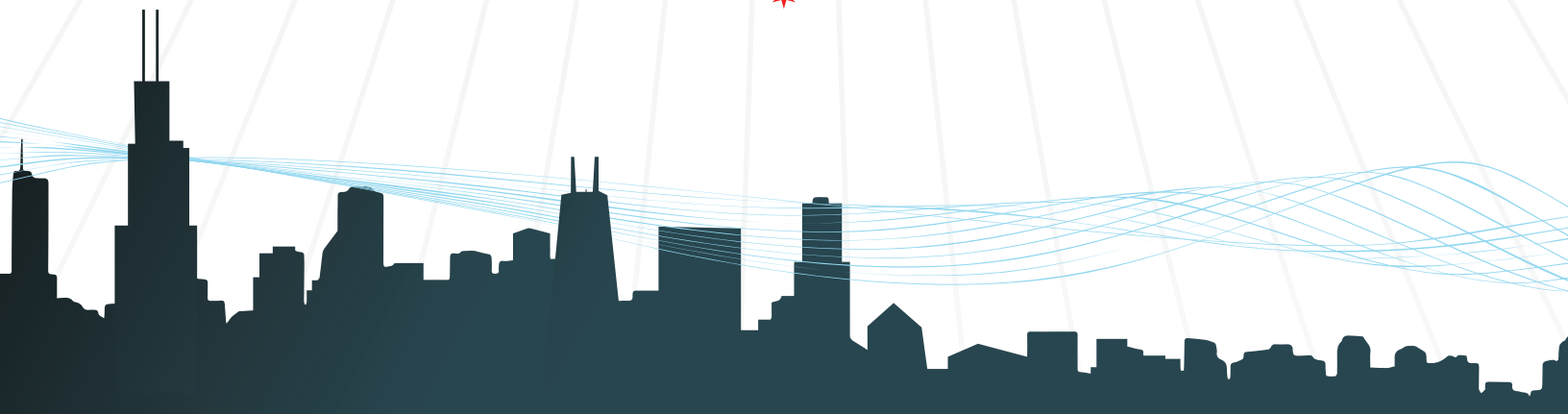
VIS 2015

VAST ✶ INFOVIS ✶ SCIVIS

PROGRAM

25-30 October 2015

CHICAGO, ILLINOIS, USA



IEEE vgtc · IEEE · IEEE computer society

WELCOME TO THE WINDY CITY AND TO IEEE VIS 2015!

As the VIS 2015 chairs, we are proud to see the IEEE's premier conference in visual analytics, information visualization, and scientific visualization come to the City of Chicago for the first time ever. The visualization community represents a wide range of researchers and practitioners who tackle every kind of visual data analysis challenge from the theoretical to the practical, from government and university research centers to the business sector, and we've planned an exciting and diverse program with something for everybody.

As the largest annual gathering of academics, practitioners, and researchers focused on visually analyzing datasets of every variety, we encourage you to attend as many of the more than 40 sessions as possible, and actively engage in the tutorials, workshops, and symposia, and informal community networking opportunities that the organizing committee has expertly assembled.

As in past years, VIS papers talks and panels are organized into three tracks: Visual Analytics Science and Technology (VAST), Information Visualization (InfoVis), and Scientific Visualization (SciVis), along with a three-day exhibition, all of which start Tuesday.

We have many new offerings this year, including Monday night's industry-oriented Visualization in Practice event, where applications experts can share their work in an informal setting. The expanded VIS Arts Program, which opens Tuesday evening, includes a panel, talks, and a two-week public art exhibition at the School of the Art Institute of Chicago's LeRoy Neiman Center, which is located across the street from the Palmer House.

We are especially honored to have Donna Cox and Molly Wright Steenson as our featured speakers this year. Donna has been a leader in the field of scientific visualization for over three decades, and she her team have produced award-winning 3D IMAX movies and dome planetarium shows that have been viewed by millions of people worldwide.

Molly, a design, architecture, and media scholar, recently joined the faculty of Carnegie Mellon's School of Design. She explores interesting relationships between technology, modes of communication, and design, and is sure to bring a unique perspective to the VIS community.

Maxine and I wish to thank the 2015 organizing committee, the VIS Executive Committee and the IEEE Visualization and Computer Graphics Technical Committee for all their hard work and dedication to bring you a truly memorable conference program. We also owe a special thank you to the Student Volunteers who keep the program on track and running smoothly. Enjoy the conference and have a great time in our wonderful city!

Maxine D. Brown and Michael E. Papka

Image: Luc Renambot

TOC

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To become a member visit:
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IEEE Visualization and Graphics Technical Committee (VGTC)

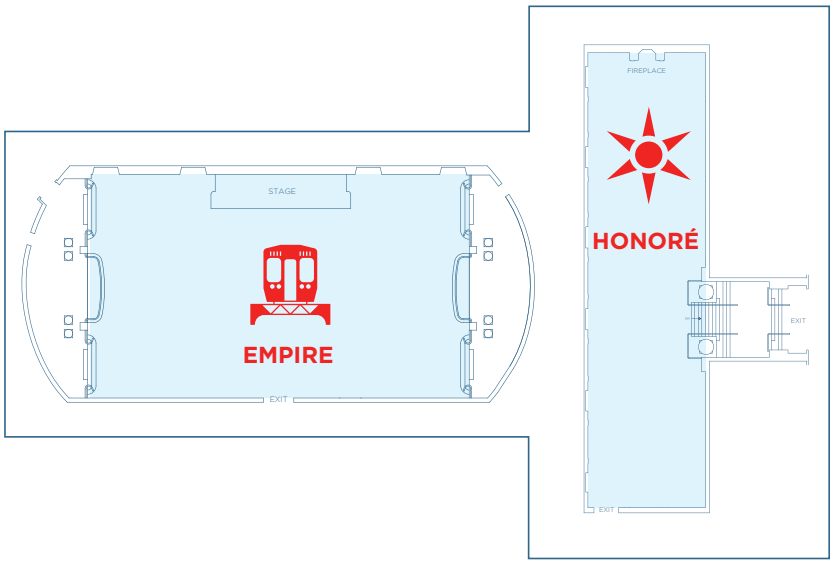
For information on awards, national initiatives, conferences and symposia, and a comprehensive membership directory, please visit: http://vgtc.org/

