

1998

Vis98

IEEE VISUALIZATION 1998

FINAL PROGRAM

October 18 • October 23, 1998
 Sheraton Imperial Hotel
 Research Triangle Park, NC



THE INSTITUTE OF ELECTRICAL & ELECTRONICS ENGINEERS, INC.



IEEE COMPUTER SOCIETY

Sponsored by IEEE Computer Society Technical Committee on Computer Graphics In Cooperation with ACM/SIGGRAPH

CONFERENCE - AT - A - GLANCE

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
7:00am	REGISTRATION	REGISTRATION	REGISTRATION	REGISTRATION		
8:00am				Keynote Session <i>Imperial IV & V</i>	REGISTRATION	REGISTRATION
9:00am	Tutorials	Information Visualization Symposium	Information Visualization Symposium		Papers	Papers
10:00am		Volume Visualization Symposium	Volume Visualization Symposium	Panel	Papers	Case Studies
11:00am		Tutorials	Tutorials	Papers	Panel	Papers
12:00pm				Case Studies	Case Studies	Case Studies
1:00pm					Vis '99 Open Meeting	
2:00pm				Papers	Papers	Demonstrations and CAL
3:00pm				Papers	Papers	Capstone Session <i>Imperial IV & V</i>
4:00pm				Case Studies	Case Studies	
5:00pm				Papers	Panel	Hot Topics
6:00pm				Hot Topics	Hot Topics	
7:00pm				Demonstrations and CAL	BOFs	
8:00pm		Symposium & Tutorial Reception <i>Empire C-E</i>	VizLies	Conference Reception <i>Empire C-E</i>		
9:00pm						

Sessions include Real-time Volume Rendering, Terrain Visualization, Flow Visualization, Surfaces & Level-of-Detail Techniques, Feature Detection & Visualization, Medical Visualization, Multi-Dimensional Visualization, Flow & Streamlines, Isosurface Extraction, Information Visualization, 3D Modeling & Visualization, Multi-Source Data Analysis Challenges, Interactive Visualization/VR/Animation, Terrain & Large Data Visualization, Isosurface & Volume Rendering, Simplification, Marine Data Visualization, Tensor/Flow, Key Problems & Thorny Issues, Image-based Techniques and Volume Analysis, Engineering & Design, Texturing and Rendering, Art & Visualization

Get complete, up-to-date listings of program information from

URL: <http://www.erc.msstate.edu/vis98>

<http://davinci.informatik.uni-kl.de/Vis98>

Volvis URL: <http://www.erc.msstate.edu/volvis98>

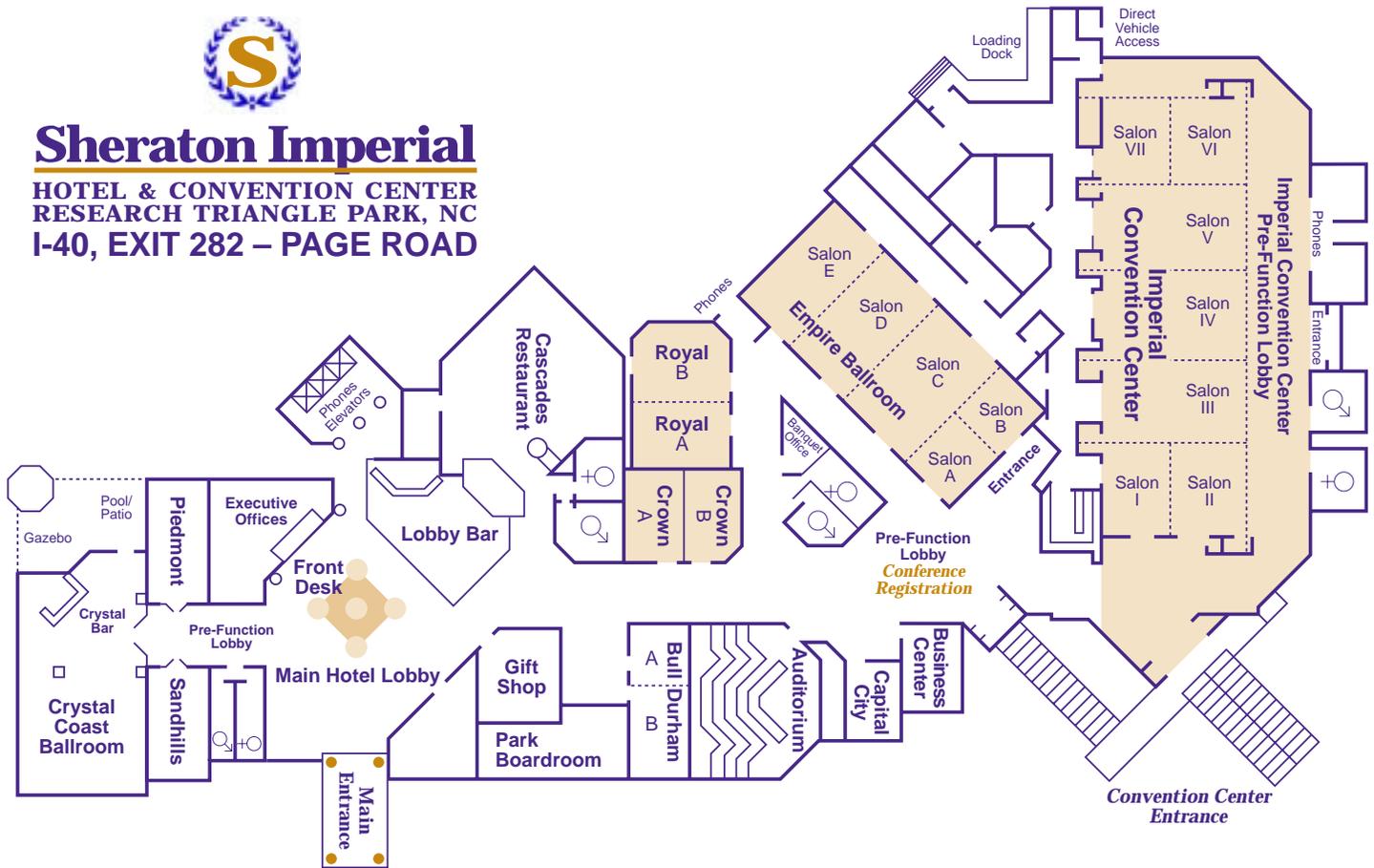
InfoVis URL: <http://www.erc.msstate.edu/infovis98>

or contact: Theresa-Marie Rhyne, Lockheed Martin/U.S. EPA Sci Vis Center, 919-541-0207, trhyne@vislab.epa.gov
 Robert Moorhead, Mississippi State University, 601-325-2850, rjm@erc.msstate.edu



Sheraton Imperial

HOTEL & CONVENTION CENTER
RESEARCH TRIANGLE PARK, NC
I-40, EXIT 282 – PAGE ROAD



IEEE Visualization '98 Conference Committee

Conference Co-Chairs:

Theresa-Marie Rhyne, *Lockheed Martin/US EPA Scientific Visualization Center*
Robert Moorhead, *Mississippi State University*

Program Co-Chairs:

Steve Bryson, *NASA Ames Research Center*
Lloyd Treinish, *IBM T.J. Watson Research Center*

Papers Co-Chairs:

David Ebert, *University of Maryland Baltimore County*
Holly Rushmeier, *IBM T.J. Watson Research Center*
Hans Hagen, *University Kaiserslautern*

Case Studies Co-Chairs:

Kwan-Liu Ma, *ICASE*
Frits H. Post, *Delft University of Technology, The Netherlands*

Panels Co-Chairs:

J. Edward Swan II, *Naval Research Lab*
Jamie Painter, *Los Alamos National Laboratory*

Late Breaking Hot Topics Co-Chairs:

Craig M. Wittenbrink, *Hewlett-Packard Laboratories*
Amitabh Varshney, *State University of New York at Stony Brook*

