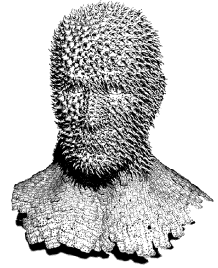


David H. Laidlaw

Box 1910, Department of Computer Science
Providence, RI 02912

401-863-7647
email: dhl@cs.brown.edu
<http://www.cs.brown.edu/~dhl>



Note that change bars in right margin indicate additions for 2005.

Research

Overview Interdisciplinary research into robust and effective computer science and visualization tools to solve problems in biology, fluids, medical imaging, archaeology, geology, geography, and other disciplines. Collaborative work with colleagues in these areas guides the research and provides a mechanism for evaluating the usefulness and robustness of results.

Honors

- 2005 Best Poster award at IEEE Visualization '05
SIGGRAPH, ACM Student Research Competition, 2nd place with PhD student Daniel Keefe
- 2004 Best Panel award at IEEE Visualization '04
- 2003 Henry Merritt Wriston Teaching Fellowship
- 2002 *Computers & Graphics* Second Best Paper Award
- 2001 [Best Case Study award at IEEE Visualization '01](#)
Best Layout and Best Scientific Presentation Exhibit Award at the American Society for Surgery of the Hand Annual Meeting '01
Awarded NSF CAREER Grant
- 2000 Appointed Stephen Robert Assistant Professor
- 1998 Best Panel award at IEEE Visualization '98
- 1989 Earl C. Anthony Graduate Fellowship
- 1984 Raster Tech Image Contest
elected to Sigma Xi

Education Ph.D., Computer Science, California Institute of Technology, 1995.

Geometric Model Extraction from Magnetic Resonance Volume Data
Researched biological applications of computer graphics. Created new computer

graphics modeling and animation techniques that collect better magnetic resonance imaging (MRI) data, classify or segment sampled volume data, volume render, and animate extracted models .

M.S., Computer Science, California Institute of Technology, 1992.

Material Classification of Magnetic Resonance Volume Data

Sc.M., Computer Science, Brown University, 1985.

Rendering Parametric Surfaces

Sc.B., Computer Science, Brown University, *summa cum laude*, honors in Math, 1983.

Topology and Mechanics, Honors thesis (film)

Experience **Associate Professor, Brown University**, 2003 to present.

Stephen Robert Assistant Professor, Brown University, 2000 to 2003.

Assistant Professor, Brown University, 1998 to 2000.

Specific research projects include visualization of vector-valued and tensor-valued volume data, acquiring images of blood pressure measurements and of water diffusion tensor measurements using magnetic resonance, development of geometric tools for archaeology, simulation of human joint dynamics, and visualization of computer programs.

Senior Research Fellow, California Institute of Technology, 1996 to 1998.

Research focussed on quantitative biological and medical imaging and image processing, modeling biological systems, and scientific visualization. Responsible for creating a research plan, raising funds, executing the plan, and directing and supervising students and staff.

Postdoc/Grad. Research Assistant, California Institute of Technology, 1989 to 1996.

Research focused on extracting computer graphics models of animals and plants from 3-D MRI data. Participated in fund-raising and site reviews for the HBP and the distributed NSF Science and Technology Center for Computer Graphics and Scientific Visualization. Achieved research goals from the two projects, including developing tissue classification algorithms, visualizing MRI data, and placing organic textures on geometric models.

Consultant, Starent/Advanced Visual Systems, 1989 to 1993.

Consulted on design and implementation strategies for Application Visualization System (AVS) scientific visualization software. Implemented new CAD/CAM finite element functionality. Worked with customers to improve their animation and modeling applications.

Software Engineer, Stellar Computer, 1986 to 1989.

Designed, prototyped, and implemented AVS. As first member of the graphics software team at Stellar, helped recruit and build the group, and coordinate with the graphics hardware group. Developed and implemented graphics software architecture for the Stellar graphics supercomputer.

Research Assistant, Brown University, 1983 to 1985.

Consultant, Basel Institute for Immunology, Switzerland, Summer 1984.

Teaching Assistant, Brown University, 1983.

Programmer, Johns Hopkins University, 1980 to 1982.

Journal and SIGGRAPH

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On the optimality of partial volume classification methods: Voxel histogram classification vs. eigenimage filtering. David H. Laidlaw. *IEEE Transactions on Medical Imaging*, 17(6):1094–1096, December 1998. (pdf) (bibtex: Laidlaw-1998-OPV).

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adakis. In *Proceedings of International Conference on Computational Science*, pages 689–694, 2005. ([pdf](#)) ([bibtex: Pivkin-2005-SVA](#)).

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Visualizing multivalued data from 2D incompressible flows using concepts from painting. Michael Kirby, H. Marmanis, and David H. Laidlaw. In *Proceedings of IEEE Visualization 1999*, pages 333–340, 1999. ([pdf](#)) ([bibtex: Kirby-1999-VMD](#)).

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Registration and computational staining of multiple MRI data sets. David B. Kirk, David H. Laidlaw, and Alan H. Barr. In *Proceedings of AUSGRAPH 1990*, September 1990. ([bibtex: Kirk-1990-RCS](#)).

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Laidlaw. In *Visualization Handbook*. Academic Press, June 2004. ([pdf](#)) ([bibtex: Zhang-2004-DTM](#)).

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Continuous bayesian tissue classification for visualization techniques. David H. Laidlaw. In *Data Visualization Techniques*, pages 107–129. John Wiley and Sons Ltd, 1999. ([pdf](#)) ([bibtex: Laidlaw-1999-CBT](#)).

Goal-directed magnetic resonance brain micro-imaging. David H. Laidlaw, Alan M. Barr, and Russell E. Jacobs. In *Neuroinformatics: An Overview of the Human Brain Project*, chapter 6, pages 125–202. Lawrence Erlbaum Assoc., 1997. ([bibtex: Laidlaw-1997-GDM](#)).