MEETING ROOMS

LOBBY

EMPIRE ROOM

HONORÉ BALLROOM



3RD FLOOR

1 SALON 1

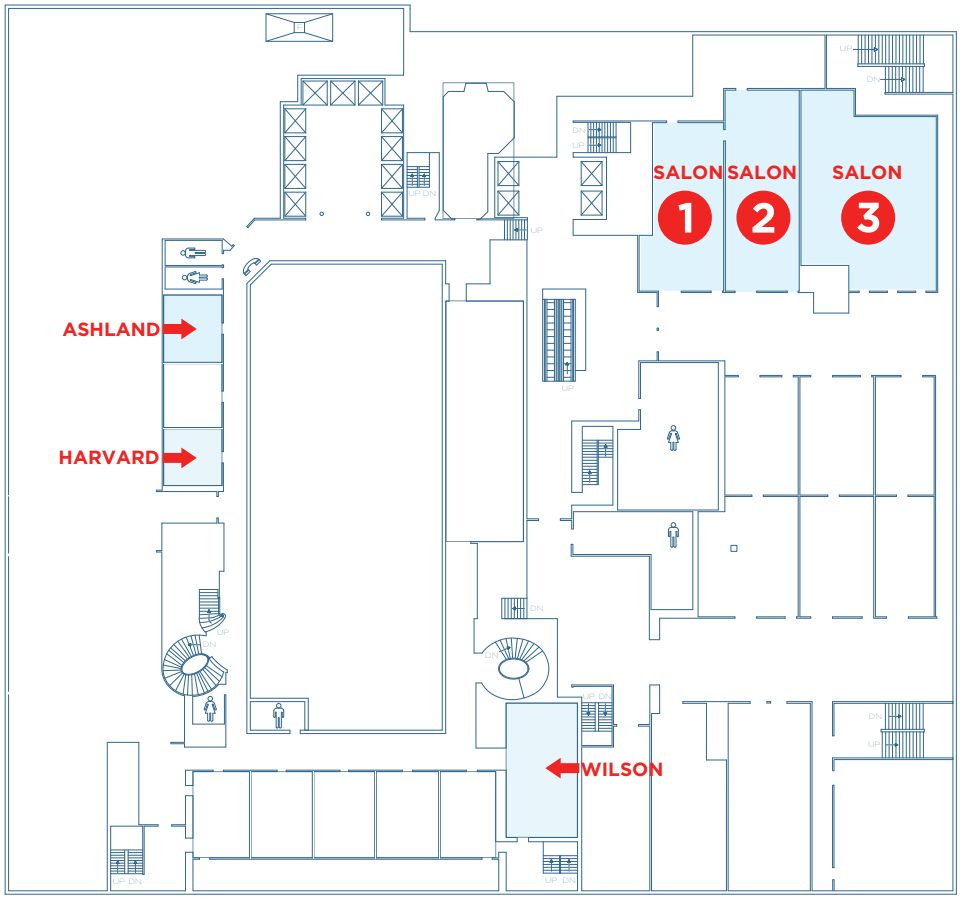
2 SALON 2

3 SALON 3

Speaker Preparation Room
WILSON (Sunday-Friday)
First-come, first-served

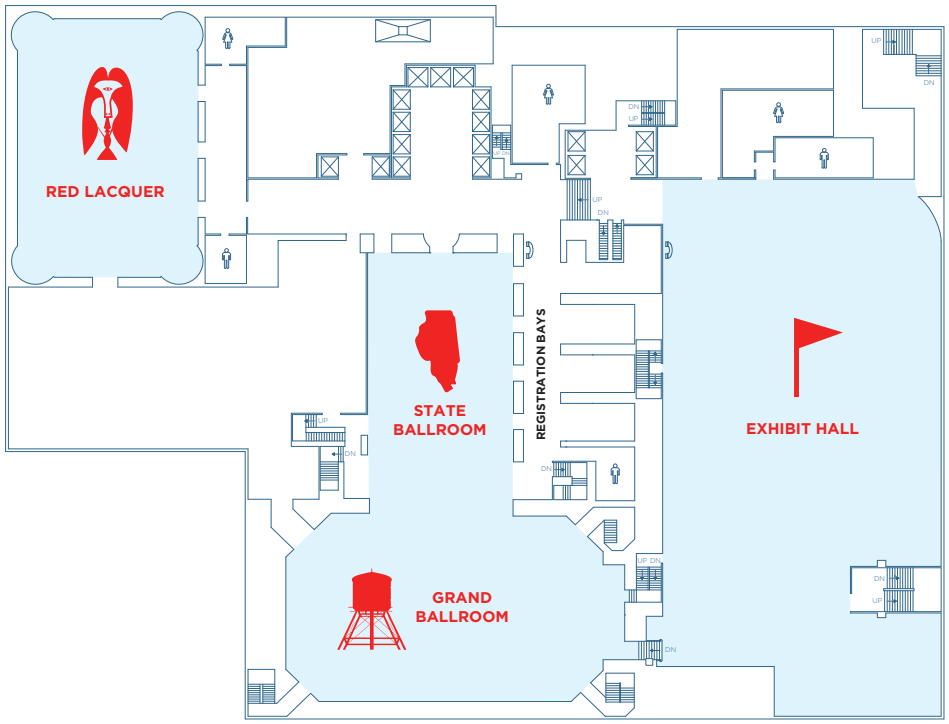
Personal Consideration Room
ASHLAND (Sunday-Friday)

Interview Room
HARVARD (Sunday-Friday)
Schedule at Registration Desk



Conference Registration – MEZZANINE

Saturday 6pm–8pm
Sunday 7am–4:30pm
Monday to Thursday 7:30am–4:30pm
Friday 7:30am–10:30am



4TH FLOOR

- RED LACQUER
- STATE BALLROOM
- GRAND BALLROOM
- EXHIBIT HALL

6TH FLOOR

- ADAMS ROOM
- MONROE ROOM

VIS 2015 AT A GLANCE

LDAV VizSec VDS

Tutorial Workshop

SATURDAY 24.OCT

	SALON 1	SALON 2	SALON 3
Session 1 8:30 AM 10:10 AM	Doctoral Colloquium (by invitation only) TRACK 1	Doctoral Colloquium (by invitation only) TRACK 2	Doctoral Colloquium (by invitation only) TRACK 3
Session 2 10:30 AM 12:10 PM			
Session 3 2:00 PM 3:40 PM			
Session 4 4:15 PM 5:55 PM			

SUNDAY 25.OCT

	GRAND	STATE	RED	EMPIRE	HONORÉ	ADAMS	MONROE	EXHIBIT
Session 1 8:30 AM 10:10 AM	LDAV Symposium	VAST Challenge	XData Tools	Visual Analytics in Healthcare	Personal Visualization: Exploring Data in Everyday Life	1st Workshop on Eye Tracking and Visualization	Rejuvenated Medical Visualization	Posters 8:30am-6pm
Session 2 10:30 AM 12:10 PM	LDAV Symposium	VAST Challenge	XData Tools	Visual Analytics in Healthcare	Personal Visualization: Exploring Data in Everyday Life	1st Workshop on Eye Tracking and Visualization	Rejuvenated Medical Visualization	
Session 3 2:00 PM 3:40 PM	LDAV Symposium	VAST Challenge	A Practical Intro to Data Science in Python	Visual Analytics in Healthcare	Business Vis 15	Perception and Cognition	Direct Volume Interaction for Visual Data Analysis	★ ★ ★ ★ Symposia Reception & Poster Viewing 7-9pm
Session 4 4:15 PM 5:55 PM	LDAV Symposium	VAST Challenge	A Practical Intro to Data Science in Python	Visual Analytics in Healthcare	Business Vis 15	Perception and Cognition	Direct Volume Interaction for Visual Data Analysis	

MONDAY 26.OCT

	GRAND	STATE	RED	EMPIRE	HONORÉ	ADAMS	MONROE	EXHIBIT
Session 1 8:30 AM 10:10 AM	LDAV Symposium	VizSec Symposium	VDS Symposium	Visualization for Decision Making Under Uncertainty	Exploring Graphs at Scale	Interactive GPU-based Visualization of Large Dynamic Particle Data	Applying Color Theory to VIS	Posters 8:30am-6pm
Session 2 10:30 AM 12:10 PM	LDAV Symposium	VizSec Symposium	VDS Symposium	Visualization for Decision Making Under Uncertainty	Exploring Graphs at Scale	Interactive GPU-based Visualization of Large Dynamic Particle Data	Applying Color Theory to VIS	
Session 3 2:00 PM 3:40 PM	LDAV Symposium	VizSec Symposium	VDS Symposium	Visualization for Decision Making Under Uncertainty	Data Systems for Interactive Analysis	The ParaView Tutorial	Visualization Analysis and Design	
Session 4 4:15 PM 5:55 PM	LDAV Symposium	VizSec Symposium	VDS Symposium	Visualization for Decision Making Under Uncertainty	Data Systems for Interactive Analysis	The ParaView Tutorial	Visualization Analysis and Design	
				Practitioner Event 7-9pm ★				