Tutorials Co-Chairs:

Kelly Gaither, *Mississippi State University*
William Schroeder, *Kitware, Inc.*
Polly Baker, *National Center for Supercomputing Applications*

Creative Applications Lab Co-Chairs:

Russell M. Taylor II, *University of North Carolina*
Kelly Gaither, *Mississippi State University*

Mini-Workshops and BOFs Co-Chairs:

Steve Talent, *Motorola Semiconductor Technology*
Russell M. Taylor II, *University of North Carolina*

Vol Vis 98 Symposium Liaison:

Hanspeter Pfister, *MERL*

Info Vis 98 Symposium Liaison:

John Dill, *Simon Fraser University*

Local Arrangements Co-Chairs:

Bill Youngblood, *North Carolina Supercomputing Center (MCNC)*
Lynne Petterson, *United States Environmental Protection Agency (US EPA)*

Video Proceedings Co-Chairs:

Robert J. McDermott, *University of Utah*
James A. Rose, *Pixar Animation Studios*

CD ROM Chair:

Torsten Möller, *The Ohio State University*

Demonstrations Co-Chairs:

Upul Obeysekere, *Concurrent Technologies Corporation*
L. Eric Greenwade, *Lockheed Martin Idaho Technologies*

Publicity Co-Chairs:

Rhonda J. Vickery, *Mississippi State University*
Michael Bender, *University Kaiserslautern*
Michael E. Goss, *Hewlett-Packard Laboratories*

Audio-Visual Co-Chairs:

Rob Erbacher, *University of Massachusetts, Lowell*
Kevin Campbell, *Lawrence Berkeley National Labs*

Networking Co-Chairs:

Robert J. Silvia, *North Carolina Supercomputing Center (MCNC)*
Stephen Lau, *Lawrence Berkeley National Labs*
Bil Hays, *University of North Carolina, Chapel Hill*

Registration Chair:

Nancy Grady, *Oak Ridge National Laboratory*

Finance Co-Chairs:

Carol Hunter, *Lawrence Livermore National Lab*
Rachael Brady, *National Center for Supercomputing Applications*
Loretta Auvil, *National Center for Supercomputing Applications*

Student Volunteers Co-Chairs:

Daniel R. Schikore, *Lawrence Livermore National Laboratory*
Dave Pinkney, *University of Massachusetts, Lowell*

Steering Committee

Arie Kaufman, *State University of New York at Stony Brook*
Carol Hunter, *Lawrence Livermore National Lab*
Greg Nielson, *Arizona State University*
Larry Rosenblum, *Naval Research Laboratory*

Papers Committee

David C. Banks, *Mississippi State University*
George Pierre Bonneau, *LMC-IMAG*
Daniel Cohen-Or, *Tel-Aviv University*
Leila DeFloriani, *University of Genoa*
A. Robin Forrest, *University of East Anglia*
Markus H. Gross, *Swiss Federal Institute of Technology*
Bernd Hamann, *University of California, Davis*
Charles Hansen, *University of Utah*
William Hibbard, *University of Wisconsin, Madison*
Victoria Interrante, *University of Minnesota*
Chris Johnson, *University of Utah*
David L. Kao, *NASA Ames*
Stanislav V. Klimenko, *Institute for High Energy Physics, Moscow*
Hans-George Pagendarm, *DLR, German Aerospace Center*
Alex Pang, *University of California, Santa Cruz*
Deborah Silver, *Rutgers University*
Samuel P. Useton, *MRI/NASA Ames*
William Wright, *Visible Decisions, Inc.*

VISUALIZATION '98 TUTORIALS

Sunday, Monday, Tuesday

TUTORIAL 1

Sunday 9:30-6:30

Wavelet and Numerical Methods for Visualization

Instructors: Raghu Machiraju, Nelson Max, Robert Moorhead, Torsten Möller

Level: Intermediate

Course Description:

The focus of this course is a survey of wavelet and numerical tools for the imaging and visualization process. We will introduce basic numerical concepts of interpolation and approximation theory. The application of this theory to volume rendering and image analysis is demonstrated by different current research results. We especially introduce signal processing analysis tools and wavelet techniques. We show their origin (connection) to numerical analysis and their practical interpretation and use for the specification of image artifacts such as blurring and aliasing as well as for efficient algorithms (multi-resolution analysis).

Who Should Attend:

This tutorial is designed for scientists, engineers, computer graphicists, and graduate students who are interested in learning more about the mathematical foundations of imaging and visualization algorithms. It would also be of interest to professionals who would like to learn state-of-the-art techniques in image analysis and compression using multi-resolution techniques, including wavelets. Some basic mathematical background and exposure to volume rendering is assumed.

Royal A & B

TUTORIAL 3

Monday 8:30-5:30

Introduction to Programming with Java 3D

Instructors: David R. Nadeau (Organizer and Speaker), Michael J. Bailey, Henry A. Sowizral

Level: Intermediate

Course Description:

Java 3D is a new cross-platform API for developing 3D graphics applications in Java. Java 3D's feature set has been designed to enable quick development of complex 3D applications, and at the same time enable fast and efficient implementations on a variety of platforms, from PCs to workstations. Using Java 3D, software developers can build cross-platform applications that build 3D scenes programmatically, or via loading 3D content from VRML, OBJ, and/or other external files.

The Java 3D API includes a rich feature set for building shapes, composing behaviors, interacting with the user, and controlling rendering details. Participants in this tutorial learn the concepts behind Java 3D, the Java 3D class hierarchy, typical usage patterns, ways of avoiding common mistakes, animation and scene design techniques, and tricks for increasing performance and realism.

Who Should Attend:

This tutorial assumes an intermediate level knowledge of Java programming and a beginning understanding of 3D graphics concepts. No advanced math background is required.

Imperial II

TUTORIAL 2

Sunday 9:30-6:30

Visualization Toolkits: Applications and Techniques

Instructors: Kenneth M. Martin, Lisa Sobierajski Avila, William E. Lorensen, James V. Miller, William J. Schroeder

Level: Intermediate

Course Description:

In this tutorial we will discuss fundamental issues regarding the design, implementation, and application of 3D graphics and visualization systems. We will describe and contrast some current systems such as Open Inventor, Java3D, Data Explorer and the Visualization Toolkit. We will examine in more detail the implementation of the Visualization Toolkit. This will be used to illustrate important design issues such as graphics portability, interpreted versus compiled languages, multiple versus single inheritance, data flow models, and user interaction methods. In the remainder of this tutorial we will focus on applying visualization techniques and toolkits to solve problems from a selection of application domains.

Who Should Attend:

Attendees should have a basic understanding of computer graphics principles, software development techniques, and visualization algorithms such as color mapping and contouring. This course is intended for users, developers, researchers, and practitioners of 3D graphics and data visualization.

Imperial II

TUTORIAL 4

Monday 8:30-5:30

Perception for Visualization: From Design To Evaluation

Instructors: Haim Levkowitz (Organizer and Speaker), Victoria Interrante, Hans Peter Meinzer

Level: Intermediate

Course Description:

1. What is the smallest sample I can show that will be perceived?
2. What is the smallest sample I can show that will be perceived in color?
3. Can I afford using image compression? If yes, how much and what kind?
4. Should I use a grayscale or another color scale? How many gray levels do I absolutely need? What color scale should I use? How many bits for color do I need to have?
5. Should I use 3D, stereo, texture, motion? If so what kinds? and
6. Has my visualization been successful meeting its goals and needs?

If you have ever designed a visualization, you probably have asked yourself (perhaps others) some of these questions; at least you should have.

Since visualization "consumers" are humans, the answers to these questions can only come from a thorough analysis and understanding of human perceptual capabilities and limitations, combined with the visualization's goals and needs.

This tutorial will teach you the basics of human perception and how to utilize them in the complete process of visualization: from design to evaluation.

Who Should Attend:

Anybody engaged in the design, implementation, and evaluation of visualizations.