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Diffusion-tensor imaging and executive function in subcortical ischemic vascular disease and mild cognitive impairment. Stephen Correia, Thea Brennan-Krohn, Song Zhang, David H. Laidlaw, Paul Malloy, and Steven Salloway. In *International Neuropsychological Society conference*, February 2005. ([ppt](#)) ([bibtex: Correia-2005-DTI](#)).

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Panel session: Information and scientific visualization: Separate but equal or happy together at last. Theresa-Marie Rhyne, Melanie Tory, Tamara Munzner, Matt Ward, Chris Johnson, and David H. Laidlaw. In *Proceedings of IEEE Visualization'03*, 2003. ([pdf](#)) ([bibtex: Rhyne-2003-ISV](#)).

Using CavePainting to create scientific visualizations, David Karelitz, Daniel Keefe, and David H. Laidlaw. *IEEE Visualization 2003 Poster Compendium*, October 2003. ([pdf](#)) ([bibtex: Karelitz-2003-UCC](#)).

The combined effect of pulsatile inflow and unsteady geometry on flow in coronary arteries. Igor Pivkin, Peter Richardson, David H. Laidlaw, and George Karniadakis. In *Proceedings of International Symposium on Modeling of Physiological Flows*, 2003. ([pdf](#)) ([ps](#)) ([bibtex: Pivkin-2003-CEP](#)).

Designer-critiqued comparison of 2D vector visualization methods: A pilot study. Cullen Jackson, Daniel Acevedo, David H. Laidlaw, Fritz Drury, Eileen Vote, and Daniel Keefe. In *SIGGRAPH 2003 Sketches and Applications*. ACM SIGGRAPH, 2003. ([pdf](#)) ([bibtex: Jackson-2003-DCC](#)).

Design-by-example: A schema for designing visualizations using examples from art. Eileen Vote, Daniel Acevedo, Cullen Jackson, Jason Sobel, and David H. Laidlaw. In *SIGGRAPH 2003 Sketches and Applications*. ACM SIGGRAPH, 2003. ([pdf](#)) ([bibtex: Vote-2003-DBE](#)).

A 3D method for segmenting and registering carpal bones from CT volume images. G. Elisabeta Marai, David H. Laidlaw, James J Coburn, Mohammad A Upal, and Joseph J. Crisco. In *Proceedings of Annual Meeting of the American Society of Biomechanics*, September 2003. ([pdf](#)) ([ppt](#)) ([bibtex: Marai-2003-3DM](#)).

TIV: A thread interaction viewer. Kevin Audleman, David H. Laidlaw, and Steve Reiss. In *Poster Proceedings of IEEE Visualization*, October 2002. ([pdf](#)) ([ppt](#)) ([bibtex: Audleman-2002-TIV](#)).

The great potato search: The effects of visual context on users feature search and recognition abilities in an IVR scene. Cullen Jackson, David Karelitz, Sean A. Cannella, and David H. Laidlaw. In *Poster Proceedings of IEEE Visualization*, October 2002. ([pdf](#)) ([bibtex: Jackson-2002-TGP](#)).

Application of DTI visualization and analysis on a data set from a brain tumor patient. Song Zhang, David H. Laidlaw, Mark Bastin, Saurabh Sinha, and Thomas S. Deisboeck. In *IEEE Visualization Poster Compendium*, October 2002. ([pdf](#)) ([bibtex: Zhang-2002-AOD](#)).

Visualizing the differences between diffusion tensor volume images. Marco DaSilva, Song Zhang, Cagatay Demiralp, and David H. Laidlaw. In *Proceedings ISMRM Workshop in Diffusion MRI: Biophysical Issues*, pages 237–238, March 2002. ([pdf](#)) ([bibtex: DaSilva-2002-VDD](#)).

Contact areas and ligament lengths are abnormal in patients with malunited distal radius fracture despite normal radioulnar kinematics. G. Elisabeta Marai, David H. Laidlaw, Ca-

gatay Demiralp, Cindy Grimm, Joseph J. Crisco, Douglas Moore, and E. Akelman. In *World Congress Biomechanics*, 2002. ([pdf](#)) ([bibtex: Marai-2002-CAA](#)).

Modeling and visualization of inter-bone distances in joints. Cagatay Demiralp, G. Elisabeth Marai, Stuart Andrews, David H. Laidlaw, Joseph J. Crisco, and Cindy Grimm. In *Visualization '01 Work in Progress Proceedings*, pages 24–25, October 2001. ([pdf](#)) ([bibtex: Demiralp-2001-MVI](#)).

Visualizing diffusion tensor volume differences. Marco DaSilva, Song Zhang, Cagatay Demiralp, and David H. Laidlaw. In *Visualization '01 Work in Progress Proceedings*, pages 16–17, October 2001. ([pdf](#)) ([bibtex: DaSilva-2001-VDT](#)).

Realism, expressionism, and abstraction: Applying art techniques to visualization. Theresa-Marie Rhyne, David H. Laidlaw, Christopher G. Healey, Victoria Interrante, and David Duke. In *Proceedings of IEEE Visualization Conference*, pages 523–526, San Diego, California, October 2001. ([pdf](#)) ([bibtex: Rhyne-2001-REA](#)).

Interactive visualization of 3D carpal kinematics and bony anatomy. Joseph J. Crisco, Cagatay Demiralp, David H. Laidlaw, A-P. C. Weiss, E. Akelman, and S.W. Wolfe. In *Am. Soc. for Surgery of the Hand 56th Annual Meeting*, October 2001. ([bibtex: Crisco-2001-IV3](#)).