TUESDAY 27.OCT

	GRAND	STATE	RED	EMPIRE	EXHIBIT
Session 1 8:00 AM 10:10 AM	Welcome and VGTC Technical Awards (8:00am) ★ VIS Keynote (8:30-9:30am) ★ VIS FF (Tue) (9:30-10:10am) ★				
Session 2 10:30 AM 12:10 PM	Intro + Projections	Intro + Biomedical and Molecular Visualization (I)	Intro + Visual Analytics of Temporal Network Data		Posters 8:30am-6pm
Session 3 2:00 PM 3:40 PM	Color Mapping in VIS: Perspectives on Optimal Solutions	Comparative, Ensemble and Uncertainty Visualization	Managing Visual Analytics Process		★ ★ ★ ★ Exhibits 10am-6pm
Session 4 4:15 PM 5:55 PM	Networks	Reconstruction, Rendering and Evaluation	Platforms of Visual Analytics	Vis in the Real World	
			VIS FF (Wed) (6:15-7:00pm) ★	VISAP'15 Arts Program Opening (7:00-9:00pm) LeRoy Neiman Center ★	

InfoVis SciVis VAST VISAP CG&A Supporters

Panel SAIC LeRoy Neiman Center 37 S. Wabash Ave. (Across the street)

WEDNESDAY 28.OCT

	GRAND	STATE	RED	EMPIRE	EXHIBIT
Session 1 8:30 AM 10:10 AM	Applications	Tasks and Applications	Visual Analytics in Medicine and Healthcare		
Session 2 10:30 AM 12:10 PM	Design Studies and Methodology	Feature Extraction and Flows	Complementing Visual and Algorithmic Analysis	VISAP Papers #1	Posters 8:30am-6pm
	Creative Challenges at the Intersections of Visualization Research and New Media Arts (1-2pm) LeRoy Neiman Center				****
Session 3 2:00 PM 3:40 PM	Perception	Solved Problems in Visualization	Visual Analytics of Movement and Transport Data	Personal Visualization	Exhibits 10am-6pm
Session 4 4:15 PM 5:55 PM	Supporter Presentation Session	Maps, Geometry and Terrain	Uncertainty, Correlation, and Causality	Could Visualization Provide a Pathway to STEM?	
	VIS Banquet and Service Awards (7:30-10:00pm)		VIS FF (Thu+Fri) (6:15-7:00pm)		Exhibits & Poster Viewing (7:00-8:00pm)

THURSDAY 29.OCT

	GRAND	STATE	RED	EMPIRE	EXHIBIT
Session 1 8:30 AM 10:10 AM	Human Reasoning	Interfaces, Languages and Systems	Visual Analytics of Textual Data (I)		
Session 2 10:30 AM 12:10 PM	Interactive Systems	Vectors, Accelera-tion, and Hardware	Visual Analytics of Social Media Data	VISAP Papers #2	Posters 8:30am-6pm
				VIS 2016 kick-off (open to all)	****
Session 3 2:00 PM 3:40 PM	Techniques	Multivariate and Tensor Visualization	The Professional Ecology of Visualization	Application-Tailored Visualizations	Exhibits 10am-6pm
Session 4 4:15 PM 5:55 PM	Multidimensional Visualization	Vis: The Next Generation	Visual Analytics in Design and Development (II)	SciVis Contest	

FRIDAY 30.OCT

	GRAND	STATE	RED	EMPIRE
Session 1 8:30 AM 10:10 AM	Time	Biomedical and Molecular Visualization (II)	Visual Analytics of Textual Data (II)	Business Intelligence Visualization and Displays
Session 2 10:30 AM 12:00 PM	VIS Capstone (10:30-11:30am)			
	VIS Closing (11:30am-12:00pm)			

PROGRAM DETAILS

Sunday, 25 October

SUNDAY

Full Day

Workshop (8:30am–5:55pm) — State

VAST Challenge

ORGANIZERS: Kristin Cook, Georges Grinstein, Mark Whiting

The Visual Analytics Science and Technology (VAST) Challenge is an annual contest with the goal of advancing the field of visual analytics through competition. The VAST Challenge is designed to help researchers understand how their software would be used in a novel analytic task and determine if their data transformations, visualizations, and interactions would be beneficial for particular analytic tasks. VAST Challenge problems provide researchers with realistic tasks and data sets for evaluating their software, as well as an opportunity to advance the field by solving more complex problems. This year's VAST Challenge presents two related mini-challenges and an overall Grand Challenge, and we encouraged participants to create innovative visualizations to support their analyses of the data to solve a mystery.

The VAST Challenge workshop brings together organizers, participants, and conference attendees to discuss the innovative submissions to this year's challenge. The workshop will feature sessions dedicated to each of the mini-challenges and the grand challenge. The 2015 award winners and honorable mention winners will present their submissions. In addition, the meeting will feature a poster session and a participant feedback session. This workshop is open to all IEEE VIS attendees.

Workshop (8:30am–5:55pm) — Empire

Visual Analytics in Healthcare ★

ORGANIZERS: Theresia Gschwandtner, Adam Perer, Jürgen Bernard

As medical organizations move to electronic medical records and increasingly embrace health information technology, the amount of data available is growing at an unprecedented rate. This vast amount of healthcare data poses a challenging task (1) for medical experts trying to make sense of patients' conditions and understanding their medical history, (2) for patients trying to make sense of their health data, and (3) for analysts to conduct outcome research, such as exploring the effectiveness of different approaches. Visual Analytics and Information Visualization have the potential to provide great benefits to healthcare providers, patients, and data analysts. Given the strong turnout of this workshop in previous years, we propose to host a follow-up workshop at IEEE VIS 2015. In this workshop participants will have the opportunity to present ongoing work with short papers and demonstrations, and discuss user needs and challenges.

Half Day

Tutorial (8:30am–12:10pm) — Red

XData Tools

SPEAKERS: Joseph Cottam, Peter Wang, Jeff Baumes, Jeff Heer

Visualization and analytical tools face major challenges as datasets become larger and more dynamic. The Defense Advance Research Projects Agency (DARPA) XData initiative is funding projects to meet those challenges. The entire XData catalog projects provide a wide spectrum of analytical and visualization tools. This tutorial will introduce participants to several tools of particular interest to the visualization and visual analytics communities. The selected tools are Bokeh, Tangelo, Vega, Lyra and Blaze. These tools incorporate current research in ready-to-use packages and represent excellent avenues for moving research into practice. This tutorial will provide a basic orientation for each tool and showcase interoperation between them.