Imperial III

TUTORIAL 5

Tuesday 8:30-5:30

Interactive Visualization and Web-based Exploration in the Physical and Natural Sciences

Instructors: Theresa Marie Rhyne (Organizer and Speaker), Mike Bailey, Mike Botts, Lloyd Treinish

Level: Intermediate

Course Description:

This tutorial will examine the convergence of visualization methods with the World Wide Web as well as the relationship between real-time interactivity and scientific information exploration. The application of visualization tools and interactive techniques to the examination and interpretation of scientific data sets will be discussed. Highly illustrative atmospheric, oceanographic, and geographic examples will be demonstrated in real time. The process of developing effective visualization paradigms for supporting high speed networking, database management, heterogeneous computing platforms, user interface design, collaborative computing, science education, and the implementation of animation techniques will be highlighted. In addition to examining 3D graphics displays, one case study will also explore solid freeform fabrication as a visualization tool.

Who Should Attend:

Scientific researchers, educators, and computer graphics specialists interested in exploring particular issues associated with handling the visual display of scientific information and large scientific data sets. Experience with scientific visualization systems and terminology is helpful as well as an understanding of computer graphics programming.

TUTORIAL 6

Tuesday 8:30-5:30

Level-Of-Detail in Surface and Volume Modeling

Instructors: L. De Floriani, E. Puppo, R. Scopigno

Level: Intermediate

Course Description:

Participants will learn how to manage the complexity of 3D graphics datasets (surfaces and volumes). The course offers in-depth coverage of compression and simplification techniques, and multiresolution data representation schemes. Applications will also be presented in the fields of terrain visualization, volume data rendering, surface rendering, and web-based systems.

Who Should Attend:

This tutorial is intended for programmers or researchers interested in developing efficient, interactive 3D visual applications.

Imperial II

TUTORIAL 7

Tuesday 8:30-12:30

Clifford Algebra, Quaternions and their Applications in Visualization

Instructors: Hans Hagen, Andrew Hanson, and Gerik Scheuermann
Level: Beginner

Course Description:

Quaternions build a four-dimensional algebra for three-dimensional geometry. They give the best way to deal with rotations in 3-space. In Scientific Visualization, one has used them to deal with vector fields in space and for animations because of their nice interpolation properties.

Clifford algebra is a mathematical language for geometry extending the usual vector space description. It incorporates such important concepts as complex numbers, quaternions, and matrices which are widely used in modern computer graphics and visualization. The central idea is defining elements of different grades like scalars, vectors, bivectors, trivectors, and quaternions together with a multiplication of different graded elements that unify scalar multiplication, scalar product, quaternion, and matrix multiplication. Its extension to Clifford analysis results in a coordinate invariant differential operator unifying gradient, divergence, and rotation. It opens new ways to understand geometry and physics, making it an excellent choice for new scientific visualization algorithms.

Who Should Attend:

This tutorial is designed for those wanting a good starting base for research in the application of Clifford algebra to scientific visualization.

Imperial V

Imperial III

New This Year!!! CREATIVE APPLICATIONS LAB *Imperial I*

The Creative Applications Lab (CAL) is designed to let conference attendees interact with presentors on an individual basis. The CAL will have a variety of computers on which contributors can install their materials for attendees' experimentation and enjoyment. The CAL will be open in conjunction with demonstrations at Visualization '98. This is a unique opportunity for conference attendees to interface directly with conference contributors. Please come visit the CAL while you are at Vis '98!

OTHER VISUALIZATION EVENTS IN THE RESEARCH TRIANGLE PARK AREA

An Introduction to Scientific Visualization with AVS/Express • Sunday, October 18, 9:00am - 5:00pm
URL: <http://www.ncsc.org/training/workshop/>

US EPA Scientific Visualization Center Tours • Tuesday, October 20, 5:30pm - 7:00pm
URL: http://www.epa.gov/vislab/svc/outreach/ieee_vis98/
Buses will run from the conference hotel to EPA

UNC Chapel Hill Open House • Thursday, October 22, 7:00pm - 9:00pm
URL: <http://www.cs.unc.edu/~glasgow/VIS98.html>
Buses will run from the conference hotel to UNC

Vector Field Visualization Workshop • Thursday, October 22, 6:00pm - 10:00pm
URL: <http://www.cs.msstate.edu/cs/vis/vfvis/call.html>

IEEE SYMPOSIUM ON VOLUME VISUALIZATION (VOLVIS '98)

Sponsored by the IEEE Computer Society Technical Committee on Computer Graphics in Cooperation with ACM/SIGGRAPH

October 19-20, 1998 • Imperial IV

VOLVIS98 KEYNOTE SESSION

Volume Visualization – a sleeping giant about to awaken
Speaker: Jim Foley, Chairman and CEO, Mitsubishi Electric Research

The coming era of inexpensive volume rendering will enable many volumetric applications that heretofore have been impractical. We describe one such application – surgical simulation – and an inexpensive real-time volume rendering hardware capable of processing 500 megavoxels per second.

Monday, October 19

- 8:30 - 8:45 **Opening**
- 8:45 - 9:45 **Keynote Address: Volume Visualization – a sleeping giant about to awaken, Jim Foley**
- 9:45 - 10:15 Coffee Break
- 10:15 - 12:00 **Papers: Volume Graphics I**
- (1) **3D Scan Conversion of CSG Models into Distance Volume**, David E. Breen, Sean Mauch, Ross T. Whitaker
 - (2) **Coloring Internal Cavities for Virtual Endoscopy**, Omer Shibolet, Daniel Cohen-Or
 - (3) **Using Distance Maps for Accurate Surface Reconstruction in Sampled Volumes**, Sarah F. F. Gibson
- 12:00 - 1:30 Lunch Break
- 1:30 - 2:45 **Papers: Hardware**
- (1) **A Real-Time Volume Rendering Architecture for Parallel and Perspective Projections**, Masato Ogata, TakaHide Ohkami, Hugh C. Lauer, Hanspeter Pfister
 - (2) **Adding Shadows to a Texture-Based Volume Renderer**, Uwe Behrens, Ralf Ratering
- 2:45 - 3:15 Coffee Break
- 3:15 - 5:00 **Papers: Rendering and Animation**
- (1) **Volume Animation using the Skeleton Tree**, Dilip Kenchammana-Hosekote, Deborah Silver, Nikhil Gagvani
 - (2) **Adaptive Perspective Ray Casting**, Kevin Kreeger, Ingmar Bitter, Frank Dachille, Baoquan Chen, Arie Kaufman
 - (3) **Edge Preservation in Volume Rendering Using Splatting**, Jian Huang, Roger Crawfis, Don Stredney

Tuesday, October 20

- 8:30 - 9:45 **Papers: Segmentation**
- (1) **Probabilistic Segmentation of Volume Data for Visualization Using SOM-PNN Classifier**, Feng Ma, Wenping Wang, Wai Wan Tsang, Zesheng Tang, Shaowei Xia
 - (2) **Semi-Automatic Generation of Transfer Functions for Direct Volume Rendering**, Gordon Kindlmann, James Durkin
- 9:45 - 10:15 Coffee Break
- 10:15 - 12:00 **Papers: Volume Visualization**
- (1) **An Exact Interactive Time Visibility Ordering Algorithm for Polyhedral Cell Complexes**, Claudio T. Silva, Joseph S.B. Mitchell, Peter L. Williams
 - (2) **Hypervolume Visualization: a Challenge in Simplicity**, C. Bajaj, V. Pascucci, G. Rabbio, D. Schikore
 - (3) **Extracting Iso-Valued Features in 4-Dimensional Scalar Fields**, Chris Weigle, David C. Banks
- 12:00 - 1:30 Lunch Break
- 1:30 - 2:45 **Papers: Volume Graphics II**
- (1) **Object Voxelization by Filtering**, Milos Sramek, Arie Kaufman
 - (2) **Accurate Method for the Voxelization of Planar Objects**, Jian Huang, Roni Yagel, Vassily Filippov
- 2:45 - 3:15 Coffee Break
- 3:15 - 5:00 **Papers: Reconstruction and Sampling**
- (1) **Wavelets Based Adaptive Interpolation for Volume Rendering**, Ricardo Sanchez, Marcelo Carvajal
 - (2) **Opacity-Weighted Color Interpolation for Volume Sampling**, Craig M. Wittenbrink, Thomas Malzbender, Michael E. Goss
 - (3) **Design of Accurate and Smooth Filters for Function and Derivative Reconstruction**, Torsten Möller, Klaus Mueller, Yair Kurzion, Raghu Machiraju, Roni Yagel