Elucidating neural structure in diffusion tensor MRI volumes using streamtubes and streamsurfaces. Song Zhang and David H. Laidlaw. In *Proc. 9th International Society of MR in Medicine*, April 2001. ([pdf](#)) ([bibtex: Zhang-2001-ENS](#)).

Multimodal multidimensional digital developmental atlas of mouse brain. Russell E. Jacobs, David H. Laidlaw, G. Burns, R. Moats, and A. Toga. In *Winter Conference on Brain Research. Panel Session*, January 2001. ([bibtex: Jacobs-2001-MMD](#)).

Archave: A virtual environment for archaeological research. Daniel Acevedo, Eileen Vote, David H. Laidlaw, and Martha Joukowsky. In *Work in Progress Proceedings of IEEE Visualization '00*, October 2000. ([pdf](#)) ([bibtex: Acevedo-2000-AVE](#)).

What's virtual reality good for? The ARCHAVE system — problems and possibilities. Eileen Vote, Daniel Acevedo, Martha Joukowsky, and David H. Laidlaw. In *Proc. Virtual Archaeology between Scientific Research Territorial Marketing (VAST)*, pages 83–86, November 2000. ([pdf](#)) ([bibtex: Vote-2000-VRS](#)).

Streamtubes and streamsurfaces for visualizing diffusion tensor MRI volume images. Song Zhang, Charles T. Curry, Daniel S. Morris, and David H. Laidlaw. In *Visualization '00 Work in Progress*, October 2000. ([pdf](#)) ([bibtex: Zhang-2000-SSV](#)).

Visualizing diffusion tensor MR images using streamtubes and streamsurfaces, Song Zhang, Charles T. Curry, Daniel S. Morris, and David H. Laidlaw. Poster at Human Brain Project Annual Meeting, NIH, Bethesda, MD, May 2000. ([pdf](#)) ([bibtex: Zhang-2000-VDT](#)).

Reducing errors due to partial-volume effects and noise in pressure maps calculated for MR velocity data. Marco DaSilva, David H. Laidlaw, and J. Michael Tyszka. In *Proc. 8th International Society for MR in Medicine*, April 2000. ([bibtex: DaSilva-2000-RED](#)).

Visualization needs more visual design! Sensory design issues as a driving problem for visualization research. J. Edward Swan, Victoria Interrante, David H. Laidlaw, Theresa-

Marie Rhyne, and Tamara Munzner. In *Proceedings of IEEE Visualization Conference*, pages 485–490, San Francisco, California, 1999. ([pdf](#)) ([bibtex: Swan-1999-VNM](#)).

Evaluating effects of diffusion weighting choice on accuracy of diffusion tensor MRI of fixed mouse spinal cord. David H. Laidlaw, Kristen L. Cook, and Yuri M. Goldfeld. In *Proc. 7th International Society for MR in Medicine, Poster Session*, May 1999. ([pdf](#)) ([bibtex: Laidlaw-1999-EED](#)).

A demonstration of errors in relative pressure calculations for MR velocity data. David H. Laidlaw and J. Michael Tyszka. In *Proc. 7th International Society for MR in Medicine*, May 1999. ([pdf](#)) ([bibtex: Laidlaw-1999-DER](#)).

Investigating white matter diffusion anisotropy using the desmyelinating shiverer mutant mouse. Eric T. Ahrens, David H. Laidlaw, Carol Readhead, and Scott E. Fraser. In *Proc. 7th International Society for MR in Medicine*, May 1999. ([bibtex: Laidlaw-1999-IWM](#)).

Goal-directed optimization of magnetic resonance imaging. David H. Laidlaw, Eric T. Ahrens, Matthew J. Avalos, Mark D. Montague, Alan H. Barr, Russell E. Jacobs, and Scott E. Fraser. In *Neuroscience Abstracts*, November 1998. ([bibtex: Laidlaw-1998-GOM](#)).

Panel: Art and visualization: Oil and water? David H. Laidlaw, davidkremers, Felice Frankel, Victoria Interrante, and Thomas F. Banchoff. In *Proceedings of IEEE Visualization Conference*, pages 507–509, Research Triangle Park, North Carolina, October 18 - 23 1998. ([pdf](#)) ([bibtex: Laidlaw-1998-AVO](#)).

Visually representing multi-valued scientific data using concepts from oil painting. David H. Laidlaw, davidkremers, Eric T. Ahrens, and Matthew J. Avalos. In *SIG-GRAPH '98 Visual Proceedings (sketch)*, page 249, August 1998. ([pdf](#)) ([bibtex: Laidlaw-1998-VRM](#)).

Evaluating numerical methods for blood pressure MRI. David H. Laidlaw and J. Michael Tyszka. In *Laverna Titus Young Investigators forum*, May 1998. ([bibtex: Laidlaw-1998-ENM](#)).

Three-dimensional space-time structure of turbulent jets. Jerry W. Shan, David H. Laidlaw, Galen G. Gornowicz, Daniel B. Lang, and Paul E. Dimotakis. In *Proc. DFD97 Meeting of the American Physical Society*, November 1997. ([bibtex: Shan-1997-TSS](#)).

Bayesian mixture classification of MRI data for geometric modeling and visualization. David H. Laidlaw. In *abstract and poster for International Workshop on Mixtures*, September 1995. ([bibtex: Laidlaw-1995-BMC](#)).

Popular Press Not your typical new magazine: Brown university s chaise is printed on a dvd disc, Bill Van Siclen. Providence Journal Arts Section, February 2004. ([pdf](#)) ([bibtex: Siclen-2004-NYT](#)).

Nugget for NSF: ITR collaborative: Perceptual optimization for data visualization, Colin Ware, Don House, David H. Laidlaw, and Jeffrey Proehl. Submitted to NSF, January 2004. ([pdf](#)) ([bibtex: Ware-2004-NUG](#)).