Workshop (8:30am–12:10pm) — Honoré

Personal Visualization: Expoloring Data in Everyday Life

ORGANIZERS: Charles Perin, Alice Thudt, Melanie Tory, Wesley Willett, Sheelagh Carpendale

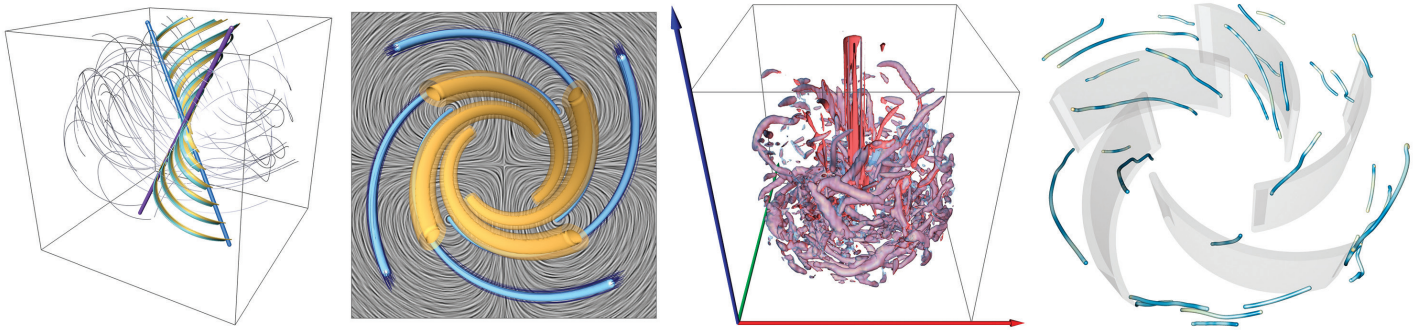
Individuals recently began to seek how they can explore and understand the data that affect their personal lives. This includes biometric personal data such as health-related data, self-monitoring, sports performance, and data from online social networks, energy consumption, and photo collections. The main purpose of such data understanding is generating insights, and eventually making decisions to improve one's life, the ultimate purpose of visualization. Assessing individual's needs in the context of their personal data and designing appropriate tools to support visualization and analysis of this data is a crucial and emergent challenge. This workshop is intended to gather academics and industries concerned by the emergent topic of personal visualization and personal visual analytics. The intended outcomes of the workshop are 1) to gather the community working on the topic of personal visualization, and 2) to converge on a research agenda for the community.

Workshop (8:30am–12:10pm) — Adams

1st Workshop on Eye Tracking and Visualization

ORGANIZERS: Daniel Weiskopf, Michael Burch, Albrecht Schmidt, Brian Fisher, Lewis Chuang

★ Recommended for Practitioners



There is a growing interest in eye tracking as a research method in many communities, including information visualization, scientific visualization, visual analytics, but also in human-computer interaction, applied perception, psychology, cognitive science, security, and mixed reality. Progress in hardware technology and the reduction of costs for eye tracking devices have made this analysis technique accessible to a large population of researchers. Recording the observer's gaze can reveal how dynamic graphical displays are visually accessed and which information are processed in real time. Nonetheless, standardized practices for technical implementations and data interpretation remain unresolved. With this Workshop on Eye Tracking and Visualization (ETVIS), we intend to build a community of eye tracking researchers within the visualization community, covering information visualization, scientific visualization, and visual analytics. We also aim to establish connections to related fields, in particular, in human-computer interaction, cognitive science, and psychology. This will promote a robust exchange of established practices and innovative use scenarios.

Tutorial (8:30am–12:10pm) Monroe

Rejuvenated Medical Visualization—Large-Scale, Whole-Body Visualization, Visualizing Physiology, Non-standard imaging and Simulations, and Cohort Studies

SPEAKERS: Steffen Oeltze-Jafra, Anders Ynnerman, Stefan Bruckner, Helwig Hauser

Medicine is one of the primary drivers of visualization research and medical visualization (MedViz) is a vibrant and successful field with a tradition of dozens of years. Traditionally, a lot of MedViz research has been focused on the visualization of a single, uni-modal patient dataset, being usually defined on a regular grid in 3D and capturing a selected part of the human anatomy. As a prominent example, volume rendering has been extensively studied, together with advanced lighting simulation, etc. In recent years, however, the most pressing challenges in MedViz have broadened, not at the least paralleling new developments in image acquisition, and being associated with a growing data complexity, and advances in medical diagnosis and patient treatment. It is now becoming increasingly common, that several datasets are acquired, also at different points in time, and that in-vivo information, related to physiology, is complementing the more traditional anatomical information. Different imaging modalities are applied and whole-body scans facilitate the screening for disease and amplify the opportunities of forensic pathology. Data may also be measured or computed in a numerical simulation over complex grids, e.g., in ultrasound imaging or in the simulation of blood flow in cerebral and aortic aneurysms. All this data needs to be integrated with the anatomical scans. While traditional MedViz usually focuses on data of a single patient, the large data pools that are acquired in longitudinal cohort studies, for example, in epidemiology, involving hundreds to thousands of individuals (the cohort) pose tremendous new challenges. These include the combined visualization of image and non-image data as well as the integrated visualization of heterogeneous data. The effective and efficient interactive exploration of large medical data requires innovative technology and dedicated interaction techniques such as table-top user interfaces and gesture-based interaction.

Lunch Break (12:10pm–2:00pm)

Tutorial (2:00pm–5:55pm) Red

A Practical Introduction to Data Science in Python ✶

SPEAKERS: Stéfan van der Walt

From a wider perspective, Data Science be seen as the management and interpretation of data through computation and statistics. This tutorial highlights several of these core elements through an interactive computational workshop. To work with data, we need to access a data source, whereafter the data can be visualized to explore its structure. Based on intuitions gained about this structure, exploratory statistical analyses can then be made. Finally, more sophisticated machine learning models can be fit to the data to draw inferences and make predictions about data yet unseen. This tutorial systematically leads attendees through these steps by way of practical, real-world examples, augmented by hands-on computations in the Python language.

Workshop (2:00pm–5:55pm) Honoré

business|vis|15 ✶

ORGANIZERS: Rahul Basole, Steven Drucker, Jörn Kohlhammer, Jarke Van Wijk

Companies of all sizes (startups to incumbents), shapes (public, private, non-profit), and industries (manufacturing, energy, healthcare, finance, technology, education, tourism) are inundated by an accelerating tsunami of relevant business data. Converting these diverse and heterogenous data into actionable insights and better business outcomes is a pressing

and strategic challenge for all managers and decision makers. Despite the potential of visualization, existing applications are often limited to corporate dashboards. The real value is still untapped. With the growing prevalence of business analytics, what is the future of visualization in an increasingly data-driven business environment? How can visualizations be used to drive and augment business decisions? How do we bridge the gap between visualization research and practice? This half-day workshop will build on the momentum of the highly successful business|vis|14 workshop and aims to explore these questions. It will bring together researchers and practitioners interested in the design, development, and application of visualization and visual analytics to complex business problems. It will provide a fantastic opportunity for those engaged in this broad application domain to interact and share their experiences. Hopefully, it will spur a growing, focused subarea of data visualization for the future.

Tutorial (2:00pm–5:55pm) Adams

Perception and Cognition for Visualization, Visual Data Analysis, and Imaging

SPEAKER: Bernice Rogowitz

Imaging, visualization and computer graphics provide visual representations of data in order to communicate, provide insight and enhance problem solving. The human observer actively processes these visual representations using perceptual and cognitive mechanisms that have evolved over millions of years. The goal of this tutorial is to provide an introduction to these processing mechanisms, and to show how this knowledge can guide the decisions we make about how to represent data visually, how we visually represent patterns and relationships in data, and how we can use human pattern recognition to extract features in the data.