Symposium Chair

Arie Kaufman, *State University of New York at Stony Brook*

Program Co-Chairs

William Lorensen, *GE Corporate Research and Development*

Roni Yagel, *Biomedicom and The Ohio State University*

Program Committee

Brian Cabral, *Silicon Graphics*

Daniel Cohen-Or, *Tel Aviv University*

Roger Crawfis, *The Ohio State University*

Nick England, *University of North Carolina at Chapel Hill*

Issei Fujishiro, *Ochanomizu University*

Sarah Gibson, *MERL*

Karl Heinz Hoehne, *University of Hamburg*

Ron Kikinis, *Brigham and Women's Hospital, Harvard Medical School*

Kwan-Liu Ma, *ICASE, NASA Langley*

Tom Malzbender, *Hewlett Packard Laboratories*

Nelson Max, *Lawrence Livermore National Laboratory*

Greg Nielson, *Arizona State University*

Frits Post, *Delft University of Technology*

Georgios Sakas, *Fraunhofer Institute for Computer Graphics*

Lisa Sobierajski, *GE Corporate Research and Development*

Roberto Scopigno, *CNUCE-CNR*

Wolfgang Strasser, *Universitaet Tuebingen*

Michael Vannier, *University of Iowa College of Medicine*

Allen Van Gelder, *University of California at Santa Cruz*

Peter Williams, *IBM TJ Watson Research Center*

Symposium Committee

Martin Brady, *Intel Corp.*

Min Chen, *University of Wales Swansea*

Barthold Lichtenbelt, *3DLabs*

Raghu Machiraju, *Mississippi State University*

Hanspeter Pfister, *MERL*

For further information see

<http://www.erc.msstate.edu/volvis98>

IEEE SYMPOSIUM ON INFORMATION VISUALIZATION (INFOVIS '98)

Sponsored by the IEEE Computer Society Technical Committee on Computer Graphics
October 19-20, 1998 • Imperial VI & VII

Monday, October 19

- 8:30 - 10:00 **Opening Remarks and Keynote Address: Leveraging Human Capabilities in Information Perceptualization**, George Robertson, *Microsoft*
- 10:00 - 10:30 Break
- 10:30 - 12:00 **Papers: Visualizing Hierarchies and Networks**
- (1) **WebPath - a Three-dimensional Web History**, Emmanuel Frecon, Gareth Smith
 - (2) **Traversal-based Visualization of Data Structures**, Jeffrey Korn, Andrew Appel
 - (3) **Reconfigurable Disc Trees**, Chang Sung Jeong, Alex Pang
 - (4) **An Interactive View for Hierarchical Clustering**, Graham Wills
- 12:00 - 1:30 Lunch
- 1:30 - 3:00 **Papers: Visualizing Large Information Spaces**
- (1) **Taming Large Datasets with Dynamic Aggregation**, Mei Chuah
 - (2) **The Generalized Detail-In-Context Problem**, T. Alan Keahey
 - (3) **Similarity Clustering of Dimensions for an Enhanced Visualization of Multidimensional Data**, Mihael Ankerst, Stefan Berchtold, Daniel Keim
 - (4) **Uncluttering Force-Directed Layouts**, E. Gansner, S. North
 - (5) **Combining Topological & Multidimensional Scaling for Visualizing Large Datasets**, D. Brodbeck, L. Giardin
- 3:00 - 3:30 Break
- 3:30 - 5:00 **Papers: Visualization Frameworks and Systems**
- (1) **An Operator Interacton Framework for Visualization Spreadsheets**, Ed Chi, John Riedl
 - (2) **Algorithm Visualization for Distributed Environments**, Yoram Moses, Zvi Polunsky, Ayellet Tal, Leonid Ulitsky
 - (3) **IVORY - an object-oriented Framework for Physics-Based Information Visualization in Java**, T.C. Sprenger, M.H. Gross, D. Bielser, T. Strasser
 - (4) **Geographic Visualization: Designing Manipulable Maps for Exploring Temporally Varying Georeferenced Statistics**, Alan MacEachren, Frank Boscoe, Daniel Haug, Linda Pickle
- 7:00 Reception

Tuesday, October 20

- 8:30 - 9:15 **Panel: Visualization in Command and Control Centers - A discussion of issues and challenges for both military and industry centers for command and control of large complex systems**
- 9:15 - 10:00 **Short Reports and Late Breaking Hot Topics I**
- (1) **Information Slices**, Andrews
 - (2) **Enhancing Visualizations with Motion**, L. Bartram
 - (3) **Bringing the Advantages of 3D Distortion Viewing Into Focus**, Carpendale et al.
- 10:00 - 10:30 Break
- 10:30 - 12:00 **Short Reports and Late Breaking Hot Topics II**
- (1) **Saying It in Graphics: From Intentions to Visualizations**, Stephan Kerpedjiev, Giuseppe Carenini, Nancy Green, Johanna Moore, Steven Roth
 - (2) **Visualizing Decision Table Classifiers**, Bary Becker
 - (3) **Comparative Visualization of Protein Structure-Sequence Alignments**, Marc Hansen, Doanna Meads, Alex Pang
 - (4) **Tactical map-based information**, Steven Holste
 - (5) **Visualizing Contract Wins & Losses**, S. Kim et al.
 - (6) **Contextual Model Fitting**, L. Tweedle
 - (7) **Navigating Aggregation Spaces**, A. Mockus
- 12:00-1:30 Lunch
- 1:30 - 3:00 **Papers: Visualizing Text and Documents**
- (1) **Lensbar - Visualization for Browsing and Filtering Large Lists of Data**, Toshiyuki Masui
 - (2) **The Shape of Shakespeare: Visualizing Text Using Implicit Surfaces**, Randall Rohrer, David Ebert, John Sibert
 - (3) **BiblioMapper: A Cluster-based Information Visualization Technique**, Min Song
 - (4) **Multi-faceted Insight Through Interoperable Visual Information Analysis Paradigms**, Beth Hetzler, Paul Whitney, Lou Martucci, Jim Thomas
- 3:00 - 3:30 Break
- 3:30 - 5:00 **Capstone Address: Visual Explanations**, Edward Tufte, *Yale University*

**IEEE InfoVis '98 Symposium
gratefully acknowledges support from:**

Intel Corporation

VIZLIES '98

TUESDAY EVENING SPECIAL SESSION – PARTY

Tuesday 7:30pm • Imperial VI & VII

How to Lie and Confuse with Visualization

Symposium Chair

Jim Hollan, *University of California, San Diego*

Program Co-Chairs

Graham Wills, *Lucent Technologies' Bell Labs*, gwills@research.bell-labs.com
John Dill, *Simon Fraser University*, dill@cs.sfu.ca

Symposium Steering Committee

Stuart Card, *Xerox PARC*
Stephen G. Eick, *Lucent Technologies' Bell Labs*
Steven Feiner, *Columbia University*
Nahum Gershon, *The MITRE Corporation*
George Robertson, *Microsoft*

VISUALIZATION '98 WORKSHOPS

DISTRIBUTED VISUALIZATION SYSTEMS

Royal A & B

Saturday, October 17, 1998 – 8:00am-5:00pm

Michel Grave, ONERA & Université de La Rochelle • grave@onera.fr
Wilfrid Lefer, Université du Littoral, Calais • lefer@lil.univ-littoral.fr
<http://www-lil.univ-littoral.fr/~lefer/IEEEWorkshop.html>

This diverse group of workshop participants will share and consolidate their various experiences in the field of remotely accessing distributed data through visual interfaces, including CSCW, distributed VR, and database issues. Discussions will be organized around three main topics; Applications of Distributed Visualization, Environments & User Interfaces, and Technologies for Distributed Visualization. A report about the workshop will be prepared and is planned for publication in an international journal. The workshop content will be used to prepare a larger workshop or a full symposium with refereed papers at future Visualization conferences.