Faculty forum: Teaching innovations. Catherine Dube, David H. Laidlaw, and Thompson Webb III. *The Teaching Exchange, Brown University*, January 2003. ([pdf](#)) ([bibtex: Dube-2003-FFT](#)).

Random samples: Painterly data. Constance Holden. *Science Magazine*, 298(5594):739, October 2002. ([pdf](#)) ([bibtex: Holden-2002-RSA](#)).

Brown-risd course unites two disciplines, two institutions. Elizabeth Miller. *George Street Journal*, 27, November 2002. ([pdf](#)) ([bibtex: Miller-2002-BRC](#)).

Virtual da vinci. Kathy Walker. *Shift Magazine*, 10(2), May 2002. ([pdf](#)) ([bibtex: Walker-2002-VDV](#)).

The virtual voyager. Paroma Basu. *The MIT Technology Review*, September 2001. ([pdf](#)) ([bibtex: Basu-2001-TVV](#)).

Other

Publications Faculty forum: Teaching innovations. Catherine Dube, David H. Laidlaw, and Thompson Webb III. *The Teaching Exchange, Brown University*, January 2003. ([pdf](#)) ([bibtex: Dube-2003-FFT](#)).

Nonphotorealistic rendering in scientific visualization. Christopher G. Healey, Victoria Interrante, davidkremers, David H. Laidlaw, and Penny Rheingans. In *Course Notes of SIGGRAPH 2001*, volume Course 32, August 2001. ([pdf](#)) ([bibtex: Healey-2001-NRS](#)).

Applying concepts from oil painting and art to visualization. David H. Laidlaw. *Sidebar in IEEE Computer Graphics and Applications*, January 2000. ([bibtex: Laidlaw-2000-ACO](#)).

Geometric Model Extraction from Magnetic Resonance Volume Data. David H. Laidlaw. PhD thesis, California Institute of Technology, 1995. ([pdf](#)) ([bibtex: Laidlaw-1995-GME](#)).

Computer graphics and the geometry of s3. Huseyin Kocak and David H. Laidlaw. *The Mathematical Intelligencer*, 9(1):8–10, 1987. ([bibtex: Kocak-1987-CGG](#)).

Invited Lectures/Presentations

2005 Joint Greater Boston ACM and IEEE Seminar, December

Physical Chemistry Seminar, Brown, November

Biostatistics Seminar, Brown, November

IEEE Visualization Conference, October

Dagstuhl, June

Dynamic Data-Driven Application Systems Workshop, International Conference on Computational Science, Atlanta, May

National Academy of Engineering, German American Frontiers of Engineering Symposium, Potsdam, May

VRVis Seminar, Vienna, May

Image and Meaning II Conference, Los Angeles, June

Visual Analytics Panel, AAAS, Washington DC, February

- 2004 IEEE Visualization Conference, October
- Brown CS 25th Anniversary, May
- University of Kaiserslautern, April
- Dagstuhl Diffusion Imaging and Visualization Symposium, April
- Wayland Collegium, March
- Winter Conference on Brain Research, January
- 2003 SIAM Geometry Conference, November
- Imaging 2020 Conference, September
- Dagstuhl Visualization Symposium, June
- Princeton University, May
- Siemens Corporate Research, May
- 2002 University of New Hampshire, October
- Fraunhofer Center for Research in Computer Graphics (CRCG), February
- 2001 Carnegie Mellon University, November
- Brown Inauguration, October
- MIT Image and Meaning Conference, June
- University of Edinburgh, April
- 2000 NIH Diffusion Tensor Magnetic Resonance Imaging Conference, December
- 1998 NSF Conference on Computing in the Life Sciences, Pomona College, April
- Naval Research Lab, May
- Brown University Computer Science, April
- University of Southern California, April
- 1997 NSF Science and Technology Center for Computer Graphics and Visualization, January
- 1996 Human Brain Project Annual Meeting, NIH, May
- University of Washington, April
- 1995 Human Brain Project Annual Meeting, NIH, May
- 1988 Naval Underwater Systems Center, Newport, RI

Seattle local IEEE meeting v

1985 Apple Computer

Films and

Videos “Bearly Growing,” with the Caltech Graphics Group, Siggraph Video Review, August, 1995.

“Fruit Tracing,” with the Caltech Graphics Group, Siggraph Electronic Theater, August, 1993.

“[The Hypersphere: Foliations and Projections](#),” with Thomas Banchoff, Hüseyin Koçak, Frederic Bisshopp and David Margolis, Siggraph Animation Screening, 1985; Siggraph Video Review, 1986; Siggraph Art Show, 1986; also shown at numerous mathematics conferences.

“Topology and Mechanics: Flows on the Torus,” with Thomas Banchoff, Hüseyin Koçak and Frederic Bisshopp, Honors Thesis, Brown University, December, 1983.

“Topology and Mechanics: Linear Oscillators and the Hypersphere,” with Thomas Banchoff, Hüseyin Koçak, Frederic Bisshopp and David Margolis, Honors Thesis, Brown University, December, 1983.

Images

“Bee MRI Data,” “Inside a Bee,” “Inside the Human Hand 2,” “Human Hand Montage,” “Lobster MRI Data,” with Matthew J. Avalos, Russell E. Jacobs, Kurt W. Fleischer, and Alan H. Barr, Siggraph Technical Slide Set, 1994; in *Scientific Visualization: The New Eyes of Science*, by Christopher W. Baker, Millbrook Press, Brookfield, CT, 2000.

“Visualization of 2D Velocity, Vorticity, Deformation Rate Tensor, and Turbulent Sources,” with R. Michael Kirby and H. Marmanis; Siggraph Technical Slide Set, 1998; cover of Visualization ’99 Conference Proceedings, 1999; *Computer Graphics and Applications*, Jan/Feb ’00.