Tutorial (2:00pm–5:55pm) Monroe

Direct Volume Interaction for Visual Data Analysis

SPEAKERS: Alexander Wiebel, Tobias Isenberg, Stefan Bruckner, Timo Ropinski

Natural sciences, medicine and engineering are only a small selection of application domains where volumetric data, continuous as well as scattered, are close to ubiquitous. While the visualization of such data itself is not straightforward, interaction with and manipulation of volumetric data - essential aspects of effective data analysis - pose even further challenges. Due to the three-dimensional nature of the data, it is not straightforward how to select features, pick positions, segment regions or otherwise interact with the rendering or the data themselves in an intuitive manner. In this tutorial we will present state of the art approaches and methods for addressing these challenges with a special focus on the users' analysis and interaction tasks, as well as on the application of the methods in a large variety of application domains.

Symposia Reception & Poster Viewing Exhibit

(7pm-9pm)

LDAV Symposium Grand

CHAIRS: Kelly Gaither, Venkatram Vishwanath

Opening Remarks (8:30am-9:00am)

Plenary Presentation (9:00am-10:00am)

Playing Scales: Bridging the Scale Gap Between Visual Perception and Big Data

Speaker: T. Alan Keahey

Day 1 LDAV Fast Forward (10:00am-10:10am)

Break (10:10am–10:40am)

Feature Extraction and Tracking (10:40am-12:10pm)

In Situ Depth Maps Based Feature Extraction and Tracking

Yucong (Chris) Ye, Yang Wang, Robert Miller, Kwan-Liu Ma, Kenji Ono

Tracking Features in Embedded Surfaces: Understanding Extinction in Turbulent Combustion

Wathsala Widanagamaachchi, Pavol Klacansky, Hemanth Kolla, Ankit Bhagatwala, Jackie Chen, Valerio Pascucci, Peer-Timo Bremer

Fast Uncertainty-Driven Large-Scale Volume Feature Extraction on Desktop PCs

Jinrong Xie, Franz Sauer, Kwan-Liu Ma

Lunch Break (12:10pm–2:00pm)

Scientific Visualization Algorithms (2:00pm-3:40pm)

Cylindrical Acceleration Structures for Large Hexahedral Volume Visualization

Junpeng Wang, Mai Elshehaly, Yong Cao

Flying Edges: A High-Performance Scalable Isocontouring Algorithm

William Schroeder, Robert Maynard, Berk Geveci

Lagrangian Representations of Flow Fields with Parameter Curves

Roxana Bujack, Kenneth Joy

Coffee Break (3:40pm-4:15 pm)

Aggregation and Binning I (4:15pm-5:55pm)

A Compact Multivariate Histogram Representation for Query-Driven Visualization

Kewei Lu, Han-Wei Shen

A Visual Analytics Paradigm Enabling Trillion-Edge Graph Exploration

Pak Chung Wong, David Haglin, David Gillen, Daniel Chavarria, Vito Castellana, Cliff Joslyn, Alan Chappell, Song Zhang

Scalable Visualization of Discrete Velocity Decompositions Using Spatially Organized Histograms

Tyson Neuroth, Franz Sauer, Weixing Wang, Stephane Ethier, Kwan-Liu Ma

Full Day

Workshop (8:30am-5:55pm) — Empire

Visualization for Decision Making Under Uncertainty

ORGANIZERS: Kristin Potter, Ruediger Westermann, Christoph Heinzl, Mike Kirby, Ross Whitaker, Eduard Groller, Torsten Möller, Stefan Bruckner

The goal of this workshop is to call on the research community to discuss the state-of-the-art and research challenges for supporting modeling and decision making under uncertainty in the computational and data sciences. When creating visual tools for simulations, challenges exist in the uncertainty analysis (UA) of ensembles, the sensitivity analysis (SA) of input-output models, and the decision making process that requires the understanding of risk stemming from both UA and SA.

Over the last few years we have seen many different attempts to address these issues, and it is now time to review the achievements in the light of real-world applications. We therefore attempt to broaden the focus of uncertainty analysis to a more comprehensive approach to modeling and discuss the current and future requirements from an application-oriented perspective.

The workshop shall bring together researchers from visualization and scientific domains where uncertainty - whether it is model-based uncertainty or data-based uncertainty - needs to be analyzed to enable an improved predictability of relevant events as well as their sensitivity to specific input model parameterizations.

Half Day

Workshop (8:30am-12:10pm) — Honoré

Exploring Graphs At Scale (EGAS)

ORGANIZERS: Pak Chung Wong, David Haglin, David Bader, David Trimm

The workshop will explore the technical challenges and technology development opportunities of graph visual analytics found in the big data era with the goal of establishing a community of interest. Today's graph problems are increasingly multi-faceted and multi-disciplinary in nature. Many cutting-edge R&D efforts are conducted independently in disparate domains such as bioinformatics, cybersecurity, and predictive machine learning. Although technology transfers in big graph visualization are recognized and growing, there has been little progress in establishing a community strategy for sharing and building knowledge.

We invite researchers and practitioners with different interests to participate at the workshop by submitting position papers and, if accepted, presenting their ideas at the workshop co-located at IEEE VIS 2015. We agree that the data size that seems big today is different from what seemed big only a few years ago. While the workshop doesn't specify upper or lower bounds on the graph's size, we are particularly interested in emerging problems that challenge conventional wisdom in computation and interaction brought by the latest social-scale or web-scale graphs. This workshop is organized by a group of big graph analytics researchers and practitioners who share a common goal of establishing a substantial community to solve big problems with big graph data.

Tutorial (8:30am-12:10pm) — Adams

Interactive GPU-based Visualization of Large Dynamic Particle Data

SPEAKERS: Martin Falk, Sebastian Grottel, Michael Krone, Guido Reina

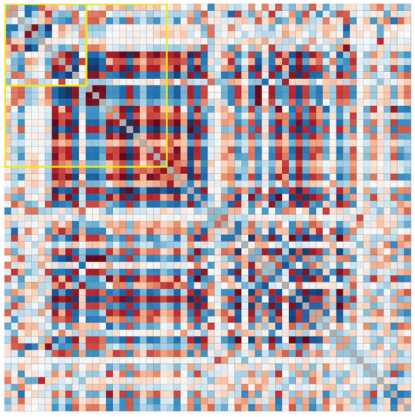
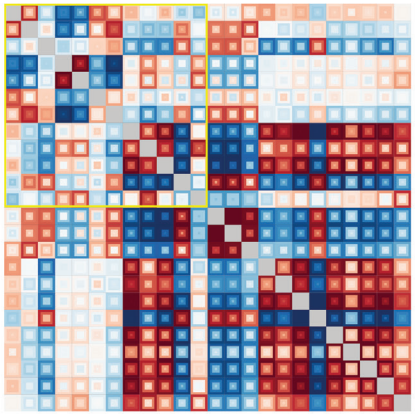
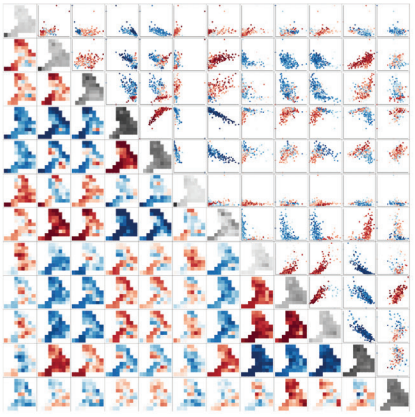
We propose a half-day tutorial that covers fundamental techniques for interactive particle-based visualization. Particle data typically originates from measurements and simulations in various fields such as life sciences or physics. Often, the particles are visualized directly, that is, by simple representants like spheres. Interactive rendering facilitates the exploration and visual analysis of the data. With increasing data set sizes in terms of particle numbers, interactive high-quality visualization is a challenging task. This is especially true for dynamic data or abstract representations that are based on the raw particle data. Our intermediate-level tutorial will cover direct particle visualization using simple glyphs as well as abstractions that are application-driven such as clustering and aggregation. It targets visualization researchers and developers who are interested in visualization techniques for large, dynamic particle-based data. We will focus on GPU-accelerated algorithms for high-performance rendering and data processing that run in real-time on modern desktop hardware. Consequently, we will discuss the implementation of said algorithms and the required data structures to make use of the capabilities of modern graphics APIs. Furthermore, we will discuss GPU-accelerated methods for the generation of application-dependent abstract representations. This includes various representations commonly used in application areas such as structural biology, systems biology, thermodynamics, and astrophysics.