MULTI-RESOLUTION REPRESENTATION OF 3D GEOMETRY FOR PROGRESSIVE TRANSMISSION

Imperial II

Saturday, October 17, 1998 – 1:00pm-5:00pm

André Guezic, IBM T.J. Watson Research Center • gueziec@watson.ibm.com
Gabriel Taubin, IBM T.J. Watson Research Center • taubin@watson.ibm.com
http://www.erc.msstate.edu/vis98/ap/workshop2_desc.html

The purpose of this workshop is to present the state of the art in the field for visualization problems involving large geometric databases (such as geographic data sets), where the issue of progressive transmission or display is important. There will be several short "invited" talks by experts in the field, and then participants will discuss the state of the art, compare alternatives, and outline the issues to be solved by attempting to answer questions regarding: already solved and unsolved problems, wavelet-based vs. polygonal surface based approaches for progressive 3D geometry transmission, progressive transmission and view-dependent refinement of 3D geometry, and methods for singular (non-manifold) input geometry.

VISUALIZATION '98 BOFS

Visualization '98 Birds of a Feather (BOF) sessions are held on Thursday evening. These sessions provide participants the opportunity to discuss current topics with others. BOF sessions are open to all Vis '98 attendees. If you wish to lead a BOF, please contact Russell Taylor (taylorr@cs.unc.edu). When you arrive at Vis '98, be sure to check the sign-up board for additional BOFs.

IBM DATA EXPLORER

Imperial V

Thursday, October 22, 1998 – 6:00pm-7:30pm

Keith Sams, Mgr, Sales & Marketing, IBM Visualization Data Explorer
ksams@us.ibm.com

<http://www.ibm.com/dx>

The IBM Visualization Data Explorer BOF is a great opportunity to learn more about IBM Visualization Data Explorer. The meeting will be an informal gathering of experienced users, development staff, and any one who is curious about the industry leading visual analysis software. We will discuss the application of IBM Visualization Data Explorer in fields such as weather visualization, computational fluid dynamics, medical imaging, business informatics, geo-spatial analysis, web based visual analysis and many others. Key members of the development team will be present to discuss their work. An open panel

discussion will allow everyone to get involved in the discussion. Refreshments will be provided. Come learn more about IBM Visualization Data Explorer!

ADVANCED VISUAL SYSTEMS, INC. (AVS)

Imperial IV

Thursday, October 22, 1998 – 6:00pm-7:30pm

John Sheehan, VP, Customer Services, Advanced Visual Systems • info@avs.com
<http://www.avs.com>

Advanced Visual Systems, Inc., the leading provider of visualization tools and solutions, will hold a meeting that will cover the company position and future, as well as highlighting the latest releases and features of AVS5 and AVS/Express. Topics will include visualization in business applications, AVS5 Linux, AVS/Express Web based applications, client server applications, C++ class generation, and animation tips & tricks. Refreshments will be provided.

VISUALIZATION '98 DEMONSTRATIONS

Opens Wednesday, October 21 • 12:15pm • Imperial II & III

The IEEE Visualization '98 Conference Committee gratefully acknowledges the Visualization '98 Corporate Partners:

Advanced Visual Systems Inc.
IBM Visualization Data Explorer
Silicon Graphics Computer Systems
Sun Microsystems
Visual Insights

Visualization '98 Corporate Demonstrators:

Research Systems Inc.
CEI Inc.
Morgan Kaufmann Publishers, Inc.
Hewlett Packard
Mitsubishi Electric America
Numerical Algorithm Group
ISG Technologies Inc.

Visualization '98 Academic and Non-Profit Demonstrators:

Pacific Northwest National Laboratory
NSF STC for Computer Graphics and Scientific Visualization
State University of New York at Stony Brook

VISUALIZATION '98 CONFERENCE PROGRAM

Wednesday, Thursday, Friday

TECHNICAL CONFERENCE PROGRAM									
	Wednesday			Thursday			Friday		
	Track A Imperial IV	Track B Imperial V	Track C Imperial VI & VII	Track A Imperial IV	Track B Imperial V	Track C Imperial VI & VII	Track A Imperial IV	Track B Imperial V	Track C Imperial VI & VII
8:00am	Keynote Session Pat Hanrahan Imperial IV & V								
9:00am				5A Papers: Isosurface Extraction	5B Papers: Information Visualization	5C Cases: 3D Modeling & Visualization	9A Papers: Image-based Techniques & Volume Analysis	9B Cases: Engineering & Design	9C Hot Topics: Session III
10:00am									
11:00am	2A Panel: Why is Real-Time Volume Rendering No Longer a Year Away?	2B Papers: Terrain Vis. & Level of Detail Techniques	2C Cases: Flow Visualization	6A Panel: Multi-Source Data Analysis Challenges	6B Papers: Interactive Visualization /VR/ Animation	6C Cases: Terrain & Large Data Visualization	10A Papers: Texturing & Rendering	10B Panel: Art & Visualization: Oil & Water?	10C Papers: Surfaces II
12:00pm									
1:00pm									
2:00pm	3A Papers: Surfaces & Level of Detail Techniques	3B Papers: Feature Detection & Visualization	3C Cases: Medical Data Visualization	7A Papers: Isosurface & Volume Rendering	7B Papers: Simplification	7C Cases: Marine Data Visualization	Capstone Session Turner Whitted Imperial IV & V		
3:00pm									
4:00pm	4A Papers: Multi- Dimensional Visualization	4B Papers: Flow & Streamlines	4C Hot Topics: Session I	8A Papers: Tensor/Flow	8B Panel: Key Problems & Thorny Issues	8C Hot Topics: Session II			
5:00pm									

VIS'98 DEMONSTRATIONS (Imperial II & III) & CAL (Imperial I) open at 12:15pm Wednesday

Wednesday, 8:00 - 10:00am

KN Keynote Session: Modern Trompe L'oeil, Pat Hanrahan

Wednesday, 10:15 - 12:15pm

2A Panel: "Why is Real-Time Volume Rendering No Longer a Year Away?"
 Arie Kaufman, Marty Brady, Bill Lorensen, Fred Kitson, Hanspeter Pfister

2B Papers: Terrain Visualization and Level of Detail Techniques
 Chair: Bernd Hamann

- (1) Large scale Terrain Visualization using the Restricted Quadtree Triangulation, Renato B. Pajarola
- (2) Contour Interpolation and Surface Reconstruction of Smooth Terrain Models, Jianyun Chai, Takaharu Miyoshi, Eihachiro Nakamae
- (3) Smooth View-Dependent Level-of-Detail Control and Its Application to Terrain Rendering, Hugues H. Hoppe
- (4) Efficient Implementation of Multi-Triangulations, Leila De Florian, Paola Magillo, Enrico Puppo

2C Cases: Flow Visualization
 Chair: Greg Nielson

- (1) Task Specific Visualization Design: A Case Study in Operational Weather Forecasting, Lloyd A. Treinish
- (2) Development of a Multi-Source Visualization Prototype, Leslie Keely, Sam Useton
- (3) Data Level Comparison of Wind Tunnel and Computational Fluid Data Dynamics Data, Qin Shen, Alex Pang, Sam Useton
- (4) Selective Visualization of Vortices in Hydrodynamic Flows, I. Ari Sadarjoen, Frits H. Post, Bing Ma, David C. Banks, Hans-Georg Pagendarm

SPECIAL THANKS TO:
 Silicon Graphics and IBM
 for the loan of equipment
 for the conference

KEYNOTE SESSION

Modern Trompe L'oeil

Speaker: Pat Hanrahan, *Stanford University*

The traditional goal of 3D computer graphics has been to create more and more realistic visual simulations, and, recently, more and more immersive technology. In art, there was a similar drive towards realism and immersion that culminated in the “trompe l’oeil” (literally, “to fool the eye”) style of architectural painting. For example, A. Pozzo painted an image of St. Ignazio rising into the heavens onto the hemicylindrical ceiling of the St. Ignazio church. The image was painted so precisely and realistically that when viewed from the center of projection, in this case a yellow marble tile in the center of the church, the painted ceiling and the architecture are seamlessly merged to create a dramatic sense of immersion.

