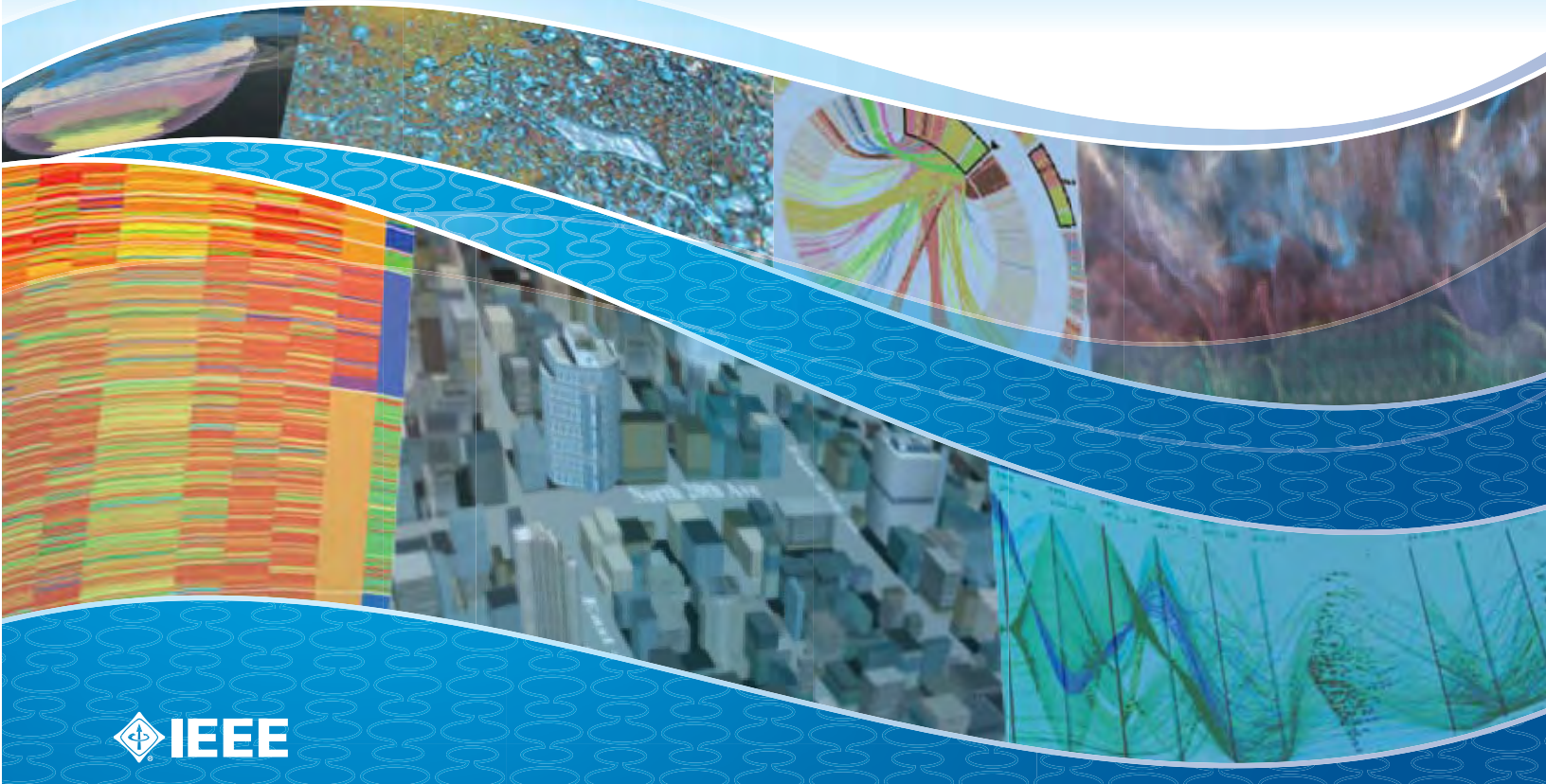
Atlantic City, New Jersey, USA
October 11 - 16, 2009

VIS • INFOVIS • VAST

VisWeek 09

PROGRAM



IEEE

IEEE COMPUTER SOCIETY

IEEE vgtc

Sponsored by the IEEE Computer Society Visualization and Graphics Technical Committee (VGTC).

Welcome

Welcome to VisWeek 2009, the umbrella conference for the IEEE Visualization (Vis) and Information Visualization (InfoVis) 2009 Conferences, and the 2009 IEEE Symposium on Visual Analytics Science and Technology (VAST)!

VisWeek 2009 continues the success of a week with seamlessly integrated activities and agendas between the three participating entities. This year the technical community presents a varied program covering a wide array of topics on data and information visualization. 2009 is our fourth year cooperating with the IEEE Computer Society to distribute the Vis and InfoVis papers to a larger readership through the IEEE Transaction on Visualization and Computer Graphics (TVCG).

The papers spotlight the most innovative and the very best research results, fostering collaboration between researchers from government, academic, industrial, and venture communities. The panels discuss some of the most pressing current and innovative topics, while the workshops and tutorials offer a dedicated learning experience. The posters allow for very current results to be presented in informal interactive sessions. In its fourth year, NSF-funded PhD Colloquium allows for interaction between current experts and the next generation of visualization researchers. New this year is the Discovery Exhibition, which showcases the impacts of applied visualization in various data domains. These venues, combined with our exhibitors, the Interactive Demonstrations & Art exhibit, and Birds-of-a-Feather sessions deliver a complete visualization experience in Atlantic City.

Wednesday evening's reception and banquet and numerous breaks have been scheduled throughout this week to allow time for you to interact with peers and colleagues. This is the place where visualization researchers come together to meet and learn from each other and have fun!

Thank you for coming, and enjoy your VisWeek!

Klaus Mueller, *Stony Brook University*
Raghu Machiraju, *The Ohio State University*
Visualization 2009 Conference Chairs

Chris North, *Virginia Tech*
InfoVis 2009 General Chair

Jörn Kohlhammer, *Fraunhofer IGD*
Richard May, *PNNL/NVAC*
VAST 2009 Symposium Chairs

TOC

How to Order Proceedings

Additional copies of the Vis 2009 and InfoVis 2009 proceedings can be ordered from:

IEEE Computer Society
By mail: 10662 Los Vaqueros Circle, Los Alamitos, CA 90720
By phone: +1-800-CS-BOOKS, +1-714-821-8380 (direct)
By fax: +1-714-821-4641
By email: csbooks@computer.org
By web: http://computer.org
under the menu item Publications/Ordering Back Issues

Additional copies of the VAST 2009 proceedings can be ordered from:

IEEE Service Center
By mail:
445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331
By phone: +1-800-678-IEEE, +1-732-981-0060 (direct)
By fax: +1-732-981-9667
By email: customer-service@ieee.org
By web: http://shop.ieee.org
VAST 2009: IEEE Catalog Number: CFP08VAS-PRT

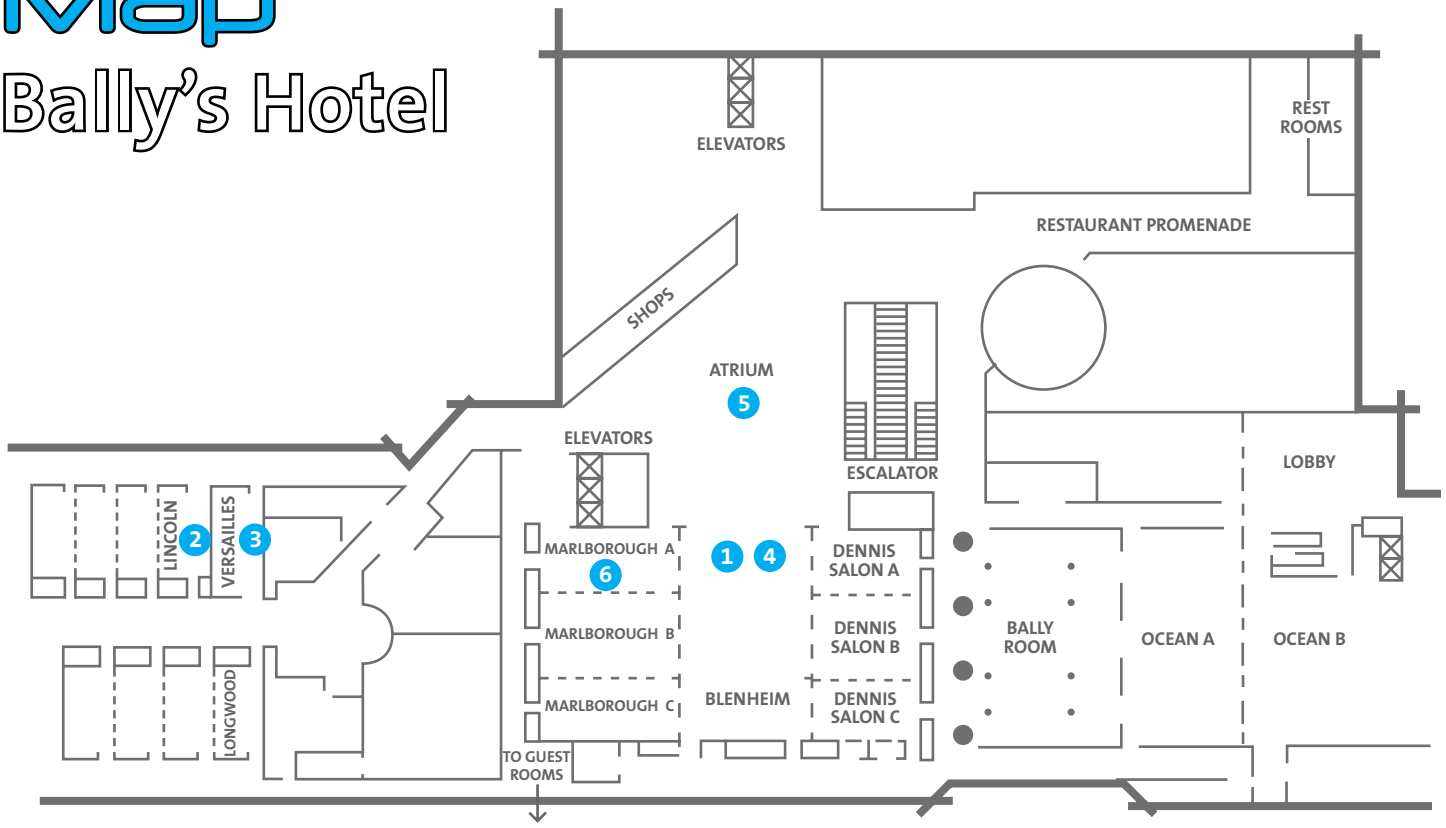
IEEE Computer Society

To become a member visit **http://computer.org/join**

IEEE Visualization and Graphics Technical Committee

For information on awards, national initiatives, conferences and symposia, and a comprehensive membership directory, please visit **http://vgtc.org/wpmu/techcom**.