“Mouse Spinal Cord Diffusion Tensor Visualization Using Concepts from Painting,” with David Kremers, Eric T. Ahrens, Matthew J. Avalos, and Carol Readhead; Siggraph Technical Slide Set, 1998; cover of Visualization ’98 Conference Proceedings, 1998; MIT Image and Meaning Conference Exhibition, ’01; CIRCA Art Magazine, Autumn 2001, pp 36-37.

“6-Valued MR Image Data Portrayed with Concepts from Painting,” with David Kremers, Eric T. Ahrens, and Matthew J. Avalos, Siggraph Technical Slide Set, 1998.

“Second-order Diffusion Tensor Field Magnetic Resonance Imaging,” with Eric T. Ahrens, Carol Readhead, Celia F. Brosnan, and Scott E. Fraser, Siggraph Technical Slide Set, 1997.

“Goal-directed Linear Combinations of Multi-Valued Magnetic Resonance Data,” with Alan H. Barr and Russell E. Jacobs, Siggraph Technical Slide Set, 1997, *Science*, 278(5342), 1997.

“Volume Rendered Locust,” with Matthew J. Avalos, Siggraph Technical Slide Set, 1996.

“Thorny Man,” with Kurt W. Fleischer, Bena L. Currin, and Alan H. Barr, cover of Siggraph Proceedings, 1995; Siggraph Art Show, 1995; Siggraph Technical Slide Set, 1995.

“Thornballs,” and “Scaled Spheres,” with Kurt W. Fleischer, Bena L. Currin, and Alan H. Barr, Siggraph Technical Slide Set, 1995.

“Human Molar Geometry Derived From MRI,” with Pratik R. Ghosh, Kurt W. Fleischer, Alan H. Barr, and Russell E. Jacobs, Siggraph Technical Slide Set, 1995.

“Human Hand,” “Peeling Banana,” “Volume Rendered Jade Plant,” “Computationally Stained Brain Slice,” and “Computationally Stained Brain Slice 2,” with Matthew J. Avalos, David B. Kirk, John Snyder, Adam R. Woodbury and Alan H. Barr, Siggraph Technical Slide Set, 1992.

“Sphere and Hypersphere,” with Hüseyin Koçak , cover for *Mathematical Intelligencer*, 9(1), 1987; Szymanski, *Introduction to Computers*, Merrill Publishing Co., Columbus, 1988.

“Color Choreography,” with Barbara J. Meier, 2nd place, student category, Raster Technologies Image Contest, 1986; permanent collection, Boston Computer Museum, since 1986; Siggraph Technical Slide Set, 1986; cover for *Brown University Directory of Science and Engineering Research*, 1987; Szymanski, *Introduction to Computers*, Merrill Publishing Co., Columbus, 1988; Szymanski, *Computers and Application Software*, Merrill Publishing Co., Columbus, 1988; Foley, et al, *Computer Graphics, Principles and Practice*, Addison-Wesley, 1992.

“Tubes within Tubes,” with Hüseyin Koçak, Siggraph Art Show, 1986; Szymanski, *Computers and Application Software*, Merrill Publishing Co., Columbus, 1988.

“Inside the Hypersphere,” with Hüseyin Koçak, cover for *Mathematical Intelligencer*, 8(3), 1986; Adage Annual Report, 1987; *The Mathematical Tourist*, Ivars Peterson, W. H. Freeman and Co., New York, 1988, 96.

“Example of Computer Animation,” with Hüseyin Koçak, in *Introduction to Computers and Information Systems*, Thomas H. Athey, Scott Foresman and Co., Glenview IL, 1986.

“The Pedal Surface of a Quartic Curve,” “Focal Surfaces of the Ellipsoid,” with Thomas Banchoff and David Margolis, NY Siggraph Art Expo, 1985; Siggraph Technical Slide Set, 1985; *ID: Magazine of International Design*, 32(1), January-February, 1985, 69.

“Flows on the Torus,” with Thomas Banchoff, Hüseyin Koçak, Frederic Bisshopp and David Margolis, *Scientific American*, September, 1984, 158; *Newsweek*, December 17, 1984, 87; *The Christian Science Monitor*, March 5, 1985, 25; *Veja*, March 6, 1985, 55; NY Siggraph Art Expo, 1985; *Computing Horizons*, Tony Durham, Addison Wesley, New York, 1988, 182; *I Frattali la Geometria Dell’irregolare*, Istituto Della Encyclopedia Italiana, 1988, 35.

“Cyclides of Dupin,” with Thomas Banchoff, Hüseyin Koçak, Frederic Bisshopp and David Margolis, record jacket for “Letters to a Friend,” and “Adman’s Dream,” I Start Counting, Mute Records, London, 1984; book jacket for *The Fourth Dimension: Towards a Geometry*

of Higher Reality, Rudy Rucker, Houghton Mifflin, New York, 1984; *ID: Magazine of International Design*, 32(1), January-February, 1985, 71; cover of *Understanding Computers*, Time-Life Books, New York, 1987; *Recent Revolutions in Mathematics*, Albert Stwertka, Franklin Watts, New York, 1987, 92-93; *The Mathematical Tourist*, Ivars Peterson, W. H. Freeman and Co., New York, 1988, 96.

“Swallowtail Catastrophe,” “Figure Eight Klein Bottle,” “Focal Surfaces of the Ellipsoid,” “Veronese Surface,” with Thomas Banchoff, *Perspectives in Mathematics, Anniversary of Oberwolfach 1984*, Birkhäuser, Boston, 1984, 43-60.

“Nautilus,” with David Margolis and Thomas Banchoff, Evans & Southerland Calendar, 1984.