In this talk I will describe this odd style from art history and try to extract some lessons of interest to computer graphics and visualization researchers. Surprisingly, the trompe l’oeil style, although technically sophisticated, is usually considered a failure. Can the goals of trompe l’oeil be rescued with modern technology? And, what can be learned about the limitations of immersive environments, particularly their effectiveness, from these early efforts?

Biography: Pat Hanrahan is the CANON USA Professor of Computer Science and Electrical Engineering at Stanford University where he teaches computer graphics. His current research involves visualization, image synthesis, and graphics systems and architectures. Before joining Stanford he was a faculty member at Princeton. He has also worked at Pixar where he developed volume rendering software and was the chief architect of the RenderMan™ Interface - a protocol that allows modeling programs to describe scenes to high quality rendering programs. Previous to Pixar he directed the 3D computer graphics group in the Computer Graphics Laboratory at New York Institute of Technology. Professor Hanrahan has received three university teaching awards. He has also received an Academy Award for Science and Technology, the Spirit of America Creativity Award, and the SIGGRAPH Computer Graphics Achievement Award.

CAPSTONE SESSION

Draw on the Wall

Speaker: Turner Whitted, *Microsoft Research*

Graphics workstations provide us a desktop window into large scale observations or complex simulations. The increasing speed of these visualization engines gives us the flexibility to view our data in a manner that is both appealing and instructive. While we are still not absolutely sure how best to present views of data to users, the price and performance of our desktop technology is now less of a limitation than our own imaginations.

What will new presentation and interaction technology do for visualization applications? Today, the most exciting development in interactive technology is the un-tethering of users from their desktops. We can imagine scientific, engineering, and business users with thoughtful looks on their faces, surrounded by their data as they wander through their offices and hallways, talking to the applications, listening to the results, and drawing on the walls. This is the popular picture of smart environments and wearable computers. The component devices for this technology have no magic; they obey the same laws of physics as the rest of the world; and there are unsolved problems in making this picture reality. While the un-tethered computing world is inevitable, its details are not completely clear and the path to its realization is rocky. This talk is both a look forward and a sanity check.

Biography: Turner Whitted recently joined Microsoft as a senior researcher. He has been a Research Professor of Computer Science at the University of North Carolina at Chapel Hill for the past 14 years, as well as a cofounder and director of Numerical Design Limited. Prior to that he was a technical staff member in Bell Labs' Computer Systems Research Laboratory. He earned BSE and MS degrees in Electrical Engineering from Duke University and a PhD from North Carolina State University. He is an editorial board member of IEEE Computer Graphics and Applications, was papers chair for SIGGRAPH 97, and is an ACM Fellow.

Wednesday, 1:45 - 3:45pm

3A Papers: Surfaces and Level of Detail Techniques

Chair: David Banks

- (1) **Visualization of Scalar Topology for Structural Enhancement**, Chandrajit L. Bajaj, Valerio Pascucci, Daniel Schikore
- (2) **A General Method for Recovering Attribute Values on Simplified Meshes**, Paolo Cignoni, Claudio Montani, Claudio Rocchini, Roberto Scopigno
- (3) **Surface Reconstruction with Anisotropic Density-Scaled Alpha Shapes**, Marek Teichmann, Michael Capps
- (4) **Level of Detail Visualization of Scalar Data Sets on Irregular Surface Meshes**, Georges-Pierre Bonneau, Alexandre Gerussi

3B Papers: Feature Detection and Visualization

Chair: David Ebert

- (1) **Tracking Features in Unstructured Datasets**, D. Silver, X. Wang
- (2) **Feature Detection in Linked Derived Spaces**, Chris Henze
- (3) **Extremal Feature Extraction from 3-D Vector and Noisy Scalar Fields**, Chi-Keung Tang, Gerard G. Medioni
- (4) **Feature Comparisons of Vector Fields using Earth Mover's Distance**, Yingmei Lavin, Rajesh Kumar Batra, Lambertus Hesselink

3C Cases: Medical Data Visualization

Chair: Ed Swan

- (1) **Visual Presentation of Magnetic Resonance Images**, J. E. van der Heyden, M. S. T. Carpendale, K. Inkpen, M. S. Atkins
- (2) **Visualization in Corneal Topography**, F. M. Vos, H. J. W. Spoelder
- (3) **Case Study Using the Virtual Environment for Reconstructive Surgery**, Kevin Montgomery, Michael Stephanides, Stephen Schendel, Muriel Ross
- (4) **Interactive Virtual Angioscopy**, Enrico Gobbetti, Piero Pili, Antonio Zorcolo, and Massimiliano Tuveri

Wednesday, 4:00 - 5:30pm

4A *Papers: Multi-Dimensional Visualization* Chair: Holly Rushmeier

- (1) **Building Perceptual Textures to Visualize Multidimensional Datasets**, Christopher G. Healey, James T. Enns
- (2) **Efficient Co-Triangulation of Large Data Sets**, Henrik Weimer, Joe Warren, Jane Troutner, Wendell Wiggins, John ShROUT
- (3) **Visualizing Diffusion Tensor Images of the Mouse Spinal Cord**, David H. Laidlaw, Eric T. Ahrens, David Kremers, Matthew J. Avalos, Carol Readhead, Russell E. Jacobs

4B *Papers: Flow and Streamlines* Chair: Hans Hagen

- (1) **Image-Guided Streamline Placement on Curvilinear Grid Surfaces**, Xiaoyang Mao, Yuji Hatanaka, Hidenori Higashida, Atsumi Imamiya
- (2) **A Higher-Order Method For Finding Vortex Core Lines**, Martin Roth, Ronald Peikert
- (3) **Automatic Detection of Open and Closed Separation and Attachment Lines**, David N. Kenwright

4C *Hot Topics Session I: Volume Manipulations, Textures, and Flow* Chair: Craig M. Wittenbrink

- (1) **Stereoscopic Volume Rendering Using Templates**, Yun-Mo Koo, Cheol-Hi Lee, Yeong Gil Shin
- (2) **Octree-based Volume Sculpting**, J. Andreas Baerentzen
- (3) **High Resolution Textures**, Tobias Hüttner
- (4) **Multi-modal Flow Animation with the Motion Map**, Claire Chédot, Wilfrid Lefer
- (5) **Time-Critical Computational Algorithms for Particle Advection in Flow Visualization**, Steve T. Bryson

Thursday, 8:30 - 10:00am

5A *Papers: Isosurface Extraction* Chair: Polly Baker

- (1) **Isosurface Extraction from Time-Varying Fields Using a Temporal Hierarchical Index Tree**, Han-Wei Shen
- (2) **Interactive Out-Of-Core Isosurface Extraction**, Yi-Jen Chiang, Claudio Silva, William Schroeder
- (3) **View Dependent Isosurface Extraction**, Yarden Livnat, Charles Hansen

5B *Papers: Information Visualization* Chair: Michael Gerald-Yamasaki

- (1) **The Gridfit Approach: An Efficient and Effective Approach to Visualizing Large Amounts of Spatial Data**, Daniel A. Keim, Annemarie Herrmann
- (2) **TOPIC ISLANDS - A Wavelet-Based Text Visualization System**, Nancy E. Miller, Pak C. Wong, Mary Brewster, Harian Foote
- (3) **Continuous Cartogram Construction**, Donald H. House, Christopher J. Kocmoud

5C *Cases: 3D Modeling and Visualization* Chair: Stas Klimenko

- (1) **Volumetric Visualization of Acoustic Fields in CNMAT's Sound Spatialization Theatre**, Sami Khoury, Adrian Freed, David Wessel
- (2) **Supporting Detail-in-Context for the DNA Representation, H-Curves**, M. L. Lantin, M. S. T. Carpendale
- (3) **Visualizing Hilbert Curves**, Nelson Max

Thursday, 10:15 - 12:15pm

6A *Panel: "Multi-Source Data Analysis Challenges"*

Sam Uselton, Jim Ahrens, Wes Bethel, Lloyd Treinish, Andrei State

INTERNET ACCESS

Internet access for electronic mail will be available Sunday through Friday in Imperial I.