Map
Bally's Hotel



About Atlantic City

Atlantic City, New Jersey, is a seaside resort community famous for its boardwalk (the world's longest at over 4 miles), its sandy beaches, and its spectacular views of the Atlantic Ocean. Other sources of attractions include an abundance of shopping centers, nightlife, shows, sporting events, fishing, boating, family fun, and casino gambling.

The conference venue is right at the oceanfront, alongside the boardwalk, at Bally's Hotel. <http://www.ballysac.com> This unique location creates a relaxing atmosphere, providing attendees many opportunities to co-mingle.

1 Conference Registration
Located in Registration B
Saturday, 6:00 pm - 9:00 pm
Sunday-Monday, 7:30 am - 4:30 pm
Tuesday, 7:30 am - 6:00 pm
Wednesday-Thursday, 7:30 am - 4:30 pm

2 Internet Access/ Email
Located in Lincoln
Sunday-Thursday, 7:30 am - 5:00 pm
Friday 7.30 am - 1.30 pm

3 Speaker Preparation
Located in Versailles
Sunday-Thursday, 7:30 am - 5:00 pm
Friday, 7:30 am - 9:00 am

4 Birds-of-a-Feather (BOF) Board
Check the board for conference times and locations.
All conference attendees are welcome.

5 Posters and Interactive Demos & Art
Located in the Atrium
Sunday 9:00 am - Friday 3:00 pm.
* Posters Hosted Viewing:
Mon 6:15-7:15, Wed 6:00-7:00

6 Exhibition
Located in Marlborough A
Tuesday, 10:00 am - 6:00 pm
Wednesday, 10:00am - 8:00 pm
Thursday, 10:00 am - 6:00 pm

VisWeek 09 Committee Members

VisWeek Conference Committee

General Chairs
Klaus Mueller (Vis), *Stony Brook University*
Raghu Machiraju (Vis), *The Ohio State University*
Chris North (InfoVis), *Virginia Tech*
Jörn Kohlhammer (VAST), *Fraunhofer IGD*
Richard May (VAST), *PNNL/NVAC*

VisWeek Executive Committee
Rachael Brady, *Duke University*
Robert Moorhead, *Mississippi State University*
John Stasko, *Georgia Institute of Technology*
Daniel Keim, *Universität Konstanz*
Larry Rosenblum, *National Science Foundation*
David Ebert, *Purdue University*

Program Chairs
Rachael Brady (Vis), *Duke University*
Han-Wei Shen (Vis), *The Ohio State University*

Papers Chairs
Sheelagh Carpendale (InfoVis), *University of Calgary*
Jean-Daniel Fekete (InfoVis), *INRIA*
Hanspeter Pfister (Vis), *Harvard University*
Torsten Möller (Vis), *Simon Fraser University*
Kwan-Liu Ma (Vis), *University of California, Davis*
John Stasko (VAST), *Georgia Institute of Technology*
Jarke van Wijk (VAST), *Eindhoven University of Technology*

Posters/Interactive Demos Chairs
Frank van Ham (InfoVis), *IBM Watson*
Chris Weaver (InfoVis), *University of Oklahoma*
Jörg Meyer (Vis), *University of California, Irvine*
Alark Joshi (Vis), *Yale University*
Tobias Schreck (VAST), *TU Darmstadt*
Bill Pike (VAST), *NVAC*

Panels Chairs
Penny Rheingans (InfoVis), *University of Maryland, Baltimore County*
Russell Taylor (Vis), *University of North Carolina, Chapel Hill*

Tutorials Chairs
Robert Kosara (InfoVis), *University of North Carolina, Charlotte*
Gerik Scheuermann (Vis), *Universität Leipzig*

Workshops Chairs
Lyn Bartram (InfoVis), *Simon Fraser University*
Lars Linsen (Vis), *Jacobs University, Bremen*

Publications Chair
Jeff Heer (InfoVis), *Stanford University*
Torsten Möller (Vis), *Simon Fraser University*

Publicity Chairs
Mike Sips (InfoVis), *Max-Planck Center for Visual Computing*
Lisa Avila (Vis), *Kitware, Inc.*
Dirk Bartz (Vis), *Universität Leipzig*

Contest/Challenge Chairs
Amit Chourasia (Vis), *University of California, San Diego*
Georges Grinstein (VAST), *University of Massachusetts, Lowell*
Catherine Plaisant (VAST), *University of Maryland*
Jean Scholtz (VAST), *Pacific Northwest National Laboratory*
Mark Whiting (VAST), *Pacific Northwest National Laboratory*

Discovery Exhibition Chairs
Jing Yang (InfoVis), *University of North Carolina, Charlotte*
Bongshin Lee (InfoVis), *Microsoft Research*
Petra Isenberg (InfoVis), *University of Calgary*

Exhibits Chairs
Ming Hao (InfoVis), *Hewlett-Packard*
Xavier Tricoche (Vis), *Purdue University*
Richard May (VAST), *Pacific Northwest National Laboratory*

Birds-of-a-Feather (BOF) Chairs
T.J. Jankun-Kelly (InfoVis), *Mississippi State University*
Ming Jiang (Vis), *Lawrence Livermore National Laboratory*

Doctoral Colloquium Chairs
Melanie Tory (InfoVis), *University of Victoria*
Daniel Weiskopf (Vis), *Universität Stuttgart*
Georges Grinstein (Vis), *University of Massachusetts, Lowell*
Brian Fisher (VAST), *Simon Fraser University*

Best Paper Committee
Stuart Card (InfoVis), *PARC*
George Robertson (InfoVis), *Microsoft Research*
Colin Ware (InfoVis), *University of New Hampshire*

Webmaster
Steve Lamont (VisWeek), *University of California, San Diego*

Finance Chair
Loretta Auvil (VisWeek), *University of Illinois*
Gautam Chaudhary (Vis), *University of California, Irvine*

Student Volunteers Chairs
Maria Velez (Vis), *Rutgers University*
Joshua New (Vis), *University of Tennessee*
Carlos Scheidegger (Vis), *University of Utah*

Publication and Project Coordinator
Meghan Haley (VisWeek), *VGTC*

Graphic Design and Web Design
Melissa Kingman, *www.elevationda.com*
Twig Gallemore, *www.elevationda.com*

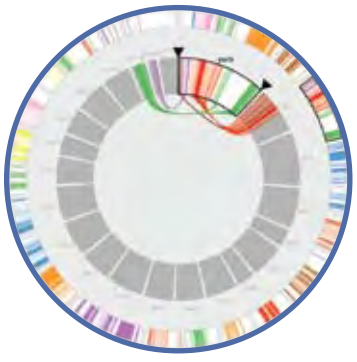
Local Arrangement Chair
Shakeera Thomas (VisWeek), *Stony Brook University*

Vis Program Committee
Lisa Avila, *Kitware, Inc.*
Dirk Bartz, *Universtät Leipzig*
Georges-Pierre Bonneau, *Grenoble Universités*
Charl Botha, *Delft University of Technology*
Stefan Bruckner, *Vienna University of Technology*
Hamish Carr, *University College Dublin*
Wei Chen, *Zhejiang University*
Yi-Jen Chiang, *Polytechnic Institute of New York University*
Patricia Crossno, *Sandia National Laboratory*
Balázs Csébfalvi, *Budapest University of Technology and Economics*
Mark Duchaineau, *Lawrence Livermore National Laboratory*
Issei Fujishiro, *Keio University*
Baining Guo, *Microsoft Research China*
Stefan Gumhold, *Technische Universität Dresden*
Markus Hadwiger, *VRVis Research Center*
Hans Hagen, *Technical University of Kaiserslautern*
Helwig Hauser, *University of Bergen*
Christopher Healey, *North Carolina State University*
Ingrid Hotz, *Zuse Institute Berlin*
Jian Huang, *University of Tennessee*

Tobias Isenberg, *University of Groningen*
Takayuki Itoh, *Ochanomizu University*
T. J. Jankun-Kelly, *Mississippi State University*
Gordon Kindlmann, *University of Chicago*
Ken Joy, *University of California, Davis*
Mike Kirby, *University of Utah*
Robert Kosara, *University of North Carolina, Charlotte*
David Laidlaw, *Brown University*
Tong-Yee Lee, *National Cheng-Kung University*
Bruno Levy, *LORIA/INRIA*
Robert van Liere, *Centrum voor Wiskunde en Informatica*
Ming Lin, *University of North Carolina, Chapel Hill*
Peter Lindstrom, *Lawrence Livermore National Laboratory*
Lars Linsen, *Jacobs University Bremen*
Dinesh Manocha, *University of North Carolina, Chapel Hill*
Tamara Munzner, The *University of British Columbia*
Robert Moorhead, *Mississippi State University*
Luis Gustavo Nonato, *Universidade de Sao Paulo*
Renato Pajarola, *University of Zürich*
Alex Pang, *University of California, Santa Cruz*
Steven Parker, *NVIDIA Corporation*
Huamin Qu, *Hong Kong University of Science and Technology*
Raghu Machiraju, *The Ohio State University*
Christof Rezk-Salama, *University of Siegen*
Penny Rheingans, *University of Maryland*
Gerik Scheuermann, *Universtät Leipzig*
Han-Wei Shen, *The Ohio State University*
James Stewart, *Queen's University*
Alexandru Telea, *University of Groningen*
Amitabh Varshney, *University of Maryland*
Ivan Viola, *University of Bergen*
Tino Weinkauf, *New York University*
Ross Whitaker, *University of Utah*
Peter Wonka, *Arizona State University*
Anders Ynnerman, *Linköpings Universitet*
Sung-Eui Yoon, *Korea Advanced Institute of Science and Technology*
Eugene Zhang, *Oregon State University*

Vis Steering Committee

Thomas Ertl, *Universität Stuttgart*
Arie Kaufman, *Stony Brook University*
Robert Moorhead, *Mississippi State University*
Amitabh Varshey, *University of Maryland*



InfoVis Program Committee

Gennady Andrienko, *Fraunhofer IAIS*
Lyn Bartram, *Simon Fraser University*
Ulrik Brandes, *Universität Konstanz*
Christopher Collins, *University of Toronto*
Mark Derthick, *Carnegie Mellon University*
Stephan Diehl, *University Trier*
John Dill, *Simon Fraser University*
Pierre Dravicevic, *INRIA*
Tim Dwyer, *Microsoft Research*
Niklas Elmqvist, *Purdue University*
Danyel Fisher, *Microsoft Research*
Carsten Goerg, *Georgia Institute of Technology*
Helwig Hauser, *University of Bergen*
Jeffrey Heer, *University of California, Berkeley*
Nathalie Henry-Riche, *Microsoft Research*
Harry Hochheiser, *Towson State*
Pourang Irani, *University of Manitoba*
Petra Isenberg, *University of Calgary*
T.J. Jankun-Kelly, *Mississippi State*
Daniel Keim, *Universität Konstanz*
Jessie Kennedy, *Napier University*
Andreas Kerren, *Växjö University*
Heidi Lam, *Google*
Bongshin Lee, *Microsoft Research*
Jock Mackinlay, *Tableau Software*
Michael McGuffin, *École de technologie supérieure (ETS)*
Guy Mélançon, *INRIA Bordeaux*
Tamara Munzner, *The University of British Columbia*
Stephen North, *AT&T Research*
Adam Perer , *IBM Haifa Research Lab*
Heidrun Schumann, *Universistät Rostock*
John Stasko, *Georgia Institute of Technology*
Margaret-Anne Storey, *University of Victoria*
Martin Theus, *University of Augsburg*
Melanie Tory , *University of Victoria*
Frank van Ham, *IBM Watson*
Huub van de Wetering, *Technische Universität Eindhoven*
Matt Ward, *Worcester Polytechnic Institute*
Martin Wattenberg, *IBM Research*
Kent Wittenburg, *MERL*
Jing Yang, *University of North Carolina, Charlotte*
Ji Soo Yi, *Purdue University*
Michelle Zhou, *IBM Watson*