“Sinusoidal Surface,” with Thomas Banchoff and David Margolis, cover for *Calculus with Analytic Geometry*, M. A. Munem and D. J. Foulis, Worth Publishers Inc., New York, 1984.

“World in Perspective,” with Thomas Banchoff, cover for John Hancock Annual Report, 1984.

“Infinite Torus,” with Thomas Banchoff, Hüseyin Koçak and Frederic Bisshopp, cover for *Sunday Journal Magazine*, Providence Journal, October 14, 1984.

“Veronese Surface and a Polyhedral Model,” with Thomas Banchoff and David Salesin, cover for *Mathematical Intelligencer*, 5(3), 1983.

Research Grants and Contracts

“MRI+DTI-Based Tools for Analyzing White Matter Variation”, PI, NIH Award EB4155A1, \$2M. October 2004 – July 2008.

“DDDAS-TMRP Interactive Data-driven Flow-simulation Parameter Refinement for Understanding the Evolution of Bat Flight”, PI, NSF Award CCR-0540266, \$100K, January 2006 – December 2006.

“Acquisition of a 3T MRI System”, Co-PI, NSF Award BCS-0521432, \$2M, September 2005 – August 2006.

Metrics for Quantifying White Matter Variation: Image Analysis, Testing, and Application, PI, Brown Research Seed Funding, \$100K, January 2005 – January 2006.

“ITR: Computational simulation, modeling, and visualization for understanding unsteady bioflows,” PI, NSF Award CNS-0427374, \$650K, October 2004 – September 2009.

Aerodynamic mechanisms of bat flight: an integrated multidisciplinary approach, Co-PI (Sharon Swartz, PI), Brown Salomon Award, \$20K, 2004.

“ITR Collaborative Research: Perceptual Optimization for Data Visualization,” PI, NSF Award CCR-0324306, \$104K, September 2003 – August 2006.

“CAREER: Shape Capture and Modeling for Wrist Dynamics and Ancient Pottery Analysis using Manifold Surfaces and Signed-Distance Volume Images,” PI, NSF CAREER Award CCR-0093238, \$324K, March 2001 – February 2007.

“Normal and Abnormal In Vivo Carpal Bone Motion,” PI on subcontract from Rhode Island Hospital to Brown, NIH AR44005, \$650K of \$2.4M, April 2001 – February 2006.

“[ITR: Visualization of Multi-valued Scientific Data: Applying Ideas from Art and Perceptual Psychology](#),” PI, NSF Award CCR-0086065, \$2,296,599 September 2000 – August 2004.

“[Visualization for Software Understanding](#),” NSF Award ACI-9982266, Co-PI, (Steve Reiss, PI), \$559,212, October 1999 – September 2002.

“[3D Free-Form Models for Geometric Recovery and Application to Archaeology](#),” NSF Award BCS-9980091, Co-PI (David Cooper, PI) \$1,370,870, September 1999 – January 2003.

“[Multi-valued MRI Acquisition, Visualization, and Dissemination](#),” PI on subcontract from Caltech to Brown, Human Brain Project, \$400K of \$4M, October 1998 – September 2003.

“[Computer Graphics Tools for Understanding Tensor-Valued Volume Data: A Painting Metaphor](#),” PI, NSF CCR-9619649, \$140K, March 1997 – February 2001.

Professional Service

- 2005 Associate Editor, IEEE Trans. on Visualization and Computer Graphics (TVCG)
Program Committee, Symposium on Interactive 3D Graphics and Games (I3D) '06
Program Committee, IEEE Visualization '05
Co-Chair, Posters Committee, IEEE Visualization '05
Best Papers Committee, IEEE Visualization '05
Program Committee, Computer Graphics International (CGI) '05
Program Committee, International Conference on Computer Graphics Theory and Applications (GRAPP) '06
Session Chair, Visualization '05
Paper reviewing for ACM SIGGRAPH (papers and courses), IEEE Computer Graphics and Applications, IEEE Transactions on Visualization and Computer Graphics, IEEE Visualization (regular and applications papers), ACM I3D, CGI, GRAPP, Elsevier, Dagstuhl.
Grant proposal reviewing for the Dutch National Research Council.
Continued invited contributed to the development of a national research agenda for visualization and analysis tools in the service of homeland security; resulting book, *Illuminating the Path*, became RFP for regional homeland-security research centers.
Continued invited participation in a joint NIH- and NSF-sponsored effort to define and author a research agenda entitled *Visualization Research Challenges*. It encompasses visualization and its applications broadly across many disciplines.

- 2004 Associate Editor, IEEE Trans. on Visualization and Computer Graphics (TVCG)
 Program Committee, Symposium on Interactive 3D Graphics and Games (I3D) '05
 Program Committee, Computer Graphics International '05
 Program Committee, IEEE Visualization '04
 Co-Chair, Posters Committee, IEEE Visualization '04
 Associate Chair, Posters Committee, SIGGRAPH '04
 Session Chair, Visualization '04
 Paper reviewing for ACM SIGGRAPH, IEEE Computer Graphics and Applications, IEEE Transaction on Medical Imaging, IEEE Transactions on Visualization and Computer Graphics. IEEE Visualization (regular and applications papers), ACM I3D, Dagstuhl Perspectives Workshop: Visualization and Image Processing of Tensor Fields
 Invited contributor to the development of a national research agenda for visualization and analysis tools in the service of homeland security.
 Invited participant in a joint NIH- and NSF-sponsored effort to define a research agenda for visualization in science and medicine.
- 2003 Associate Editor, IEEE Trans. on Visualization and Computer Graphics (TVCG)
 Program Committee, IEEE Visualization '03
 Co-Chair, Posters Committee, IEEE Visualization '03
 Co-Chair, Posters Committee, SIGGRAPH '04
 Paper reviewing for IEEE Computer Graphics and Applications Special Issue on NPR, ACM SIGGRAPH, ASME JCISE, IEEE CG&A,
 Proposal reviewer for AAAS
 Session Chair, Visualization '03
- 2002 Paper reviewing for SIGGRAPH '02, Graphics Interface '02, IEEE Visualization '02, IEEE Trans. on Medical Imaging, IEEE Computer Graphics and Applications, and CNS Spectrums
 October NIH Human Brain Project special study section (grant review panel)
 Session Chair at Visualization '02
 May NIH Human Brain Project special study section (grant review panel)
- 2001 Paper reviewing for SIGGRAPH '01, Visualization '01, ACM Non-Photorealistic Animation and Rendering (NPAR) '02

External NSF grant reviewing.