Sunday	3:00pm - 10:00pm
Monday-Thursday	7:00am - 10:00pm
Friday	7:00am - Noon

6B *Papers: Interactive Visualization / VR/Animation* Chair: Russell Taylor

- (1) **A Concept for Virtual Reality Tools for Design Reviews**, Klaus Kremer
- (2) **Efficient Warping for Architectural Walkthroughs using Layered Depth Images**, Voicu S. Popescu, Anselmo Lastra, Daniel G. Aliaga, Manuel M. de Oliveira Neto
- (3) **Visualizing Differences in Movies of Cortical Activity**, Kay A. Robbins, David M. Senseman
- (4) **A Distributed Blackboard Architecture for Interactive Data Visualization**, Robert van Liere, Jan A. Harkes, Wim C. de Leeuw

6C *Cases: Terrain & Large Data Visualization* Chair: Michael Cox

- (1) **Rear-Projecting Virtual Data onto Physical Terrain: An Exercise in Two Senses Being Better Than One**, Dru Clark, Rosemarie McKeon, Richard Marciano, Michael Bailey
- (2) **Intent, Perception, and Out-of-Core Visualization Applied to Terrain**, Douglass Davis, T. Y. Jiang, William Ribarsky, Nickolas Faust
- (3) **Production Visualization for the ASCI One TeraFLOPS Machine**, Philip D. Heermann
- (4) **Battlefield Visualization on the Responsive Workbench**, Jim Durbin, J. Edward Swan II, Brad Colbert, Chris Scannell, John Crowe, Rob King, Tony King, Terry Welsh, Zachary Wartel

Thursday, 1:45 - 3:45pm

7A *Papers: Isosurface & Volume Rendering* Chair: Kwan-Liu Ma

- (1) **Interactive Ray Tracing for Isosurface Rendering**, Steven Parker, Peter Shirley, Yarden Livnat, Charles Hansen, Peter-Pike Sloan
- (2) **Fast, Pop-Free Sheet Buffer-Based Splatting with Grid Warping for Volumes with Unequal Grid Scaling**, Klaus Mueller, Roger Crawfis
- (3) **Accelerated Ray-Casting for Curvilinear Volumes**, Lichan Hong, Arie E. Kaufman
- (4) **High Quality Rendering of Attributed Volume Data**, Ulf Tiede, Thomas Schiemann, Karl Heinz Hoehne

7B *Papers: Simplification* Chair: Daniel Cohen-Or

- (1) **Simplifying Surfaces with Color and Texture using Quadric Error Metrics**, Michael Garland, Paul S. Heckbert
- (2) **A Unified Approach for Simplifying Polygonal and Spline Models**, M. Gopi, Dinesh Manocha
- (3) **Fast and Memory Efficient Polygonal Simplification**, Peter Lindstrom, Greg Turk
- (4) **Efficient and Robust Simplification of Tetrahedral Meshes**, Issac J. Trotts, Bernd Hamann, Kenneth I. Joy, David F. Wiley

7C *Cases: Marine Data Visualization* Chair: Robert Moorhead

- (1) **Scientific Visualization and Data Modeling of Scattered Sediment Contaminant Data in New York/New Jersey Estuaries**, Hong Ma, Keith W. Jones, Eric A. Stern
- (2) **POPTEx: Interactive Ocean Model Visualization Using Texture Mapping Hardware**, Allen McPherson, Mathew Maltrud
- (3) **Acoustic Imaging and Visualization of Plumes Discharging from Black Smoker Vents on the Deep Seafloor**, P. Rona, K. Bemis, D. Kenchammana-Hosekote, D. Silver
- (4) **Seabed Visualization**, Paul Chapman, Peter Stevens, Derek Wills, Graham Brookes

Thursday, 4:00 - 5:30pm

- 8A Papers: Tensor/Flow**
 Chair: Val Watson
- (1) **Interactive Deformations from Tensor Fields**, Ed Boring, Alex Pang
 - (2) **Real-Time Techniques for 3D Flow Visualization**, Anton L. Fuhrmann, Eduard Groeller
 - (3) **Wavelets over Curvilinear Grids**, Gregory M. Nielson, Il-Hong Jung, Junwon Sung

- 8B Panel: "Key Problems and Thorny Issues in Multidimensional Visualization"**
 Georges Grinstein, Alfred Inselberg, Sharon Laskowski

- 8C Hot Topics Session II: Surface Manipulations and Glyphs**
 Chair: Amitabh Varshney
- (1) **Out-of-Core Interval Trees for Fast Isosurface Extraction**, Peter D. Sulatycke, Kanad Ghose
 - (2) **Surface Segmentation Using Morphological Watersheds**, Alan P. Mangan, Ross T. Whitaker
 - (3) **Visualization by Metamorphosis**, Marc Alexa, Wolfgang Müller
 - (4) **Progressive Iso-surfaces on the Web**, Klaus Engel, Roberto Grosso, Thomas Ertl
 - (5) **Clustering-Based Generation of Hierarchical Surface Models**, Bjoern Heckel, Antonio C. Uva, Bernd Hamann

FREE T-SHIRTS

Visualization 98 attendees who stay for the Awards Ceremony on Friday afternoon will receive a Vis98 T-shirt on a first-come, first-served basis.

Friday, 8:30 - 10:00am

- 9A Papers: Image-based Techniques and Volume Analysis**
 Chair: Chuck Hansen
- (1) **Image-Based Transfer Function Design for Data Exploration in Volume Visualization**, Shiaofen Fang, Tom Biddlecome
 - (2) **Image-Based Rendering with Occlusions via Cubist Images**, Andrew J. Hanson, Eric A. Wernert
 - (3) **Hierarchical Volume Analysis and Visualization Based on Morphological Operators**, Christoph Luerig, Thomas Ertl

- 9B Cases: Engineering & Design**
 Chair: Chris Johnson
- (1) **Configuration Space Visualization for Mechanical Design**, Elisha Sacks, Leo Joskowicz
 - (2) **Metallurgical Application of Three Dimensional Visualization Techniques**, Marco Lanzagorta, Milo V. Kral, J. Edward Swan II, George Spanos, Rob Rosenberg, Eddy Kuo
 - (3) **Visualization for Multiparameter Aircraft Designs**, Cliff A. Shaffer, Duane L. Knill, Layne T. Watson

- 9C Hot Topics Session III: Perception, User Interaction, and Toolkits**
 Chair: Larry Rosenblum
- (1) **Towards the Subjective Interface: General Support for Parameter Exploration by Overlaying Alternative Application States**, Aran Lunzer
 - (2) **Psychophysical Validation of the Visible Differences Predictor for Global Illumination Applications**, William L. Martens, Karol Myszkowski
 - (3) **Visualization Of Complex Physical Phenomena and Mathematical Objects in Virtual Environment**, Stanislav V. Klimenko, Igor N. Nikitin
 - (4) **Declarative Specification of Visualization and Interaction**, Calum Grant, Peter Robinson
 - (5) **LIMBO/VTK: A Tool for Rapid Tele-Immersive Visualization**, Jason Leigh, Paul J. Rajlich, Robert J. Stein, Andrew E. Johnson, Thomas A. DeFanti
 - (6) **Applications of Chebyshev Bases to Cylindrical Volume Grids: Direct Section Computation and Robust Volume Reconstruction**, Ranjit P. Desai, Jai Menon

To order copies of the Vis '98 and InfoVis '98 proceedings for delivery after the conference, contact IEEE CS Press:

By phone: 800-CSBOOKS or 714-821-8380 and ask for the Order Fulfillment Department
By email: Send a request to: cs.books@computer.org

To become an IEEE Computer Society member visit <http://computer.org>.