InfoVis Steering Committee

John Dill, *Simon Fraser University*
Pat Hanrahan, *Stanford University*
Daniel Keim, *Universität Konstanz*
George Robertson, *Microsoft Research*
John Stasko, *Georgia Institute of Technology*
Jarke van Wijk, *Eindhoven University of Technology*
Martin Wattenberg, *IBM Research*

VAST Program Committee

Natalia Andrienko, *Fraunhofer IAIS*
Thomas Baudel, IBM *ILOG*
Stuart Card, *Palo Alto Research Center*
Chaomei Chen, *Drexel University*
John Dill, *Simon Fraser University*
Alan Dix, *Lancaster University*
Jason Dykes, *City University London*
David Ebert, *Purdue University*
Thomas Ertl, *Universität Stuttgart*
Jean-Daniel Fekete, *INRIA*
Brian Fisher, *Simon Fraser University*
John Gerth, *Stanford University*
Carsten Gorg, *Georgia Institute of Technology*
David Gotz, *IBM Research*
Robert Kosara, *University of North Carolina, Charlotte*
Leland Wilkinson, *University of Illinois, Chicago*
Silvia Miksch, *Donau-Universität Krems*
Haesun Park, *Georgia Institute of Technology*
Bill Pike, *Pacific Northwest National Laboratory*
Margit Pohl, *Vienna University of Technology*
Bill Ribarsky, *University of North Carolina, Charlotte*
Giuseppe Santucci, *University of Roma*
Jean Scholtz, *Pacific Northwest National Laboratory*
Alexandru Telea, *University of Groningen*
Barbara Tversky, *Stanford University*
Matt Ward, *Worcester Polytechnic Institute*
Chris Weaver, *University of Oklahoma*
Pak Chung Wong, *Pacific Northwest National Laboratory*
William Wright, *Oculus Info, Inc.*
Stefan Wrobel, *Fraunhofer IAIS*

VAST Steering Committee

Jim Thomas, *Pacific Northwest National Laboratory*
Larry Rosenblum, *National Science Foundation*
William Ribarsky, *University of North Carolina*
John Dill, *Simon Fraser University*
David Ebert, *Purdue University*
Thomas Ertl, *Universität Stuttgart*
Richard May, *PNNL/NVAC*
Jörn Kohlhammer, *Fraunhofer IGD*

VisWeek 09

Sunday

VIS WEEK EVENTS

- 8:30am — Workshop: VizSec: Visualization for Computer Security @ *Blenheim*
- 8:30am — Workshop: Collaborative Visualization on Interactive Surfaces (CoVIS) @ *Marlborough B/C*
- 8:30am — Forum: FODAVA: Geometric Aspects of Machine Learning and Visual Analytics @ *Dennis A/B*
- 9:00am — Posters and Interactive Demos & Art @ *Atrium*
- 2:00pm — Tutorial: Scalar Topology in Visual Data Analysis @ *Longwood*
- 2:00pm — Workshop: Putting Visualization on the Web @ *Marlborough B/C*

Monday

VIS WEEK EVENTS

- Workshop: REVISE: Refactoring Visualization from Experience @ *Longwood*
- Tutorial: Provenance-Enabled Data Exploration and Visualization @ *Marlborough B/C*
- 8:30am — Tutorial: Interactive Massive Model Rendering @ *Dennis A/B*
- 9:00am — Posters and Interactive Demos & Art @ *Atrium*
- 10:00am — Exhibits @ *Marlborough A*
- 2:00pm — Tutorial: Visualization and Analysis Using Visit @ *Dennis A/B*

VAST *Blenheim*

- 8:30am — VAST Welcome, **VAST Keynote,** Papers Fast Forward
- BREAK
- 10:30am — Papers: Spatio-Temporal Analytics
- LUNCH BREAK
- 2:00pm — VAST Challenge Presentation
- BREAK
- 4:00pm — Papers: Multi-dimensional Data, Posters Fast Forward

- 6:00pm — VAST Poster Viewing @ *Atrium*

Tuesday

VIS WEEK EVENTS

- 8:30am — Workshop: Video Analytics @ *Longwood*
- 8:30am — Tutorial: Advanced ParaView Visualization @ *Marlborough B/C*
- 8:30am — Tutorial: Multivariate Temporal Features in Scientific Data @ *Dennis A/B*
- 9:00am — Posters and Interactive Demos & Art @ *Atrium*
- 10:00am — Exhibits @ *Marlborough A*
- 2:00pm — Tutorial: Visualization of Time-Varying Vector Fields @ *Dennis A/B*
- 2:00pm — Tutorial: Exploring Design Decisions for Effective Information Visualization @ *Longwood*

- 7:00pm — Vis/Infovis Papers Fast Forward @ *Blenheim*

VAST *Blenheim*

- 8:30am — Papers: Text Analytics
- BREAK
- 10:30am — Papers: Analysis Process & Graph Analytics
- LUNCH BREAK
- 2:00pm — Papers: Life Science & Financial Applications
- BREAK
- 4:00pm — Papers: Best Paper

  VAST Capstone Panel

At-a-Glance

Wednesday

EVENTS

- Posters and Interactive Demos & Art @ *Atrium*
- Exhibits @ *Marlborough A*
- Vis/InfoVis Poster Viewing and Discovery Exhibit @ *Atrium*
- Banquet and 20th Anniversary Celebration @ *Ocean A/B*

INFOVIS — *Blenheim*

- VisWeek Welcome, **Vis/InfoVis Keynote** @ *Blenheim*

  Keynote: Visual Thinking and Visual Thinking Tools, Colin Ware
- BREAK
- Papers: Bioinformatics Visualization
- LUNCH BREAK
- Panel: Changing the World with Visualization
- BREAK
- Papers: Models and Theories, Posters FF, Discovery FF

VIS — *Marlborough B/C*

- Papers: Surface Descriptors
- Papers: Particle Systems and Flow Visualization
- Papers: Multi-Projector Displays, Vis Contest, Posters Fast Forward

VIS — *Dennis A/B*

- Papers: Evaluation Methods
- Papers: Perception-Guided Visualization

Thursday

EVENTS

- Posters and Interactive Demos & Art @ *Atrium*
- Exhibits @ *Marlborough A*
- Vis Lies @ *Marlborough B/C*

INFOVIS — *Blenheim*

- Papers: Graph Visualization
- BREAK
- Papers: Multi-dimensional Data Visualization
- LUNCH BREAK
- VisWeek Feedback Session @ *Blenheim*
- Papers: Space and Time
- BREAK
- Papers: Collaborative Visualization

VIS — *Marlborough B/C*

- Papers: Visually Supported Analysis
- Papers: Diffusion Tensor Imaging
- Papers: Panel: Challenges in Large Data Visualization

VIS — *Dennis A/B*

- Papers: Time Dependent Data Visualization
- Papers: Medical and Molecular Vis and Analysis
- Papers: Transfer Function Design
- Papers: Neurobiologcal and Molecular Imaging

Friday

INFOVIS — *Blenheim*

- Papers: Systems
- BREAK
- Papers: Text Visualization

VIS — *Marlborough B/C*

- Papers: Visual Encoding
- Papers: Panel: New Faculty & Postdocs Spill the Beans

VIS — *Dennis A/B*

- Papers: Advanced Volume Visualization Techniques I
- Papers: Advanced Volume Visualization Techniques II

- Posters and Interactive Demos & Art @ *Atrium*
- BREAK
- VisWeek Closing , **Vis/InfoVis Capstone** @ *Blenheim*

  Capstone: Visual aids: Use of Paintings and Photography for Lighting in the Theater, Brian MacDevitt

8:30am
9:00am
9:30am
10:00am
10:30am
11:00am
11:30am
12:00pm
1:00pm
2:00pm
2:30pm
3:00pm
3:30pm
4:00pm
4:30pm
5:00pm
5:30pm
6:00pm
6:30pm
7:00pm
8:00pm
9:00pm

Program Details VisWeek 09

Sunday 11 October

8:30am - 5:55pm

VisWeek Workshop *Blenheim*

VizSec: Visualization for Computer Security

Organizers: Deborah Frincke, John Goodall, Carrie Gates

The 6th International Workshop on Visualization for Cyber Security (VizSec) is a forum that brings together researchers and practitioners in information visualization and security to address the specific needs of the cyber security community through new and insightful visualization techniques. Co-located this year with IEEE VisWeek 2009, VizSec will continue to provide opportunities for the two communities to collaborate and share insights into providing solutions for security needs through visualization approaches. Accepted papers will be published by the IEEE and archived in the IEEE Digital Library. The authors of the best papers will be invited to extend and revise their paper for journal publication in a special issue of Information Visualization. This year our focus is on advancing Visualization for Cyber Security as a scientific discipline. While art, engineering, and intuitions regarding the human element will always remain important if we are to obtain useful cyber security visualizations, advances in the scientific practice of research are needed. The scientific aspects of visualization for cyber security draw both on empirical observation (similar to many natural and social sciences) and formal science (such as the formal derivations in mathematics). Barriers confronting current researchers include concerns about available data, lack of a common agreement about what constitutes sound experimental design, the difficulties of measuring the relative effectiveness of security visualizations in practice, and the lack of a common understanding of user requirements. While many researchers are making progress in these and other critical areas, much work yet remains.

VisWeek Forum *Dennis A/B*

FODAVA: Geometric Aspects of Machine Learning and Visual Analytics

Organizers: V. Koltchinskii, M. Maggioni, H. Park, A. Varshney

Speakers: Misha Belkin, Gunnar Carlson, Tony Jebara, Gilad Lerman, Sayan Mukherjee, Justin Romberg, Clayton Scott, Santosh Vempala, Rene Vidal

The primary aim of the forum is to bring together researchers in Computer Science, Mathematics, Statistics and related areas working on geometric problems in Machine Learning with a potential impact in Data and Visual Analytics. In the recent years, there has been significant progress in Machine and Statistical Learning in general, the design of algorithms that extract and process information from data sets, and the mathematical understanding of the limits and capabilities of such algorithms. In this forum we will focus on recent trends in Machine Learning that aim at understanding the geometric nature of Machine Learning problems. It has been understood that there are rather subtle geometric structures involved in complex high dimensional data sets that have to be revealed in the process of their analysis and visualization. These structures are often hidden even in the data sets that seemingly have nothing to do with geometry (such data sets are common in many Visual Analytics applications). Novel techniques, theoretical insights, algorithms and computational techniques have been developed along this lines and will be discussed in the forum.