Session Chair at Visualization '01.

NSF ITR grant review panel and external NSF grant reviewing.

2000 Program Committee, Joint Eurographics-IEEE TCVG Symposium on Visualization (Vis-Sym) '01.

Paper reviewing for SIGGRAPH '00, Visualization '00, and GI'00.

1999 Paper reviewing for SIGGRAPH '99, Visualization '99, and UIST '99.

Journal paper reviewing for IEEE Trans. on Visualization and Computer Graphics.

Grant reviewing for the Wellcome Trust and the NIH.

Chaired breakout meeting on “Software Component Testing and Comparison Specifications” for biological imaging tools. Human Brain Project annual meeting, NIH.

1998 Conference paper reviewing for SIGGRAPH '98, Visualization '98, and ACM SIGMOD DiSC.

Journal paper reviewing for IEEE Trans. on Visualization and Computer Graphics.

pre-1998 Reviewing for SIGGRAPH Conferences, Visualization Conferences, Volume Visualization Workshops, IEEE Transactions on Visualization and Computer Graphics, IEEE Computer Graphics and Applications, and Computer Aided Geometric Design.

Teaching and Research Advising

Ph.D. Graduates: Eileen Vote, 2001 (co-advised with Martha Joukowsky)

Ph.D. Candidates: Daniel Acevedo, 2002; Daniel Keefe, 2000; Liz Marai, 2000; Song Zhang, 1999

Sc.M. Graduates: Vadim Slavin, 2005; Cagatay Demiralp, 2005; David Eigen, 2004; Cagatay Demiralp, 2004; Eduardo Hueso, 2004; Jason Sobel, 2003; Andreas Wenger, 2002; Prabhat, 2001

Undergraduate Honors Theses: Stephanie Lee, 2005; Andrew McClain, 2003; Andrew Hull, 2003 (Visual Art); Rachel Weinstein, 2002; Jason Sobel, 2002; Marco da Silva, 2001; Danah Boyd, 2000

2005

[Software System Design \(CS 190\)](#)

[Interdisciplinary Scientific Visualization \(CS 237\)](#)

Graduate Research Advising: Daniel Acevedo Feliz, Cagatay Demiralp, David Eigen, Radu Jianu, Daniel Keefe, Misha Kostandov, Wenjin Lee, Dmitri Lemmerman, Liz Marai, Igor Pivkin (Appl. Math), Vadim Slavin, Song Zhang

Undergraduate Research Advising: Stephanie Lee, Misha Zaitzeff

Examiner: Dana Tenneson, Joe Kniss (U. Utah)

Reader: Joe LaViola, Sonia Leach.

2004 [Virtual Reality Design for Science \(CS 137\)](#)

Postdoctoral Research Advising: Cullen Jackson, Eileen Vote

Graduate Research Advising: Daniel Acevedo Feliz, Cagatay Demiralp, David Eigen, Eduardo Hueso, David Karelitz, Daniel Keefe, Dmitri Lemmerman, Liz Marai, Igor Pivkin (Appl. Math), Stephen Seow (Psych.), Vadim Slavin, Song Zhang

Undergraduate Research Advising: Stephanie Lee, Misha Zaitzeff

Examiner: Peter Sibley, Steve Seow (Psych.), Joe Kniss (U. Utah)

Reader: Joe LaViola, Gordon Kindlmann (U. Utah)

2003 [Interdisciplinary Scientific Visualization \(CS 237\)](#)

[Software System Design \(CS 190\)](#)

Postdoctoral Research Advising: Cullen Jackson, Eileen Vote

Graduate Research Advising: Daniel Acevedo Feliz, Cagatay Demiralp, Eduardo Hueso, David Karelitz, Daniel Keefe, Liz Marai, Igor Pivkin (Appl. Math), Stephen Seow (Psych.), Vadim Slavin, Jason Sobel, Song Zhang

Undergraduate Research Advising: Andrew McClain, Misha Zaitzeff

2002 [Interdisciplinary Scientific Visualization \(CS 237\)](#) Newly developed class co-taught with RISD professor Fritz Drury. RISD and Brown students work together to explore design and realization issues for virtual reality scientific visualization applications in Brown's Cave.

Postdoctoral Advising: Cullen Jackson, Eileen Vote

Graduate Advising: Daniel Acevedo Feliz, Kevin Audleman, Cagatay Demiralp, Eduardo Hueso, David Karelitz, Daniel Keefe, Liz Marai, Jason Sobel, Andy Wenger, Song Zhang

Undergraduate Advising: Andrew McClain, Akash Parikh, Phil Stone, Rachel Weinstein

2001 [Software System Design \(CS 190\)](#)

Postdoctoral Advising: Cullen Jackson, Eileen Vote

Graduate Advising: Daniel Acevedo Feliz, Stuart Andrews, Kevin Audleman, Daniel Keefe, Mike Kirby, Liz Marai, Prabhat, Eileen Vote, Andy Wenger, Song Zhang

Undergraduate Advising: Marco da Silva, Scott Davidson, Sarah Papp, Andrew Pienaar, Merrie Ringel, Phil Stone, Rachel Weinstein

Examiner: Gordon Kindlmann (U. Utah)

Reader: R. Michael Kirby, Sc.M.