Tutorial (8:30am-12:10pm) — Monroe

Applying Color Theory to VIS

SPEAKER: Theresa-Marie Rhyne

We examine the foundations of color theory & how these methods apply to building effective visualizations. We define color harmony & demonstrate the application of color harmony to case studies. Case studies include ensemble scientific visualizations, historic & new infographics, correlation in biological data, rainbow color deficiency safe examples, & time series animations. The Pantone Matching System, Munsell Color System and other hue systems are reviewed. The features of ColorBrewer, Adobe's Color app & Josef Albers "Interaction of Color" app are examined. We

also introduce “Gamut Mask” & “Color Proportions of an Image” analysis tools. Our tutorial concludes with a hands on session that teaches how to use online and mobile apps to successfully capture, analyze and store color schemes for future use in visual analytics. This includes the evaluations for color deficiencies using Coblis. These color suggestion tools are available online for your continued use in creating new visualizations. Please bring small JPEG examples of your visualizations for performing color analyses during the hands on session.

Workshop (2:00pm-5:55pm)
Honoré

Data Systems for Interactive Analysis (DSIA)

ORGANIZERS: Remco Chang, Danyel Fisher, Jeffrey Heer, Carlos Scheidegger

The goal of this workshop is to foster innovative research at the intersection of databases, machine learning, and interactive visualization. Database researchers have developed techniques for storing and querying massive amounts of data, including methods for distributed, streaming and approximate computation. Machine learning techniques provide ways to discover unexpected patterns and to automate and scale well-defined analysis procedures. Recent systems research has looked at how to develop novel database systems architectures to support the iterative, optimization-oriented workloads of machine learning algorithms.

Of course, both the inputs and outputs of these systems are ultimately driven by people, in support of analysis tasks. The life-cycle of data involves an iterative, interactive process of determining which questions to ask, the data to analyze, appropriate features and models, and interpreting results. In order to achieve better analysis outcomes, data processing systems require improved interfaces that account for the strengths and limitations of human perception and cognition. Meanwhile, to keep up with the rising tide of data, interactive visualization tools need to integrate more techniques from databases and machine learning.

In this workshop, we will explore the idea that the next-generation of database, machine learning, and interactive visualization systems should not be designed in isolation. For example, machine learning techniques might recommend improved data transformation and visual encoding decisions. Or, database query optimizers might take advantage of perceptual constraints, while prefetching methods reduce latency by modeling likely interactions.

This workshop seeks to jump start cross-pollination between these fields. The program will be split between invited talks from researchers in these communities, and speculative, ongoing work that straddles the areas. In addition, we will host a second session, off-site from the main VIS conference, where we will hold focused working groups for interested participants.

Tutorial (2:00pm-5:55pm)
Adams

The ParaView Tutorial

SPEAKERS: Kenneth Moreland, Alan Scott, David DeMarle

ParaView is a powerful open-source turnkey application for analyzing and visualizing large data sets in parallel. Designed to be configurable, extendible, and scalable, ParaView is built upon the Visualization Toolkit (VTK) to allow rapid deployment of visualization components. This tutorial presents the architecture of ParaView and the fundamentals of parallel visualization. Attendees will learn the basics of using ParaView for scientific visualization with hands-on lessons. The tutorial features detailed guidance on scripting and extending ParaView and an introduction to visualizing the massive simulations run on today’s supercomputers. Attendees should bring laptops to install ParaView and follow along with the demonstrations.

Tutorial (2:00pm-5:55pm)
Monroe

Visualization Analysis and Design

SPEAKER: Tamara Munzner

This introductory tutorial will provide a broad foundation for thinking systematically about visualization systems, built around the idea that becoming familiar with analyzing existing systems is a good springboard for designing new ones. The major data types of concern in visual analytics, information visualization, and scientific visualization will all be covered: tables, networks, and sampled spatial data. This tutorial is focused on data and task abstractions, and the design choices for visual encoding and interaction; it will not cover algorithms. No background in computer science or visualization is assumed.

★ Recommended for Practitioners

VizSec Symposium

State

CHAIR: Lane Harrison

Keynote (8:30am-9:30am)
SPEAKER: Greg Conti

VizSec Posters Fast Forward (9:30am-9:45am)

Visualizing Users Activity 1 (9:45am-10:10am)

BitConeView: Visualization of Flows in the Bitcoin Transaction Graph
Giuseppe Di Battista, Valentino Di Donato, Maurizio Patrignani, Maurizio Pizzonia, Vincenzo Roselli, and Roberto Tamassia

Visualizing Users Activity 2 (10:30am-11:20pm)

Discovery of Rating Fraud with Real-Time Streaming Visual Analytics
Kodzo Webga and Aidong Lu

Visualizing the Insider Threat: Challenges and Tools for Identifying Malicious User Activity
Philip A. Legg

Network Security 1 (11:20am-12:10pm)

SNAPS: Semantic Network Traffic Analysis through Projection and Selection
Bram C.M. Cappers and Jarke van Wijk

Visual Analytics for Cyber Red Teaming
Joseph Yuen, Benjamin Turnbull, and Justin Hernandez

Lunch Break (12:10pm–2:00pm)

Network Security 2 (2:00pm-3:40pm)

PERCIVAL: Proactive and rEactive attack and Response assessment for Cyber Incidents using Visual AnaLytics
Marco Angelini, Nicolas Prigent, and Giuseppe Santucci

Ocelot: User-Centered Design of a Decision Support Visualization for Network Quarantine
Dustin L. Arendt, Russ Burtner, Daniel M. Best, Nathan D. Bos, John R. Gersh, Christine D. Piatko, and Celeste Lyn Paul

Contextual Network Navigation to Provide Situational Awareness for Network Administrators
Cameron C. Gray, Panagiotis D. Ritsos, Jonathan C. Roberts

Ensemble Visualization For Cyber Situation Awareness of Network Security Data
Lihua Hao, Christopher G. Healey, and Steve E. Hutchinson

Coffee Break (3:40pm-4:15 pm)

Models and Methods (4:15pm-5:05pm)

A Visual Analytics Loop for Supporting Model Development
Simon Walton, Eamonn Maguire, and Min Chen

