An Open-Source Framework for Tensor Visualization and Analysis”, University of Las Palmas de Gran Canaria, Spain, November 2006.

“Crease Features in Tensor Invariants”, Radiologic Sciences Laboratory, Stanford University, February 2006.

“Visual Display of Diffusion Tensor Fields,” PICASso Research Seminar, Princeton University, November 2005.

“Visualization and Analysis of Diffusion Tensor Fields,” Electrical and Computer Engineering Colloquium, Cornell University, September 2005.

“Tensor Invariants, their Gradients, and their Failings.” Dagstuhl Perspectives Seminar 04172 “Visualization and Image Processing of Tensor Fields,” (H. Hagen and J. Weickert, organizers), Germany, April 2004.

CONFERENCE COURSES, TUTORIALS, PANELS

S. Oeltze, D. Bartz, F. Link, G. Kindlmann, K. Mueller, B. Preim, M. Wacker, “Visual Medicine: Techniques, Applications and Software.” IEEE Visualization 2006, Tutorial 1, October 2006.

T. J. Jankun-Kelly (panel moderator), R. Kosara, G. Kindlmann, C. North, C. Ware, E. W. Bethel. “Is There Science In Visualization?” IEEE Visualization 2006, October 2006. (*Awarded Best Panel*)

D. Bartz, G. Kindlmann, K. Mueller, B. Preim, M. Wacker, “Visual Medicine: Foundations of Medical Imaging” and “Visual Medicine: Advanced Applications for Medical Imaging,” IEEE Visualization 2005, Tutorials 2 and 3, October 2005.

L. Ibanez, G. Kindlmann, S. Aylward, “Hot Topics in 3D Medical Visualization,” ACM SIGGRAPH 2005, Tutorial/Course 33, August 2005.

A.L. Alexander, G. Kindlmann, D. Weinstein, L. Zhukov, E. K. Jeong, “Diffusion Tensor MRI: From Acquisition to Application”, SIAM Conference on Imaging Science, May 2004.

D. Weinstein, P. J. Basser, A. L. Alexander, E. Hsu, G. Kindlmann, D. Laidlaw, L. Zhukov, C.-F. Westin, J. Tsuruda, “Diffusion Tensor MRI: From Acquisition to Application,” IEEE Visualization 2003, Workshop 1, October 2003.

J. Kniss, G. Kindlmann, M. Hadwiger, C. Rezk-Salama, R. Westermann, “High-Quality Volume Graphics on Consumer PC Hardware,” IEEE Visualization 2002, Tutorial 2, October 2002.

T. Yoo, G. Gerig, R. Whitaker, G. Kindlmann, R. Machiraju, and T. Möller, “Image Processing for Volume Graphics,” ACM SIGGRAPH 2002, Course 50, July 2002.

T. Yoo, G. Gerig, R. Whitaker, G. Kindlmann, R. Machiraju, and T. Möller, “From Transfer Functions to Level Sets: Advanced Topics in Volume Image Processing,” IEEE Visualization 2001, Tutorial 5, October 2001.

H. Pfister (panel moderator), B. Lorensen, C. Bajaj, G. Kindlmann, W. Schroeder, L. Sobierajski Avila, K. Martin and R. Machiraju. “The Transfer Function Bake-Off.” In Proceedings IEEE Visualization 2000, pages 523–526, October 2000. (*Awarded Best Panel*)

TEACHING EXPERIENCE

University of Utah, Teaching Assistant for Scientific Visualization 2000, 2001
(Profs. Ross Whitaker and Christopher Johnson) Created and graded assignments, helped write and grade exams, gave occasional lectures, and created on-line resources for VTK/Tcl/Tk.

Cornell University, Teaching Assistant for “Disruptive Technologies” 1997
(Prof. Donald Greenberg) Helped prepare lecture material on computer graphics and new Internet products and protocols, created and graded assignments.

PROFESSIONAL SERVICE

Co-Chair, Workshop on Visual Computing for Biomedicine (<http://www.vcbm.org>) 2008

Co-Chair, Interactive Demos session, IEEE Visualization 2008

Co-Chair, Posters session, IEEE Visualization 2006, 2007

Program Committee, Eurographics/IEEE-VGTC Symposium on Visualization 2008

Program Committee, IEEE Visualization 2005 – 2007

Program Committee, Applied Perception in Graphics and Visualization 2006 – 2008

Program Committee, Volume Graphics 2007

Program Committee, Vision, Modeling, and Visualization 2004 – 2005

Reviewer, IEEE Visualization, Eurographics/IEEE-VGTC Symposium on Visualization, Pacific Visualization, ACM SIGGRAPH, ACM EuroGraphics, International Society for Magnetic Resonance in Medicine (ISMRM), IEEE Transactions on Visualization and Computer Graphics, IEEE Transactions on Medical Imaging, Medical Image Computing and Computer-Assisted Intervention (MICCAI).

REFERENCES

Carl-Fredrik Westin (westin@bwh.harvard.edu)
Director, Laboratory of Mathematics in Imaging
Department of Radiology, Harvard Medical School

Ron Kikinis (kikinis@bwh.harvard.edu)
Director, Surgical Planning Laboratory
Department of Radiology, Harvard Medical School

Christopher R. Johnson (crj@cs.utah.edu)
Director, Scientific Computing and Imaging Institute
School of Computing, University of Utah