2000 [Interdisciplinary Scientific Visualization \(CS237\)](#)

[Software System Design \(CS190\)](#)

Graduate Advising: Daniel Acevedo Feliz, Stuart Andrews, Daniel Keefe, Mike Kirby, Joe La Viola, Joe Lee, Liz Marai, Prabhat, Eileen Vote, Song Zhang

Undergraduate Advising: Marco da Silva, Scott Davidson, Samuel Ginsberg, Daniel Morris, Andrew Pienaar, Merrie Ringel, Phil Stone, Benjamin White.

Reader: Lisa Zorn, Sc.B.; Margaret Kosmala, Sc.B.

1999 [Interdisciplinary Scientific Visualization \(CS295-5\)](#). I developed and taught this course for the first time this year. In it, students emulated the process of doing interdisciplinary research by applying for grants, having their proposals evaluated, implementing them, and presenting their work at a mock conference. The groups for each project were required to have participants from multiple disciplines, exposing them to many of the skills required for multi-disciplinary collaborative work. The class also experimented with using a Rhetoric and Writing Fellow to help students with communication skills.

[Software System Design \(CS190\)](#)

Graduate Advising: Daniel Acevedo Feliz, Stuart Andrews, Mike Kirby, Jaehoon Lee, Liz Marai, Paul Reitsma, Song Zhang, Gordon Kindlmann (U. Utah)

Undergraduate Advising: David Akers, Charlie Curry, Cagatay Demiralp, Marco da Silva, Rob Manchester, Toan Pham, Jonathan Reiter.

Reader: Joe LaViola, Sc.M.; Lee Markosian, Ph.D.

1998 [Computer Graphics Seminar \(CS 295-1\)](#) (with Nancy Pollard).

Undergraduate Advising: Danijela Cabrac, Nemanja Petrovic, Jit Kee Chin, Laura Brogach, Kristin Cole, Yury Goldfeld.

1997 Undergraduate Advising: Seth Blumberg, Clifford Elgin, David Devault, Jed Wing.

University Service

2005 University Resources Committee (URC)

Magnetic Resonance Facility (MRF) Executive Committee

MRF Science Advisory Board

Center for Computation and Visualization (CCV) Advisory Committee

CCV Director Search Committee

Brain Science Program (BSP) Executive Committee

Committee for Inter-Institutional Cooperation (CIC) (Brown/RISD)

Wriston Fellowship Selection Committee

Chair, CS Computing/Facilities Committee

CS ad hoc web upgrade committee

Hosted seminar/colloquia speakers: Donald House, Arie Kaufmann, Gideon May, Dmitri Metaxis, Colin Ware

Moderated Royce Fellows' Seminar

2004 University Resources Committee (URC)

Magnetic Resonance Facility (MRF) Executive Committee

MRF Search Committee

Center for Computation and Visualization (CCV) Advisory Committee

Committee for Inter-Institutional Cooperation (CIC) (Brown/RISD)

Medical School Applicant Interviewing

CS Curriculum Committee

CS Facilities Committee

CS ad hoc administrative staff search committee

Hosted seminar/colloquia speakers: Derek Jones, John Allman, Hanspeter Pfister, Kelly Gaither, Tom Raidler, and Robert Moorhead

2003 Magnetic Resonance Facility (MRF) Executive Committee

MRF Search Committee

Brown/RISD ad hoc committee on collaboration and newly created standing Committee for Inter-Institutional Cooperation (CIC)

Ad hoc Computational Initiative Committee

CS Graduate Admissions Committee

CS ad hoc Teaching Load Committee

Hosted seminar/colloquia speakers: Iain Woodhouse, Dean Turner, Felice Frankel, Beth Meyerand, Xianfeng Gu, Robert Moorhead, Daniel Weiskopf, Philip Fu, Robert Haimes, Raghu Machiraju, Colin Ware

2002 Magnetic Resonance Facility Executive Committee

Brown/RISD committee on collaboration

CS Graduate Admissions Committee

Hosted seminar/colloquia speakers: Tarn Tanner, Greg Little

2001 CS Graduate Admissions Committee

Magnetic Resonance Facility Executive Committee

Brain Science Program Web Site Committee

Brain Science Program Graduate Advisory and Admissions Committee

Brain Science Program Brochure Committee

Hosted seminar/colloquia speaker: davidkremers (Caltech)

Undergraduate and graduate academic advising

2000 Chaired CS Graduate Recruiting Committee

CS Graduate Admissions Committee

Magnetic Resonance Facility Executive Committee

Brain Science Program Web Site Committee

Brain Science Program Graduate Advisory and Admissions Committee

Brain Science Program Brochure Committee

Hosted seminar/colloquia speakers: Peter Basser (NIH), Chris Johnson (U. Utah), Maurizio Forte (Florence).

Committee to develop speaker series on “What Physics can Measure: What Biologists Want to Measure”

Committee to develop speaker series on Simulation and Visualization.

Undergraduate and graduate academic advising

1999 Chaired CS Graduate Recruiting Committee

CS Graduate Admissions Committee

Brain Science Program Web Site Committee

Brain Science Program Graduate Advisory Committee

Hosted seminar/colloquia speakers: Felice Frankel (MIT and Victoria Interrante (U. Minn.)

Hosted a department Town Meeting

1998 CS Graduate Recruiting Committee

Undergraduate and graduate academic advising

Helped make available color printing and slide-making to the department.

Memberships Sigma Xi, ACM, SIGGRAPH, IEEE.

Interests Bicycle touring, investing, nordic skiing, gardening.

Prepared January 13, 2006