8:30am - 12:15pm

VisWeek Workshop *Marlborough B/C*

Collaborative Visualization on Interactive Surfaces (CoVIS)

Organizers: Petra Isenberg, Michael Sedlmair, Dominikus Baur, Tobias Isenberg, Andreas Butz

It is common for small groups of people to gather around visual displays of information to discuss or interpret the information to form decisions. Groups can share the task load of exploring large and complex datasets and can share various interpretations of a dataset when working together. However, tools to support synchronous collaboration between several people in their data analysis are still relatively scarce. Traditionally, visualization and visual analytics tools have been designed from a single-user perspective and for desktop computers. While hardware such as multi-touch displays and network capabilities have emerged that lend themselves especially well to collaboration, software support for collaboration around visualizations is still relatively scarce. One of the reasons is that singleuser systems do not necessarily translate well to collaborative scenarios or interactive surfaces and require specific re-design. The design of digital systems for collaboration around visualization and visual analytics systems, therefore, poses additional challenges: we need to understand (a) how people collaboratively work with visual representations of data and which methods they use to solve information analysis tasks as a team, and (b) what the exact design requirements are for collaborative visual analysis scenarios. In this workshop we would like to discuss these challenges and discuss the role of interactive surfaces as an emerging technology for supporting collaborative visualization and visual analytics settings.

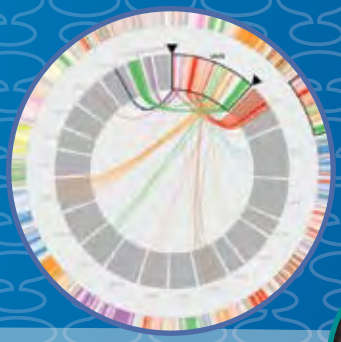
12:15pm - 2:00pm

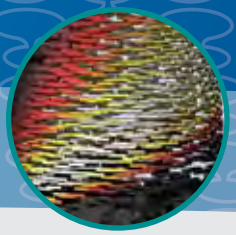
Lunch Break

2:00pm - 5:55pm

VisWeek Workshop *Marlborough B/C*

Putting Visualization on the Web





Organizers: Robert Kosara, Nathan Yau, Andrew Vande Moere

The World Wide Web is a primary source of information for many people, but not everything that can be found online when searching for "visualization" would be recognized as such by VisWeek attendees. There is clearly a place for data art, information graphics, mash-ups, etc. — but what is generally considered the core of visualization research (or visual analytics, for that matter) seems underrepresented. And while it is not difficult to find images of many techniques, there is little material that explains, demonstrates, compares, and critiques them. All this is even more true for scientific visualization than for information visualization. To reach more people in the real world, we need to understand the mechanisms for disseminating knowledge outside of the conference or journal paper. A few examples exist where academic visualization research has become successfully popularized, e.g., TreeMaps, ThemeRiver (used in last.fm), StreamGraphs (a well-received New York Times chart of box office revenues). More examples like these are clearly needed, as is more open and accessible information from the people in the field. A blog or website is not just a place for dispensing wisdom, it can provide a platform for experiments and interaction. It also makes it possible to get feedback from readers about real-world problems that might be tackled in research projects. And it can even become the subject of research; Many Eyes is a wonderful example of this. The proposed workshop will give participants the opportunity to learn about experiences, get hints, and discuss issues. Such issues include academic blogging (talk about research before it is published?), finding an audience, promoting a site, etc. The goal of the workshop is to collect ideas and best practices, and to come up with useful solutions to problems posed.

○ **VisWeek Tutorial** *Longwood*

Scalar Topology in Visual Data Analysis

Organizers: Gunther Weber, Peer-Timo Bremer, Hamish Carr, Attila Gyulassy

As scientific datasets continue to increase in size and complexity, topological tools that have been developed to capture significant features of the data at an abstract level that enables and facilitates understanding by the researcher. In particular, three topological structures — the Morse-Smale complex, the Reeb graph, and the contour tree, a special case of the Reeb graph — have been demonstrated to be effective at capturing and recognizing significant features in a disciplined fashion that allows abstract tracking, manipulation and presentation. These techniques are not yet, however, widely disseminated, and it is the intention of this tutorial to remedy this by presenting a systematic overview of current topological methods for the benefit of experienced researchers in visualization who are unfamiliar with them. While general fluency in the field of visualization must be assumed, the intention is to present these tools from the ground up.

Monday

8:30am - 5:55pm

VisWeek Tutorial *Marlborough B/C*

Provenance-Enabled Data Exploration and Visualization

Organizers: Emanuele Santos, Claudio Silva, Juliana Freire, Erik Anderson

Scientists are now faced with an incredible volume of data to analyze. To explore and understand the data, they need to assemble complex workflows (pipelines) to manipulate the data and create insightful visual representations. Provenance is essential in this process. The provenance of a digital artifact contains information about the process and data used to derive the artifact. This information is essential for preserving the data, for determining the data's quality and authorship, for both reproducing and validating results – all important elements of the scientific process. Provenance has shown to be particularly useful for enabling comparative visualization and data analysis. This tutorial will inform computational and visualization scientists, users and developers about different approaches to provenance and the trade-offs among them. Using the VisTrails project as a basis, we will cover different approaches to acquiring and reusing provenance, including techniques that attendees can use for provenance-enabling their own tools. The tutorial will also discuss uses of provenance that go beyond the ability to reproduce and share results.

VisWeek Workshop *Longwood*

Workshop: REVISE: Refactoring Visualization from Experience

Organizers: Hamish Carr, Min Chen, Kelly Gaither, Hans Hagen, Matt Ward, Gunther Weber, Thomas Wischgoll

In many ways, the development of a visualization application is similar to a software engineering process, involving technical development and evaluation of methods, development and evaluation of libraries and methods. It therefore follows that reflection and feedback from application experience is needed for refactoring and redesign of future generations of visualization applications. This workshop aims to encourage systematic analysis, review and refactoring of visualization techniques and applications, including: Short anecdotal reports on effectiveness of libraries and applications, case studies of unexpected adaptations of visualization software to user tasks, post facto evaluations, including failure analysis and post-mortems, systematic studies of visualization tools, surveys of commercial, industrial or academic usage patterns, instrumentation and tracing of visualization libraries or applications, requirements analysis for visualization libraries or applications, and reports on refactoring of visualization applications.

8:30am - 12:15pm

VisWeek Tutorial *Dennis A/B*

Interactive Massive Model Rendering

Organizers: Sung-Eui Yoon, Dinesh Manocha, David Kasik, Enrico Gobbetti, Renato Pajarola, Philipp Slusallek

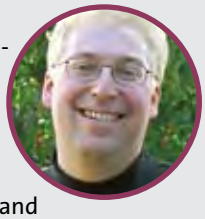
Users have consistently tried to manage and visualize more data than any computing system allows. 3D data used in scientfic visualization, medical imaging, seismic exploration, information visualizationfilm, games, CAD systems, etc. are most problematic. This course covers fundamental techniques that effectively overcome system constraints to allow real-time interaction with massive models.

8:30am - 10:10am

VAST Welcome, VAST Keynote, Papers Fast Forward *Blenheim*

VAST Keynote: Using Stories To Understand Patterns

Speaker: Andrew Glassner



People easily find patterns everywhere, from familiar faces in pancakes to voices on the wind and tigers in the clouds. We see patterns behind the migration of birds and which houses get bought and sold in a neighborhood.

The patterns we perceive are usually in a context, and frequently that context is a story. The tendency to see stories is another built-in human quality that has served us well, from avoiding hungry predators to building loving relationships. Building a narrative around a set of observed patterns is a natural and powerful tool for understanding, because the familiar nature of narrative gives our minds a structure for entering the patterns imaginatively. The story we tell gives us a framework for examining and manipulating the patterns, helping us understand their origins and meanings. Narrative offers a scaffolding from which we can arrange and re-arrange the component pieces of an idea, but still keep track of how the pieces hold together.

In this talk I'll summarize the basic elements of traditional Western narrative, from character design to plot dynamics. I hope to encourage the idea that we can consciously use this powerful, innate facility to better understand and work with the increasingly complex phenomena around us.

10:10am - 10:30am

Break

10:30am - 12:30pm

VAST Papers *Blenheim*

Spatio-Temporal Analytics

Chair: Jason Dykes

Interactive Visual Clustering of Large Collections of Trajectories, Gennady Andrienko, Natalia Andrienko, Salvatore Rinzivillo, Mirco Nanni, Dino Pedreschi, Fosca Giannotti

Proximity-based Visualization of Movement Trace Data, Tarik Crnovrsanin, Chris Muelder, Carlos Correa, Kwan-Liu Ma

Guided Analysis of Hurricane Trends Using Statistical Processes Integrated with Interactive Parallel Coordinates, Chad A. Steed, J. Edward Swan II, T.J. Jankun-Kelly, Patrick J. Fitzpatrick

Finding Comparable Temporal Categorical Records: A Similarity Measure with an Interactive Visualization, Krist Wongsuphasawat, Ben Shneiderman

A Visual Analytics System for Radio Frequency Fingerprinting-based Localization, Yi Han, Erich P. Stuntebeck, John T. Stasko, Gregory D. Abowd

Geovisual Analytics for Self-Organizing Network Data, Ho Van Quan, Tobias Åström, Mikael Jern

12 October

12:30pm - 2:00pm

○ Lunch Break

2:00pm - 5:55pm

○ VisWeek Tutorial *Dennis A/B*
Visualization and Analysis Using VisIt
Organizer: Hank Childs

This tutorial will focus on VisIt, an open source visualization and analysis tool designed for processing large data. The tool is built around five primary use cases: data exploration, quantitative analysis, comparative analysis, visual debugging, and communication of results. VisIt has a client-server design for remote visualization, with a distributed memory parallel server. VisIt won an R&D 100 award in 2005, has been downloaded over 100,000 times, and is being developed by a large community. VisIt is currently being used to visualize and analyze the results of hero runs on six of the top eight machines on top500.org. The tutorial will introduce VisIt concepts, demonstrate how to do basic things in VisIt, and discuss how to do advanced analysis and visualizations. The last portion of the tutorial will discuss how to do VisIt development, including writing new plugin database readers, new operators, and new plot types.