Unlocking User-Centered Design Methods for Building Cyber Security Visualizations
Sean McKenna, Diane Staheli, and Miriah Meyer

VDS Symposium

Red

CHAIRS: Daniel Keim, Hanspeter Pfister, and Cláudio Silva

Data Science and Visualization for Scientific Discovery (8:30am-10:10am)
SESSION CHAIR: Marc Streit

Visual Data Science - Advancing Science through Visual Reasoning
Torsten Möller

Visualization for Discovery
Jeff Heer

Visualization in Public Health
Rumi Chunara

Health and Spatio-Temporal Data (10:30am-12:00pm)
SESSION CHAIR: Hanspeter Pfister

Panel I: Challenges in Visualization for Data Science
Torsten Möller, Jeff Heer, and Rumi Chunara
Moderator: Hanspeter Pfister

Paper: Service Oriented Development of Information Visualization of the Electronic Health Records for Population Data Set
Jaehoon Lee, Thomas Oniki, Nathan Hulse, and Stanley Huff

Paper: RioBusData: Visual Data Analysis of Outlier Buses in Rio de Janeiro
Aline Bessa, Fernando de Mesentier Silva, Rodrigo Frassetto Nogueira, Enrico Bertini, and Juliana Freire

Paper: Quality of Movement Data: from Data Properties to Problem Detection
Gennady Andrienko, Natalia Andrienko, and Georg Fuchs

Journalism, Sports, and Data Exploration (2:00pm-3:30pm)
SESSION CHAIR: Alexander Lex

Doing Data Science at News Corp
Rachel Schutt

Space, Time, and Skill: Understanding High Performance Sport
Luke Bornn

Interactive Online Data Exploration and Analytics
Feifei Li

Databases and Algorithms (4:00pm-5:50pm)
SESSION CHAIR: Cláudio T. Silva

Panel II: Challenges in Visualization for Data Science
Rachel Schutt, Luke Bornn, and Feifei Li
Moderator: Cláudio T. Silva

Paper: Off-Screen Visualization Perspectives: Tasks and Challenges
Dominik Jaekle, Bum Chul Kwon, and Daniel A. Keim

Paper: Comparing Dimensionality Reduction Methods Using Data Descriptor Landscapes
Bastian Rieck and Heike Leitte

Paper: Comprehension of Data/Model Differences through Diagrammatic Reasoning
Kim Frederic Albrecht, Burcu Yucesoy
Paper: Feature-Based Visual Exploration of Text Classification
Florian Stoffel, Lucie Flekova, Daniela Oelke, Iryna Gurevych, Daniel A. Keim

LDAV Symposium

Grand

Welcome and Day 2 Remarks
(8:30am-9:00am)

Plenary Presentation (9:00am-10:00am)
XSEDE and the National Cyberinfrastructure
Speaker: John Towns

Day 2 LDAV Fast Forward (10:00am-10:10am)

Break (10:10am–10:40am)

Exascale Visualization
(10:40am-12:10pm)
Exploring Tradeoffs between Power and Performance for a Scientific Visualization Algorithm
Stephanie Labasan, Matthew Larsen, Hank Childs
Evaluating the Efficacy of Wavelet Configurations on Turbulent-Flow Data
Shaomeng Li, Kenny Gruchalla, Kristin Potter, John Clyne, Hank Childs
Utilizing Many-Core Accelerators for Halo and Center Finding within a Cosmology Simulation
Christopher Sewell, Li-ta Lo, Katrin Heitmann, Salman Habib, James Ahrens

Lunch Break (12:10pm–2:00pm)

Aggregation and Binning II
(2:00pm-3:40pm)
Large Interactive Visualization of Density Functions on Big Data Infrastructure
Alexandre Perrot, Romain Bourqui, Nicolas Hanusse, Frédéric Lalanne, David Auber
Bandlimited OLAP Cubes for Interactive Big Data Visualization
Caleb Reach, Chris North
A Visualization Pipeline for Large-Scale Tractography Data
James Kress, Erik Anderson, Hank Childs

Coffee Break (3:40pm-4:15 pm)

Panel
(4:15pm-5:15pm)
In Situ 2020: Predictions for the Future of In Situ Processing
Kelly Gaither (organizer), Jim Ahrens, Wes Bethel, Hank Childs, and Christoph Garth

Awards Ceremony and Closing Remarks
(5:15pm-5:45pm)

VIS

Empire

Practitioner Event: Visualization in Practice
(7:00pm-9:00pm)

High-Category Glyphs in Industry
Richard Brath
Visual Exploration in Surgery Monitoring for Coronary Vessels
Christina Gillmann, Thomas Wischgoll, and Hans Hagen
Workflow to Create Interactive Visualizations of Geographic Information Centered in Analysis Tasks
Juan C. Ibarra, Jose T. Hernandez, and Frederic Merienne
A Novel Distance Measure for Ocean Reconstruction from Sparse Observations Demonstrated on the Atlantic
Markus Kronenberger, Lorraine E. Lisiecki, Christopher Weber, Carlye Peterson, Geoffrey Gebbie, Howard J. Spero, Oliver Kreylos, Bernd Hamann, and Louise H. Kellogg, and Hans Hagen
Statistical Forecasting in the Energy Sector: Task Analysis and Lessons Learned from Deploying a Dashboard Solution
Thomas Muhlbacher, Clemens Arbesser, and Harald Piringer
Deploying Moored Profilers on the Ocean Floor
Carolina Nobre
Visualization for Error-Controlled Surface Reconstruction from Large Electron Microscopy Image Stacks
Julia Portl, Markus Reischl, Johannes Stegmaier, Rasmus Schroder, Ira V. Mang, and Heike Leitte
Pre-filtering of Turbulent Vector fields in the Geodynamo, Patrick Rudiger, Christopher Weber, Hiroaki Matsui, Eric Heien, Louise H. Kellogg, Bernd Hamann, and Hans Hagen
Visual Analytics for Improving Efficiency in Mining Operations
Gilad Saadoun, Peter Bak, and Jonathan Bnayahu
Analysis and Visualization of Clostridium Difficile Hospital In-Ward Transmissions
Margaret Varga, Caroline Varga, and Ben Huston

VIS Welcome
Grand State
(8:00am-8:15am)
CHAIRS: Michael E. Papka and Maxine D. Brown

Presentation of IEEE VGTC Technical Awards
(8:15am-8:30am)

VIS Keynote (8:30am-9:30am)
SPEAKER: Donna J. Cox

An Evolving Visual Language: Connecting General Audiences to Science through Data Visualization

Visualization of all types of data is a highly effective tool used by researchers to gain insight into natural phenomena and to communicate their findings. It is also an increasingly popular means of presenting large scientific datasets to the general public in informal educational settings such as museums and planetaria. Visualization has appeared in many forms and in many cultures throughout digital history and contributes to the evolving visual language of science.

Dr. Donna Cox and the Advanced Visualization Laboratory team at the National Center for Supercomputing Applications, University of Illinois, collaborate with science teams, writers, producers, educators, and media distribution professionals on content designed to engage a wide range of audiences. In the past 8 years alone, her collaborative educational and outreach projects have produced science narratives featuring data visualizations that have been viewed by more than 45 million people worldwide.

Cox leads an NSF-funded project to create scientific visualizations and then test audiences' understanding of the phenomenon that is being presented. Large-scale computational data present unique visualization challenges for producers of high-resolution, production-quality 3D IMAX movies; feature films; and museum fulldomes. In this keynote, Cox will provide a visual feast of major projects, including new digital fulldome museum shows and award-winning IMAX films.