Friday, 10:15 - 12:15pm

- 10A Papers: Texturing and Rendering**
 Chair: Rachael Brady
- (1) **Interactive Display of Very Large Textures**, David Cline, Parris K. Egbert
 - (2) **Pixel Masks for Screen-Door Transparency**, Jurriaan D. Mulder, Frans C.A. Groen, Jarke J. van Wijk
 - (3) **Comparing LIC and Spot Noise**, Wim C. de Leeuw, Robert van Liere
 - (4) **Size Preserving Pattern Mapping**, Yair Kurzion, Torsten Möller, Roni Yagel

- 10B Panel: "Art and Visualization: Oil and Water?"**
 David Laidlaw, David Kremers, Victoria Interrante, Felice Frankel, Thomas Banchoff

- 10C Papers: Surfaces II**
 Chair: Kelly Gaither
- (1) **Constrained Optimal Framings of Curves and Surfaces using Quaternion Gauss Maps**, Andrew J. Hanson
 - (2) **Converting Sets of Polygons to Manifold Surfaces by Cutting and Stitching**, André P. Gueziec, Gabriel Taubin, Francis Lazarus, William Horn
 - (3) **Interpolation of Triangle Hierarchies**, Axel Friedrich, Konrad Polthier, Markus Schmies
 - (4) **Progressive Tetrahedralizations**, Oliver G. Staadt, Markus H. Gross

Friday, 1:45 - 3:45pm

- CS Capstone Session: Awards for Best Paper, Best Panel, Best Hot Topics, and Best Case Study**
 Capstone Address: Draw on the Wall, Turner Whitted

IEEE VISUALIZATION '99 OPEN MEETING

Thursday 12:15pm - 1:45pm

Empire C-E

1999

VIS99

IEEE VISUALIZATION 1999

CALL FOR PARTICIPATION

October 24 • October 29, 1999
 San Francisco Airport Hyatt
 San Francisco, CA



THE INSTITUTE OF ELECTRICAL
& ELECTRONICS ENGINEERS, INC.



IEEE
COMPUTER
SOCIETY

Sponsored by IEEE Computer Society Technical Committee on Computer Graphics In Cooperation with ACM/SIGGRAPH

VISUALIZATION is a vital research and applications frontier shared by a variety of science, medical, engineering, business, and entertainment fields. The tenth IEEE Visualization conference continues the focus on interdisciplinary methods. Collaboration among developers and users of visualization methods across all of science, engineering, medicine, and commerce is addressed at Visualization '99. Sunday through Tuesday of Conference Week will include tutorials, symposia, and mini-workshops. Papers, panels, case studies, and late-breaking hot topics will be presented Wednesday through Friday.

We invite you to participate in IEEE Visualization '99 by submitting your original research through papers, panels, case studies, late breaking hot topics, and demonstrations. Share your perspectives through panels and workshops, or your experience through tutorials. Please select the forum appropriate to your submission, where it will be considered by your peers for presentation. Particular focus on parallel techniques in visualization and information visualization are addressed in special two-day symposia.

For further information on the conference, evolving symposia, or on submissions, contact:

Steve Bryson, Conference Co-Chair, NASA Ames Research Center ■ 650-604-4524 ■ Fax: 650-604-3957 ■ bryson@nas.nasa.gov

Theresa-Marie Rhyne, Conference Co-Chair, Lockheed Martin/US EPA Scientific Visualization Center ■ 919-541-0207 ■ Fax: 919-541-0056 ■ trhyne@vislab.epa.gov

or see: URL: <http://www.erc.msstate.edu/vis99>

Paper Submissions (due March 31, 1999)

Papers are solicited that present research results related to all areas of visualization. Original papers should be limited to 5,000 words. The submission of NTSC VHS video (up to 5 minutes in length) to accompany the paper is strongly recommended. Please submit 7 copies of all materials. An electronic abstract must be sent through the conference website for each submission. Accepted papers will be included in the conference proceedings; the videos will be included in the conference video proceedings.

Panel Proposals (due March 31, 1999)

Panels should address the most important issues in visualization today. Panelists should be experts in their fields who can discuss the challenges of visualization, and engage the audience and fellow panel members in a stimulating, interactive debate. Panel proposals should describe the topic to be addressed and identify the prospective panelists. Each panelist should include a position statement on the topic and a short biography, the total of which should be limited to 500 words. The statements will be included in the conference proceedings.

Case Study Proposals (due March 31, 1999)

Case studies are reports on how visualization has contributed to the analysis of data in actual applications or studies of the visualization process. A short paper limited to 2500 words (maximum 4 pages B/W plus 1 page color) will be included in the conference proceedings. Images and/or NTSC VHS video to accompany the paper are recommended; the video will be included in the conference video proceedings. Please submit six copies of all materials.

Late-Breaking Hot Topics Proposals (due June 15, 1999)

Submissions will be accepted on Late Breaking "Hot Topics" that pertain to all areas of Visualization. These submissions must be original, may show work in progress, and may not exceed 2000 words or a maximum of 4 pages including images. Images and/or NTSC VHS video to accompany the paper are recommended; the video will be included in the conference video proceedings. Accepted papers will be published and distributed at the conference. Authors of accepted papers will have an opportunity to submit a revised paper. Submissions will be done electronically.

Tutorial Proposals (due March 31, 1999)

Half-day and full-day course proposals are invited for visualization systems, methods, and application areas. Tutorials will be offered Sunday, Monday, and Tuesday.

Mini-Workshop and Birds-of-a-Feather Proposals (due March 31, 1999)

Proposals may be submitted for Mini-Workshops and evening Birds-Of-A-Feather (BOF) gatherings on visualization methods or application areas. They should deal with state-of-the-art topics and involve experts in the field. Discipline-focused proposals devoted to a particular discipline's methods and needs are encouraged.

Demonstration Proposals

Visualization '99 is a unique opportunity to present your products or research to visualization experts from a wide variety of fields. We invite demonstrations of commercial hardware, software, integrated systems peripherals, and literature, as well as academic research. We encourage demonstrators to have technical representatives in attendance.

Creative Applications Lab (due July 15, 1999)

The Creative Applications Lab (CAL) is designed to let presenters interact with conference attendees on an individual basis. CAL will have a variety of computers on which the contributors can install their materials for attendees' experimentation and enjoyment. CAL will be open in conjunction with the demonstrations at Visualization '99.

Co-located with IEEE Visualization '99 are:

IEEE 1999 Symposium on Parallel Visualization and Graphics (PVG '99) (submission deadline March 31, 1999)

Papers and case studies in parallel visualization and graphics, with particular interest in using clusters of commodity PCs and graphics cards for high-performance visualization and graphics tasks. <http://www.acl.lanl.gov/PVG99/pvg99.html>

IEEE 1999 Symposium on Information Visualization (Info Vis '99) (submission deadline March 31, 1999)

Papers, panels and case studies concentrating on issues specific to abstract information visualization. <http://www.erc.msstate.edu/infovis99>