2:00pm - 3:40pm

○ VAST Challenge *Blenheim*
VAST Challenge Presentation
Chairs: Georges Grinstein, Catherine Plaisant, Jean Scholtz, Mark Whiting

3:40pm - 4:15pm

○ Break

4:15pm - 5:55pm

○ VAST Papers *Blenheim*
Multidimensional Data
Chair: William Ribarsky

A Framework for Uncertainty-Aware Visual Analytics, Carlos D. Correa, Yu-Hsuan Chan, Kwan-Liu Ma

Combining automated analysis and visualization techniques for effective exploration of high-dimensional data, Andrada Tatu, Georgia Albuquerque, Martin Eisemann, Jörn Schneidewind, Holger Theisel, Marcus Magnork, Daniel Keim

Two-stage Framework for Visualization of Clustered High Dimensional Data, Jaegul Choo, Shawn Bohn, Haesun Park

Model Space Visualization for Multivariate Linear Trend Discovery, Zhenyu Guo, Matthew O. Ward, Elke A. Rundensteiner

○ Posters Fast Forward

6:15pm - 7:15pm

○ VAST Poster Viewing *The Atrium*

VAST Posters

Sunday 9:00 am - Friday 3:00 pm *The Atrium*

Analysis of community-contributed space- and time-referenced data (example of flickr and panoramio photos), Gennady Andrienko, Natalia Andrienko, Peter Bak, Slava Kisilevich, Daniel Keim

Interactive Poster: A Proposal for Sharing User Requirements for Visual Analytic Tools, Jean Scholtz

Working Memory Load as a Novel Tool for Evaluating Visual Analytics, Courtney C. Dornburg, Laura E. Matzen, Travis L. Bauer, Laura A. McNamara

Comparing Two Interface Tools in Performing Visual Analytics Tasks, Dong Hyun Jeong, Tera Marie Green, William Ribarsky, Remco Chang

A Scalable Architecture for Visual Data Exploration, Jonathan Decker, Alex Godwin, Mark A. Livingston, Denise Royle

Interactive Visual Analysis of Location Reporting Patterns, Derek Overby, John Keyser, Jim Wall

Reordered TileBars for Visual Text Exploration, VinhTuan Thai, Siegfried Handschuh

Visual Knowledge Exploration and Discovery from Different Points of View, Aba-Sah Dadzie, Daniela Petrelli

Poster: Visual Prediction of Time Series, Ming C. Hao, Halld R. Janetzk, Ratnesh K. Sharma, Umeshwar Dayal, Daniel A. Keim, Malu Castellanos

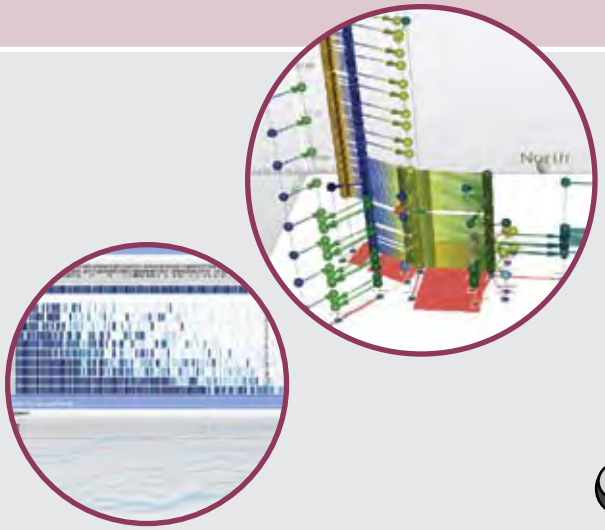
ProcessLine: Visualizing Time-Series Data in Process Industry, Xiongfei Luo, Hongan Wang, Feng Tian, Wei Liu, Dongxing Teng, Guozhong Dai

Articulate: a Conversational Interface for Visual Analytics, Yiwen Sun, Jason Leigh, Andrew Johnson, Dennis Chau

BEADS: High Dimensional Data Cluster Visualization, Soujanya Vadapalli, Kamalakar Karlapalem

Interactive Poster: Interactive Multiobjective Optimization - A New Application Area for Visual Analytics, Suvi Tarkkanen, Kaisa Miettinen, Jussi Hakanen

IceXplorer: Studying Great Lakes Ice Cover, Stina Bridgeman



Tuesday

8:30am - 5:55pm

VisWeek Tutorial *Marlborough B/C*

Advanced ParaView Visualization

Organizers: Kenneth Moreland, James Ahrens, Dave DeMarle, David Thompson, Philippe Pébay, Fabian Nathan

This tutorial brings together several of those who helped design and build ParaView to give visualization researchers and developers detailed guidance on the behavior and abilities of the ParaView application. A variety of topics will be discussed during the tutorial. A large focus of this year's tutorial will be on customizing ParaView. We will discuss using Python scripting for automated visualization and rapid prototyping, and we will discuss using ParaView's plugin mechanism for the simplified deployment of visualization and rendering algorithms and application customizations. Other topics include petascale distance visualization, visualization in-situ with simulations, and advanced statistics.

8:30am - 12:15pm

VisWeek Tutorial *Dennis A/B*

Multivariate Temporal Features in Scientific Data

Organizers: Jian Huang, Chaoli Wang, Heike Jänicke, Jonathan Woodring

In this tutorial, we survey recent progresses made in addressing the gap between users' conceptual domain knowledge vs. the way features have to be specified in traditional scientific visualizations. This gap is particularly acute at terascale and beyond, where a large amount of parallel automation is necessary to study the data at full-scale. Interactive techniques alone cannot solve the whole problem. Algorithmic methods must be studied. This tutorial covers the following topics: 1. Programming language interfaces for time-varying multivariate visualization; 2. Purely mathematical ways to specify features for visualization; 3. Importance-driven data analysis and visualization; 4. Chronovolumes, comparative visualization, and time-varying transfer functions. The tutorial also demonstrates the applications of these techniques in highly visible recent application areas, such as modeling and simulation of climate, combustion, astrophysics, earthquake and hurricane.

VisWeek Workshop *Longwood*

Video Analytics

Organizers: Nancy Chinchor, William Ribarsky, Michael Christel

This workshop will focus on tools for analyzing videos whose content ranges from persuasive videos (ads, propaganda, news) to YouTube videos. The following issues will be open for discussion at the workshop: User interfaces for video analysis that optimize cognition, tools for exploring video collections, applications that categorize videos based on content, annotation schema for video analysis, automated and/or social methods of annotating videos for improved retrieval, image, speech, sound track, and text processing that supports analysis of large video collections, methodologies for determining originator, message, and audience impacts of video, and applications that support reporting the results of the video analysis in a multimedia format.

8:30am - 10:10am

VAST Papers *Blenheim*

Text Analytics

Chair: Carsten Görg

LSAView: A Tool for Visual Exploration of Latent Semantic Modeling, Patricia J. Crossno, Daniel M. Dunlavy, Timothy M. Shead

Parallel Tag Clouds to Explore and Analyze Faceted Text Corpora, Christopher Collins, Fernanda B. Viégas, Martin Wattenberg

Describing Story Evolution from Dynamic Information Streams, Stuart Rose, Scott Butner, Wendy Cowley, Michelle Gregory, Julia Walker

What's Being Said Near "Martha"? Exploring Name Entities in Literary Text Collections, Romain Vuillemot, Tanya Clement, Catherine Plaisant, Amit Kumar

VAST Contest Dataset Use in Education, Mark A. Whiting, Chris North, Alex Endert, Jean Scholtz, Jereme Haack, Carrie Varley, Jim Thomas

10:10am - 10:30am

Break

10:30am - 12:10pm

VAST Papers *Blenheim*

Analysis Process & Graph Analytics

Chair: William Pike

Connecting the Dots in Visual Analysis, Yedendra B. Shrinivasan, David Gotzy, Jie Lu

Capturing and Supporting the Analysis Process, Nazanin Kadivar, Victor Chen, Dustin Dunsmuir, Eric Lee, Cheryl Qian, John Dill, Christopher Shaw, Robert Woodbury

Evaluating Visual Analytics Systems for Investigative Analysis: Deriving Design Principles from a Case Study, Youn-ah Kang, Carsten Görg, John Stasko

A Multi-Level Middle-Out Cross-Zooming Approach for Large Graph Analytics, Pak Chung Wong, Patrick Mackey, Kristin A. Cook, Randall M. Rohrer, Harlan Foote, Mark A. Whiting

Visual Analysis of Graphs with Multiple Connected Components, Tatiana von Landesberger, Melanie Görner, Tobias Schreck

12:10pm - 2:00pm

Lunch Break

2:00pm - 5:55pm

VisWeek Tutorial *Dennis A/B*

Visualization of Time-Varying Vector Fields

Organizers: Christoph Garth, Filip Sadlo, Jens Krueger, Daniel Weiskopf, Hank Childs

This tutorial presents a cross-section of modern approaches to time-varying vector field visualization, and is aimed at providing

the audience with a comprehensive guide of proven methods and algorithms that can help to solve real-world visualization problems. In the first part of this tutorial, we present three major classes of techniques that we regard as most important, useful, and forward-looking: geometric visualization methods, Lagrangian visualization methods, and texture-based visualization methods. In the second part of this tutorial we discuss implementation details for these methods including GPU-accelerated implementations that allow for high interactivity, and parallel visualization methods on clusters that may be necessary for processing the very large amounts of data produced by state-of-the-art simulations.

○ **VisWeek Tutorial** *Longwood*

Exploring Design Decisions for Effective Information Visualization

Organizers: Jo Wood, Jason Dykes, Aidan Slingsby

This tutorial provides an opportunity for participants to design their own information visualization of some sample datasets. Using interactive software and data provided by the instructors, issues of color, layout, symbolization and animation are explored. Results from participants' visualizations are compared along with those from the presenters allowing insights into the data and good practice in information visualization design to be gained. Participants should be equipped with their own laptop capable of running Java applications. Prior to the session participants are strongly encouraged to download the free software and data that will be used in the tutorial. The tutorial is suitable for anyone working with complex datasets who wishes to improve their data visualization design skills, in particular designing visualization solutions that match the research questions asked and the data to be analyzed.

2:00pm - 3:40pm

○ **VAST Papers** *Blenheim*

Life Science & Financial Applications

Chair: Willam Wright

MassVis: Visual Analysis of Protein Complexes Using Mass Spectrometry, Robert Kincaid, Kurt Dejgaard

Using Projection and 2D Plots to Visually Reveal Genetic Mechanisms of Complex Human Disorders, Boonthanome Nouanesengsy, Sang-Cheol Seok, Han-Wei Shen, Veronica J. Vieland

SpRay: A Visual Analytics Approach for Gene Expression Data, Janko Dietzsch, Julian Heinrich, Kay Nieselt, Dirk Bartz

Visual Opinion Analysis of Customer Feedback Data, Daniela Oelke, Ming Hao, Christian Rohrdantz, Daniel A. Keim, Umeshwar Dayal, Lars-Erik Haug, Halldór Janetzko

FinVis: Applied Visual Analytics for Personal Financial Planning, Stephen Rudolph, Anya Savikhin, David S. Ebert

3:40pm - 4:15pm

○ **Break**

4:15pm - 4:35pm

○ **VAST Best Paper** *Blenheim*

Chair: Jörn Kohlhammer

Iterative Integration of Visual Insights during Patent Search and Analysis, Steffen Koch, Harald Bosch, Mark Giereth, Thomas Ertl

4:35pm - 5:35pm

○ **VAST Capstone Panel** *Blenheim*

How Interactive Visualization Can Assist Investigative Analysis: Views and Perspectives from Domain Experts

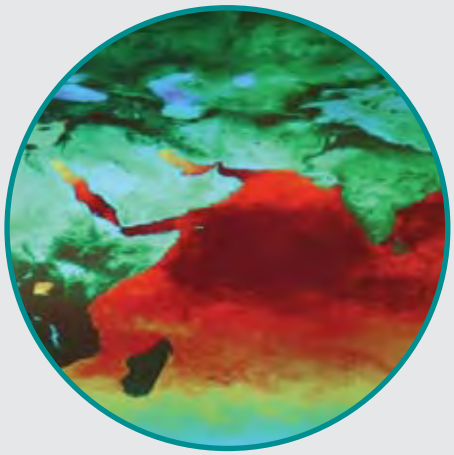
Organizer: John Stasko

Panelists: Sarah Cohen, Lawrence Hunter, Joe Parry

Interactive visualization could become an essential tool in the work of investigative analysts. Visualization could help analysts to explore large collections of data and documents, supporting the analysts' investigative sense-making processes. This panel gathers recognized leaders from three important domains, investigative reporting, biosciences (genomics), and intelligence analysis, that all include a fundamental investigative analysis component. The panelists will provide a glimpse into their worlds, describing and illustrating the data they examine, the goals and methods of their analysts, and the culture of their respective professions. In particular, the panelists will explore how visualization could potentially benefit investigators from their domain and they will provide guidance for visualization researchers seeking to collaborate with their colleagues.

7:00pm - 8:40pm

○ **Vis/InfoVis Papers Fast Forward** *Blenheim*



Wednesday

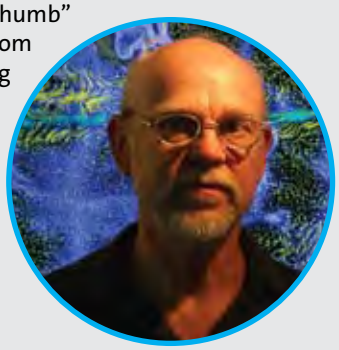
8:30am - 10:10am

VisWeek Welcome, Vis/InfoVis Keynote *Blenheim*

Vis/InfoVis Keynote: Visual Thinking and Visual Thinking Tools

Speaker: Colin Ware, Data Visualization Research Lab, University of New Hampshire

I like to think of visualization designers as skilled crafts-people who make tools to help other people think better. As Edwin Hutchins and others have pointed out, most real world thinking occurs with external aids such as paper and pencil, maps and diagrams. This means that a real world psychology must incorporate cognitive tools and their interfaces together with classic constructs of perceptual psychology, like pattern perception mechanisms and visual working memory. Perception is an active process and visual thinking can be thought of as a set of distributed processes involving pattern finding, eye movements and visual working memory operations. Interacting with a computer is also an active process, involving activities like zooming in and out, or hiding and saving information. In visual thinking using visualizations some activities occur in the head and others in the computer. The visualization is the bridge. Using studies of visualizations designed to help analyze data — from social networks and from tagged foraging humpback whales — I suggest some "artisanal rules of thumb" that can be used to generalize from the specific examples. The exciting thing for those of us who design, is that half of the emerging discipline of real world cognition (it is too early to call it a science), has to be about things that are changing and evolving. It can be constructivist in the very literal sense of building tools.



10:10am - 10:30am

Break

10:30am - 12:10pm

InfoVis Papers *Blenheim*

Bioinformatics Visualization

Chair: Jesse Kennedy

InfoVis Best Paper Award

ABySS-Explorer: Visualizing Genome Sequence Assemblies, Cydney B. Nielsen, Shaun D. Jackman, Inanç Birol, Steven J.M. Jones

Constructing Overview + Detail Dendrogram-Matrix Views, Jin Chen, Alan M. MacEachren, Donna J. Peuquet

InfoVis Honorable Mention

MizBee: A Multiscale Synteny Browser, Miriah Meyer, Tamara Munzner, Hanspeter Pfister

GeneShelf: A Web-based Visual Interface for Large Gene Expression Time-Series Data Repositories, Bohyoung Kim, Bongshin Lee, Susan Knoblach, Eric Hoffman, Jinwook Seo

Spatiotemporal Analysis of Sensor Logs using Growth Ring Maps, Peter Bak, Florian Mansmann, Halldor Janetzko, Daniel A. Keim

Vis Papers *Marlborough B/C*

Surface Descriptors

Chair: Hamish Carr

Loop Surgery for Volumetric Meshes: Reeb Graphs Reduced to Contour Trees, Julien Tierny, Attila Gyulassy, Eddie Simon, Valerio Pascucci

Applying Manifold Learning to Plotting Approximate Contour Trees, Shigeo Takahashi, Issei Fujishiro, Masato Okada

Intrinsic Geometric Scale Space by Shape Diffusion, Guangyu Zou, Jing Hua, Zhaoqiang Lai, Xianfeng Gu, Ming Dong

Multi-Scale Surface Descriptors, Gregory Cipriano, George N. Phillips Jr., Michael Gleicher

Vis Papers *Dennis A/B*

Evaluation Methods

Chair: Penny Rheingans

A User Study to Compare Four Uncertainty Visualization Methods for 1D and 2D Datasets, Jibonananda Sanyal, Song Zhang, Gargi Bhattacharya, Phil Amburn, Robert J. Moorhead

Comparing 3D Vector Field Visualization Methods: A User Study, Andrew S. Forsberg, Jian Chen, David H. Laidlaw

Verifiable Visualization for Isosurface Extraction, Tiago Etiene, Carlos Scheidegger, L. Gustavo Nonato, Robert M. Kirby, Cláudio T. Silva

Curve-Centric Volume Reformation for Comparative Visualization, Ove Daae Lampe, Carlos Correa, Kwan-Liu Ma, Helwig Hauser

12:10pm - 2:00pm

Lunch Break

2:00pm - 3:40pm

InfoVis Panel *Blenheim*

Changing the World with Visualization

Organizer: Robert Kosara

Panelists: Sarah Cohen, Jerome Cukier, Martin Wattenberg

With large amounts of data becoming available, and being accessible more easily, visualization has to step in to provide means to explore and understand that data. How can we enable people to explore the data that is of importance to them? How can we present data in a way that is not detached, but rather prompts a reaction (but yet does not distort the data)? How can visualization change the world (and what good is it if it cannot)? And how do we do all that so it still has academic value?

Vis Papers *Marlborough B/C*

Particle Systems and Flow Visualization

Chair: Eugene Zhang

Predictor-Corrector Schemes for Visualization of Smoothed Particle Hydrodynamics Data, Benjamin Schindler, Raphael Fuchs, John Biddiscombe, Ronald Peikert

Exploring the Millennium Run - Scalable Rendering of Large-Scale Cosmological Datasets, Roland Fraedrich, Jens Schneider, Rüdiger Westermann

14 October

Interactive Streak Surface Visualization on the GPU, Kai Bürger, Florian Ferstl, Holger Theisel, Rüdiger Westermann

Time and Streak Surfaces for Flow Visualization in Large Time-Varying Data Sets, Hari Krishnan, Christoph Garth, Kenneth I. Joy

○ Vis Papers *Dennis A/B*
Perception-Guided Visualization
Chair: Amitabh Varshney

Hue-Preserving Color Blending, Johnson Chuang, Daniel Weiskopf, Torsten Möller

Perception-Based Transparency Optimization for Direct Volume Rendering, Ming-Yuen Chan, Yingcai Wu, Wai-Ho Mak, Wei Chen, Huamin Qu

A Physiologically-based Model for Simulation of Color Vision Deficiency, Gustavo M. Machado, Manuel M. Oliveira, Leandro A. F. Fernandes

Depth-Dependent Halos: Illustrative Rendering of Dense Line Data, Maarten H. Everts, Henk Bekker, Jos B.T.M. Roerdink, Tobias Isenberg

3:40pm - 4:15pm

○ Break

4:15pm - 5:55pm

○ InfoVis Papers *Blenheim*
Models and Theories
Chair: T.J. Jankun-Kelly

A Nested Model for Visualization Design and Validation, Tamara Munzner

Conjunctive Visual Forms, Chris Weaver

○ Posters and Discovery Fast Forward

○ Vis Papers *Marlborough B/C*
Multi-Projector Displays
Chair: Peter Lindstrom

Markerless View-Independent Registration of Multiple Distorted Projectors on Extruded Surfaces Using an Uncalibrated Camera, Behzad Sajadi, Aditi Majumder

Color Seamlessness in Multi-Projector Displays Using Constrained Gamut Morphing, Behzad Sajadi, Maxim Lazarov, Aditi Majumder, M. Gopi

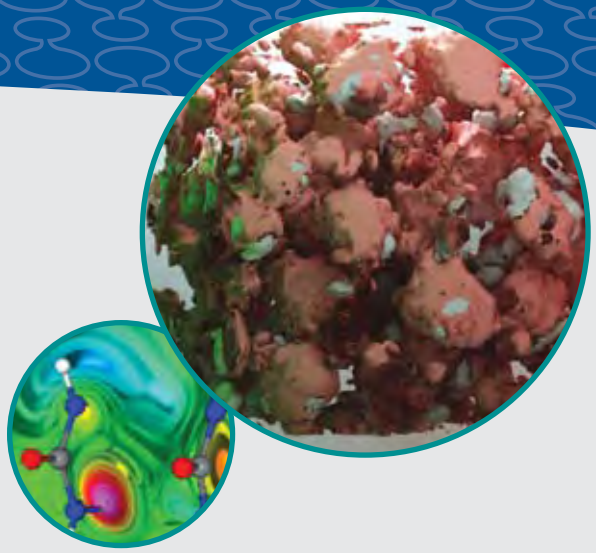
○ Vis Contest
○ Posters Fast Forward

6:00pm - 7:00pm

○ Vis/InfoVis Poster Viewing and Discovery Exhibition *The Atrium*

7:00pm - 10:00pm

○ VisWeek Banquet and 20th Anniversary Celebration *Ocean A/B*



Doctoral Colloquium 2010

Oct. 24 - 29, 2010
Salt Lake City, UT, USA

Call for Participation

VisWeek 2010 will host a Doctoral Colloquium to support the next generation of visualization researchers. Ph.D. students at any stage of their research are invited to apply to participate in the colloquium. Students who will be completing their proposal defense near the time of the colloquium are particularly encouraged to apply. It will incorporate contributions from the visualization, information visualization, and visual analytics student communities.

Colloquium participation will offer students insight and support for the framing of their research and will help them create important relationships. Financial support may be available to participants to assist in traveling to the conference.

Questions? Email info@vgtc.org

Sponsored by the IEEE Computer Society Visualization and Graphics Technical Committee (VGTC)

Thursday

8:30am - 10:10am

InfoVis Papers *Blenheim*
Graph Visualization
Chair: Nathalie Riche-Henry

Interaction Techniques for Selecting and Manipulating Subgraphs in Network Visualizations, Michael J. McGuffin, Igor Jurisica

ActiviTree: Interactive Visual Exploration of Sequences in Event-Based Data Using Graph Similarity, Katerina Vrotsou, Jimmy Johansson, Matthew Cooper

"Search, Show Context, Expand on Demand": Supporting Large Graph Exploration with Degree-of-Interest, Frank van Ham, Adam Perer

A Comparison of User-Generated and Automatic Graph Layouts, Tim Dwyer, Bongshin Lee, Danyel Fisher, Kori Inkpen Quinn, Petra Isenberg, George Robertson, Chris North

Smooth Graphs for Visual Exploration of Higher-Order State Transitions, Jorik Blaas, Charl P. Botha, Edward Grundy, Mark W. Jones, Robert S. Laramee, Frits H. Post

Vis Papers *Marlborough B/C*
Visually Supported Analysis
Chair: T.J. Jankun-Kelly

Visual Human+Machine Learning, Raphael Fuchs, Jürgen Waser, Eduard Gröller

Interactive Visual Optimization and Analysis for RFID Benchmarking, Yingcai Wu, Ka-Kei Chung, Huamin Qu, Xiaoru Yuan, S.C. Cheung

A Visual Approach to Efficient Analysis and Quantification of Ductile Iron and Reinforced Sprayed Concrete, Laura Fritz, Markus Hadwiger, Georg Geier, Gerhard Pittino, Eduard Gröller

Interactive Visual Analysis of Complex Scientific Data as Families of Data Surfaces, Kresimir Matkovic, Denis Gracanin, Borislav Klarin, Helwig Hauser

Vis Papers *Dennis A/B*
Time Dependent Data Visualization
Chair: Han-Wei Shen

Visualization and Exploration of Temporal Trend Relationships in Multivariate Time-Varying Data, Teng-Yok Lee, Han-Wei Shen

Isosurface Extraction and View-Dependent Filtering from Time-Varying Fields Using Persistent Time-Octree (PTOT), Cong Wang, Yi-Jen Chiang

Visual Exploration of Climate Variability Changes Using Wavelet Analysis, Heike Jänicke, Michael Böttinger, Uwe Mikolajewicz, Gerik Scheuermann

Interactive Coordinated Multiple-View Visualization of Biomechanical Motion Data, Daniel F. Keefe, Marcus Ewert, William Ribarsky, Remco Chang

10:10am - 10:30am

Break

10:30am - 12:10pm

InfoVis Papers *Blenheim*
Multidimensional Data Visualization
Chair: Niklas Elmqvist

InfoVis Honorable Mention
Configuring Hierarchical Layouts to Address Research Questions, Aidan Slingsby, Jason Dykes, Jo Wood

Visualizing Social Photos on a Hasse Diagram for Eliciting Relations and Indexing New Photos, Michel Crampes, Jeremy de Oliveira-Kumar, Sylvie Ranwez, Jean Villerd

Interactive Dimensionality Reduction Through User-defined Combinations of Quality Metrics, Sara Johansson, Jimmy Johansson

Scattering Points in Parallel Coordinates, Xiaoru Yuan, Peihong Guo, He Xiao, Hong Zhou, Huamin Qu

Bubble Sets: Revealing Set Relations with Isocontours over Existing Visualizations, Christopher Collins, Gerald Penn, Sheelagh Carpendale

Vis Panel *Marlborough B/C*
The Impact of Future Hardware on Visualization
Organizer: Hanspeter Pfister
Panelists: David Luebke, Larry Seiler, James Ahrens, Tom Ertl

These are times of profound changes in computer science. Multi-core processing architectures and heterogeneous systems with massively parallel co-processors are challenging existing programming models and require new skills in parallel programming. The effects of these novel architectures are no less felt in visualization, which has always relied on high performance computing for interactive image generation and data analysis. This panel will explore how the profound changes in processing hardware will lead to changes in visualization research, application development, and education.

Vis Papers *Dennis A/B*
Medical and Molecular Visualization and Analysis
Chair: James Stewart

Interactive Visualization of Molecular Surface Dynamics, Michael Krone, Katrin Bidmon, Thomas Ertl

Stress Tensor Field Visualization for Implant Planning in Orthopedics, Christian Dick, Joachim Georgii, Rainer Burgkart, Rüdiger Westermann

Visual Exploration of Nasal Airflow, Stefan Zachow, Philipp Muigg, Thomas Hildebrandt, Helmut Doleisch, Hans-Christian Hege

Sampling and Visualizing Creases with Scale-Space Particles, Gordon L. Kindlmann, Raál San José Estépar, Stephen M. Smith, Carl-Fredrik Westin

12:10pm - 2:00pm

Lunch Break

12:30pm - 1:30pm

VisWeek Feedback Session *Blenheim*

15 October

2:00pm - 3:40pm

InfoVis Papers *Blenheim*

Space and Time

Chair: Jason Dykes

FromDaDy: Spreading Aircraft Trajectories Across Views to Support Iterative Queries, Christophe Hurter, Benjamin Tissoires, Stéphane Conversy

InfoVis Honorable Mention

SellTrend: Inter-Attribute Visual Analysis of Temporal Transaction Data, Zhicheng Liu, John Stasko, Timothy Sullivan

Comparing Dot and Landscape Spatializations for Visual Memory Differences, Melanie Tory, Colin Swindells, Rebecca Dreezer

Flow Mapping and Multivariate Visualization of Large Spatial Interaction Data, Diansheng Guo

Temporal Summaries: Supporting Temporal Categorical Searching, Aggregation and Comparison, Taowei David Wang, Catherine Plaisant, Ben Shneiderman, Neil Spring, David Roseman, Greg Marchand, Vikramjit Mukherjee, Mark Smith

Vis Papers *Marlborough B/C*

Diffusion Tensor Imaging

Chair: Gordon Kindlmann

Volume Illustration of Muscle from Diffusion Tensor Images, Wei Chen, Zhicheng Yan, Song Zhang, John Allen Crow, David S. Ebert, Ronald M. McLaughlin, Katie B. Mullins, Robert Cooper, Zi'ang Ding, Jun Liao

A Novel Interface for Interactive Exploration of DTI Fibers, Wei Chen, Zi'ang Ding, Song Zhang, Anna MacKay-Brandt, Stephen Correia, Huamin Qu, John Allen Crow, David F. Tate, Zhicheng Yan, Qunsheng Peng

Parameter Sensitivity Visualization in DTI Fiber Tracking, Ralph Brecheisen, Bram Platel, Anna Vilanova, Bart ter Haar Romeny

Exploring 3D DTI Fiber Tracts with Linked 2D Representations, Radu Jianu, Çağatay Demiralp, David H. Laidlaw

Vis Papers *Dennis A/B*

Transfer Function Design

Chair: Huamin Qu

Coloring 3D Line Fields using Boy's Real Projective Plane Immersion, Çağatay Demiralp, John F. Hughes, David H. Laidlaw

The Occlusion Spectrum for Volume Classification and Visualization, Carlos D. Correa, Kwan-Liu Ma

Structuring Feature Space: A Non-Parametric Method for Volumetric Transfer Function Generation, Ross Maciejewski, Insoo Woo, Wei Chen, David S. Ebert

Automatic Transfer Function Generation Using Contour Tree Controlled Residue Flow Model and Color Harmonics, Jianlong Zhou, Masahiro Takatsuka

3:40pm - 4:15pm

Break

4:15pm - 5:55pm

InfoVis Papers *Blenheim*

Collaborative Visualization

Chair: Jeffrey Heer

ResultMaps: Visualization for Search Interfaces, Edward C. Clarkson, Krishna Desai, James D. Foley

Lark: Coordinating Co-located Collaboration with Information Visualization, Matthew Tobiasz, Petra Isenberg, Sheelagh Carpendale

The Benefits of Synchronous Collaborative Information Visualization: Evidence from an Experimental Evaluation, Sabrina Bresciani, Martin J. Eppler

Harnessing the Web Information Ecosystem with Wiki-based Visualization Dashboards, Matt McKeon

SpicyNodes: Radial Layout Authoring for the General Public, Michael Douma, Grzegorz Ligierko, Ovidiu Ancuta, Pavel Gritsai, Sean Liu

Vis Panel *Marlborough B/C*

Challenges in Large Data Visualization: A Visualization Community Call to Action

Organizer: James Ahrens

Panelists: Sean Ahern, John Gerth, Kwan-Liu Ma, Valerio Pascucci, Mark SubbaRao

Massive datasets are becoming ubiquitous, and there is a pressing need to create new approaches to process and understand this data. This panel gathers experts in large-data visualization to describe real-world grand challenge problems and to discuss how the wider visualization community can participate in solving large data visualization problems.

Vis Papers *Dennis A/B*

Neurobiological and Molecular Imaging

Chair: Raghu Machiraju

An Interactive Visualization Tool for Multi-channel Confocal Microscopy Data in Neurobiology Research, Yong Wan, Hideo Otsuna, Chi-Bin Chien, Charles Hansen

BrainGazer - Visual Queries for Neurobiology Research, Stefan Bruckner, Veronika Šoltészová, Eduard Gröller, Jiří Hladůvka, Katja Bühler, Jai Y. Yu, Barry J. Dickson

Scalable and Interactive Segmentation and Visualization of Neural Processes in EM Datasets, Won-Ki Jeong, Johanna Beyer, Markus Hadwiger, Amelio Vazquez, Hanspeter Pfister, Ross T. Whitaker

Multimodal Vessel Visualization of Mouse Aorta PET/CT Scans, Timo Ropinski, Sven Hermann, Rainer Reich, Michael Schäfers, Klaus Hinrichs

7:00pm - 8:30pm

Vis Lies *Marlborough B/C*

Organizers: Georges Grinstein and Bernice Rogowitz

People have misled and been misled with statistics and maps for years. In this community, we realize how easy it is to lie and confuse with visualization, as well. This year, we will be reinstating the very popular evening event, called How (not!) to Lie and Confuse with Visualization.

Friday

8:30am - 10:10am

InfoVis Papers *Blenheim*
Systems
Chair: Chris Weaver

code swarm: A Design Study in Organic Software Visualization, Michael Ogawa, Kwan-Liu Ma

Towards Utilizing GPUs in Information Visualization: A Model and Implementation of Image-Space Operations, Bryan McDonnel, Niklas Elmqvist

A Multi-Threading Architecture to Support Interactive Visual Exploration, Harald Piringer, Christian Tominski, Philipp Muigg, Wolfgang Berger

Protovis: A Graphical Toolkit for Visualization, Michael Bostock, Jeffrey Heer

Visual Analysis of Inter-Process Communication for Large-Scale Parallel Computing, Chris Muelder, Francois Gygi, Kwan-Liu Ma

Vis Papers *Marlborough B/C*
Visual Encoding
Chair: Tobias Isenberg

Quantitative Texton Sequences for Legible Bivariate Maps, Colin Ware

Continuous Parallel Coordinates, Julian Heinrich, Daniel Weiskopf

VisMashup: Streamlining the Creation of Custom Visualization Applications, Emanuele Santos, Lauro Lins, James P. Ahrens, Juliana Freire, Cláudio T. Silva

Focus+Context Route Zooming and Information Overlay in 3D Urban Environments, Huamin Qu, Haomian Wang, Weiwei Cui, Yingcai Wu, Ming-Yuen Chan

Vis Papers *Dennis A/B*
Advanced Volume Visualization Techniques I
Chair: Markus Hadwiger

Kd-Jump: a Path-Preserving Stackless Traversal for Faster Isosurface Raytracing on GPUs, David M. Hughes, Ik Soo Lim

Mapping High-Fidelity Volume Rendering for Medical Imaging to CPU, GPU and Many-Core Architectures, Mikhail Smelyanskiy, David Holmes, Jatin Chhugani, Alan Larson, Douglas M. Carmean, Dennis Hanson, Pradeep Dubey, Kurt Augustine, Daehyun Kim, Alan Kyker, Victor W. Lee, Anthony D. Nguyen, Larry Seiler, Richard Robb

Volume Ray Casting with Peak Finding and Differential Sampling, Aaron Knoll, Younis Hijazi, Rolf Westerteiger, Mathias Schott, Charles Hansen, Hans Hagen

Interactive Volume Rendering of Functional Representations in Quantum Chemistry, Yun Jang, Ugo Varetto

10:10am - 10:30am

Break

10:30am - 12:10pm

InfoVis Papers *Blenheim*
Text Visualization
Chair: Christopher Collins

Participatory Visualization with Wordle, Fernanda B. Viégas, Martin Wattenberg, Jonathan Feinberg

Document Cards: A Top Trumps Visualization for Documents, Hendrik Strobelt, Daniela Oelke, Christian Rohrdantz, Andreas Stoffel, Daniel A. Keim, Oliver Deussen

Visualizing the Intellectual Structure with Paper-Reference Matrices, Jian Zhang, Chaomei Chen, Jiexun Li

Exemplar-based Visualization of Large Document Corpus, Yanhua Chen, Lijun Wang, Ming Dong, Jing Hua

InfoVis Best Paper Award
Mapping Text with Phrase Nets, Frank van Ham, Martin Wattenberg, Fernanda B. Viégas

Vis Papers *Dennis A/B*
Advanced Volume Visualization Techniques II
Chair: Ivan Viola

GL4D: A GPU-based Architecture for Interactive 4D Visualization, Alan Chu, Chi-Wing Fu, Andrew J. Hanson, Pheng-Ann Heng

Decoupling Illumination from Isosurface Generation Using 4D Light Transport, David C. Banks, Kevin M. Beason

Supercubes: A High-Level Primitive for Diamond Hierarchies, Kenneth Weiss, Leila De Floriani

High-Quality, Semi-Analytical Volume Rendering for AMR Data, Stéphane Marchesin, Guillaume Colin de Verdière

Vis Panel *Marlborough B/C*
New Faculty Members and Postdoctoral Fellows Spill the Beans
Organizer: Alark Joshi

Panelists: Jeffery Heer, Gordon Kindlmann, Miriah Meyer
In this panel, we talk with new faculty members in the field of visualization to hear about their experiences in finding an academic position. They'll explain what kind of material is required for the application packet, what happens on the day of the job interview, what would new faculty members have wished they had known before they applied and much more. Since new faculty positions may be rare in the current economy, we also discuss the wonderful alternative of taking up a postdoctoral position.

12:10pm - 1:30pm

Lunch Break

1:30pm - 3:15pm

VisWeek Closing, Vis/InfoVis Capstone *Blenheim*
Capstone: Visual aids: Use of Paintings and Photography for Lighting in the Theater
Speaker: Brian MacDevitt, *Broadway Lighting Designer*

MacDevitt, winner of multiple Tony Awards, will discuss the role of a lighting designer in live Theatre, Dance and Opera. He will discuss the process lighting designers apply from "page to stage", how they communicate visual ideas to directors and collaborators, and show examples of how the outside references have aided and furthered his work. Numerous examples from Broadway shows

will be discussed and examined for principles of design involving the use of light, color, and visual aids. MacDevitt will discuss how he uses paintings and photography to support ideas and to inspire new ways of lighting the stage. By exploring images from outside of the theater, he then arrives at stage pictures that challenge the "way it is done".

Vis Posters

Sunday 9:00 am - Friday 3:00 pm *The Atrium*

A Real-Time Physical Therapy Visualization Strategy to Improve Unsupervised Patient Rehabilitation, Danny Rado, Aswin Sankaran, Joseph Plasek, David Nuckley, Daniel F. Keefe

Seismic Horizon Tracing with Diffusion Tensors, Thomas Höllt, Markus Hadwiger, Laura Fritz, Philipp Muigg, Helmut Doleisch

Asynchronous Collaborative Visualization on a Stick, Francis Marchese

Web-based Visualization and Analysis of Atmospheric Nucleation Processes, Yi Liu, Rui Ding, Jinzhu Gao, Xiaohui Cui, Bin Chen, and J. Ilja Siepmann

Multidimensional Visualization of Hemodynamic Data, Michelle Borkin, Simone Melchionna, Charles Feldman, Efthimios Kaxiras, Hanspeter Pfister

Continuous FVR of Irregularly Sampled Data Using Gaussian RBFs, H. Quynh Dinh, Neophytos Neophytou, Klaus Mueller

Interactive Visualization of Uncertainty in Probabilistic Tractography of Brain's White Matter Pathways as assessed by Diffusion Tensor Imaging, Tobias Rick, Anette von Kapri, Svenja Caspers, Simon B. Eickhoff, Karl Zilles, Torsten Kuhlen

Visualization Techniques for Monitoring Simulations, Eliot Feibush

Iconizer: A Framework to Identify and Create Effective Representations for Visual Information Encoding, Supriya Garg, Tamara Berg, Klaus Mueller

Game Engines for Visualization, Nick Green, Alex Pang

A High Quality Sampling Technique for Particle-based Volume Rendering, Takuma Kawamura, Naohisa Sakamoto, Koji Koyamada

Illustrative Visualization of Hurricane Advisory Information, Chad A. Steed, T.J. Jankun-Kelly, J. Edward Swan II, Robert J. Moorhead

Automated Illustration of Molecular Flexibility, Aaron Bryden, George Phillips, Jr, Michael Gleicher

Using LIC-like FlowVis Technique to Visualize Hurricanes, Keqin Wu, Song Zhang, Phil Amburn, Robert J. Moorhead II

LiDAR-Data: Automatic Object Detection for urban flooding models, MD. Aktaruzzaman, Theo G. Schmitt, Inga Scheler

CUDA-Accelerated Continuous 2D Scatterplots, Sven Bachthaler, Steffen Frey, Daniel Weiskopf

Star Graphs: Discretization, visualization, and analysis of tracking data, George Shaw, Deb Roy

Towards High Quality Gradient Estimation on Regular Lattices, Zahid Hossain, Usman R. Alim, Torsten Möller

An Application for Analyzing Stone Tool Artifacts, Lane Phillips, Vamsi Konchada, Matthew Hunstiger, Daniel F. Keefe

InfoVis Posters

Sunday 9:00 am - Friday 3:00 pm *The Atrium*

Visualizing Schema Clusters for Agile Information Sharing, Beth Yost, Craig Bonaceto, Michael Morse, Chris Wolf, Ken Smith

Data Vases: Plots for Visualizing Multiple Time Series, Sidharth Thakur and Theresa-Marie Rhyne

Cascading Components for Efficient Querying of Similarity-Based Visualizations, Christian Beecks, Sascha Wiedenfeld, Thomas Seidl

TraXplorer: Multi-Focus Interaction in Time-Series Data Visualization, Waqas Javed, Niklas Elmqvist

What Does Diversity Look Like?, Tuan Pham, Rob Hess, Crystal Ju, Ronald Metoyer, Juan Gilbert

Visual Graph Comparisons with Bullseyes, Nathaniel Cesario, Alex Pang, Lise Getoor, Lisa Singh

Building Visual Summaries of Clusters of Trajectories, Gennady Andrienko, Natalia Andrienko

Comparative Viral Genome Visualization, Dennis Jen, Lisa Larson, Christian Stolte, David DeCaprio, Todd Allen, Bruce Birren, Michael Koehrsen, Matthew Henn

SocioScape — a Tool for Interactive Exploration of Spatio-Temporal Group Dynamics in Social Networks, Khairi Reda, Chayant Tantipathananandh, Tanya Berger-Wolf, Jason Leigh, Andrew Johnson

Design Elements and the Perception of Information Structure, Caroline Ziemkiewicz, Robert Kosara

Interactive Coverage Effectiveness Multiplots for Evaluating Prioritized Regression Test Suites, Adam M. Smith, Joshua J. Geiger, Gregory M. Kapfhammer, Manos Renieris, G. Elisabeta Marai

Interactive Attractive and Repulsive Operators in Parallel Coordinates, Peihong Guo, He Xiao, Xiaoru Yuan

Interactive Poster: Exploring Time-Varying Hypergraphs, Mathias John, Hans-Jörg Schulz, Heidrun Schumann, Adelinde M. Uhrmacher, Andrea Unger

Social Visualization for Micro-Blogging Analysis, Tanyoung Kim, Hee Young Jeong, Yee Chieh Chew, Matthew Bonner, John Stasko

Force-Directed Layout for Euler Diagrams, Luana Micallef, Peter Rodgers

Perspectives on Time: Enhancing Utility with Flexibility, Peter Kinnaird, John Stasko

Connect to Congress, Peter Kinnaird, Hafez Rouzati, Xin Sun

Interactive Visualization of Ecosystem Change for Public Education, Tanyoung Kim, Hwajung Hong, Brian Magerko

Multivariate Visualization of Continuous Datasets, a User Study, Haleh Hagh-Shenas, Sunghee Kim, Laura Tateosian, Christopher Healey

Large-scale Comparative Sentiment Analysis of News Articles, F. Wanner, C. Rohrdantz, F. Mansmann, A. Stoffel, D. Oelke, M. Kristajic, D. A. Keim, D. Luo, J. Yang, M. Atkinson

Bit by Bit: Incremental Data Visualization, Joseph A. Cottam, Andrew Lumsdaine

Getting All Your Bats in a Row: Optimizing Layout in Chronophotographic Style Visualizations, Fedor A. Korsakov, Daniel F. Keefe

Supporters & Exhibitors

The IEEE 2009 VisWeek Committee gratefully acknowledges the following supporters and exhibitors:

Platinum

i2

National Information Assurance Research Laboratory

Gold

National Visualization and Analytics Center (NVAC)

Kitware

NVIDIA

Silver

National Library of Medicine

Microsoft Research

ATI FirePro Graphics

hp

VisMaster — Visual Analytics - Mastering the Information Age

IBM Research

Doctoral Colloquium

NSF

Breaks

CYVIZ

Applied Visions — SecureDecisions Division

Publisher

A K Peters, Ltd.

Morgan & Claypool Publishers

palgrave macmillan

Academic

SCI — www.sci.utah.edu