VIS Fast Forward (Tues) (9:30am-10:10am)
SESSION CHAIRS: Christoph Garth, Luana Micallef, Tom Peterka

Coffee Break (10:10am–10:30am)

InfoVis
Grand

InfoVis Intro + Projections (10:30am-12:10pm)
SESSION CHAIR: Carlos Scheidegger

Optimal Sets of Projections of High-Dimensional Data J
Dirk J. Lehmann and Holger Theisel

A comparative study between RadViz and Star Coordinates J
Manuel Rubio-Sánchez, Laura Raya, Francisco Díaz, and Alberto Sanchez

Perception-based Evaluation of Projection Methods for Multidimensional Data Visualization T
Ronak Etemadpour, Robson Motta, Jose Gustavo de Souza Paiva, Rosane Minghim, Maria Cristina Ferreira de Oliveira, Lars Linsen

Probing Projections: Interaction Techniques for Interpreting Arrangements and Errors of Dimensionality Reductions J
Julian Stahnke, Marian Dork, Boris Muller, and Andreas Thom

SciVis
State

SciVis Intro + Biomedical and Molecular Visualization (I) (10:30am-12:10pm)
SESSION CHAIR: Thomas Wischgoll

Accurate Interactive Visualization of Large Deformations and Variability in Biomedical Image Ensembles J
Max Hermann, Anja C. Schunke, Thomas Schultz, and Reinhard Klein

Real-Time Molecular Visualization Supporting Diffuse Interreflections and Ambient Occlusion J
Robin Skånberg, Pere-Pau Vázquez, Victor Guallar, and Timo Ropinski

Occlusion-free Blood Flow Animation with Wall Thickness Visualization J
Kai Lawonn, Sylvia Glaßer, Anna Vilanova, Bernhard Preim, and Tobias Isenberg

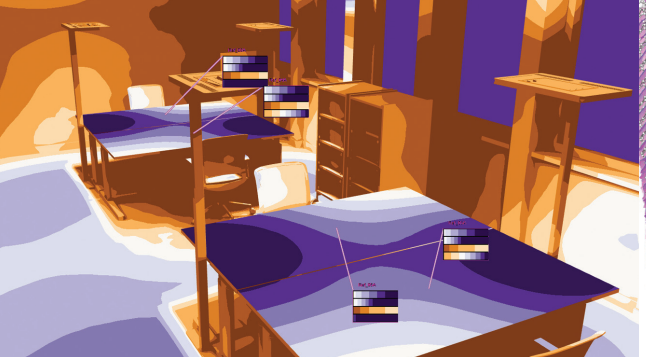
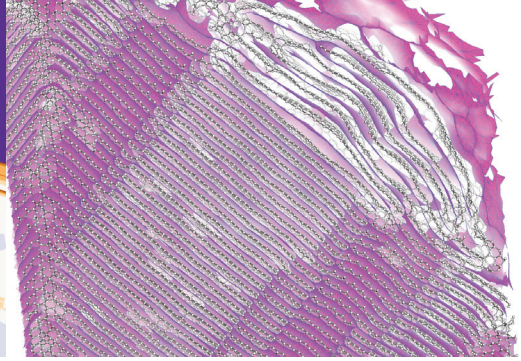
NeuroBlocks – Visual Tracking of Segmentation and Proofreading for Large Connectomics Projects J
Ali K. Al-Awami, Johanna Beyer, Daniel Haehn, Narayanan Kasthuri, Jeff W. Lichtman, Hanspeter Pfister, and Markus Hadwiger

VAST
Red

VAST Intro + Visual Analytics of Temporal Network Data (10:30am-12:10pm)
SESSION CHAIR: Enrico Bertini

Reducing Snapshots to Points: A Visual Analytics Approach to Dynamic Network Exploration J
Stef van den Elzen, Danny Holten, Jorik Blaas, and Jarke J. van Wijk

T TVCG paper J Journal paper, proceedings special issue C Conference track paper


TUESDAY

MobilityGraphs: Visual Analysis of Mass Mobility Dynamics via Spatio-Temporal Graphs and Clustering J
Tatiana von Landesberger, Felix Brodkorb, Philipp Roskosch, Natalia Andrienko, Gennady Andrienko, and Andreas Kerren

Wavelet-based Visualization of Time-Varying Data on Graphs C
Paola Valdivia, Fábio Dias, Fabiano Petronetto, Cláudio T. Silva, Luis Gustavo Nonato

MotionFlow: Visual Abstraction and Aggregation of Sequential Patterns in Human Motion Tracking Data J
Sujin Jang, Niklas Elmqvist, and Karthik Ramani

Lunch Break (12:10pm–2:00pm)

Digital Compass Blind Lunch

Panel — Grand
(2:00pm-3:40pm)

Color Mapping in VIS: Perspectives on Optimal Solutions
Theresa-Marie Rhyne (organizer), David Borland, Kenneth Moreland, Bernice Rogowitz, Francesca Samsel, Maureen Stone, Cynthia Brewer

In this panel, we highlight optimal solutions for designing and building color maps in visualization applications and presentations. Our panelists represent artists, software engineers, cartographers, color scientists, perceptual psychologists, and visualization researchers who have contributed effective solutions to applying color to data visualization. Each panelist will highlight their perspective as well as tips and tricks for color map solutions. Drawing on perspectives from many disciplines, the panel will identify gaps in our understanding about the use of color in visualization and will identify future research directions.

SciVis — State

Comparative, Ensemble and Uncertainty Visualization
(2:00pm-3:40pm)
SESSION CHAIR: Daniel Keefe

Streamline Variability Plots for Characterizing the Uncertainty in Vector Field Ensembles J
Florian Ferstl, Kai Bürger, and Rüdiger Westermann

Isosurface Visualization of Data with Nonparametric Models for Uncertainty J
Tushar Athawale, Elham Sakhaee, and Alireza Entezari

Effective Visualization of Temporal Ensembles J
Lihua Hao, Christopher G. Healey, and Steffen A. Bass

Glyph-based Comparative Visualization for Diffusion Tensor Fields J
Changgong Zhang, Thomas Schultz, Kai Lawonn, Elmar Eisemann, and Anna Vilanova

Multi-field Pattern Matching based on Sparse Feature Sampling J
Zhongjie Wang, Hans-Peter Seidel, and Tino Weinkauf

VAST — Red

Managing Visual Analytics Process
(2:00pm-3:40pm)
SESSION CHAIR: Brian Fisher

Mixed-Initiative Visual Analytics Using Task-Driven Recommendations C
Kristin Cook, Nick Cramer, David Israel, Michael Wolverton, Joe Bruce, Russ Burtner, Alex Endert

Characterizing Provenance in Visualization and Data Analysis: An Organizational Framework of Provenance Types and Purposes J
Eric D. Ragan, Alex Endert, Jibonananda Sanyal, and Jian Chen

SensePath: Understanding the Sensemaking Process through Analytic Provenance J
Phong H. Nguyen, Kai Xu, Ashley Wheat, B.L. William Wong, Simon Attfield, and Bob Fields

A Case Study Using Visualization Interaction Logs and Insight Metrics to Understand How Analysts Arrive at Insights J
Hua Guo, Steven R. Gomez, Caroline Ziemkiewicz, and David H. Laidlaw

VA²: A Visual Analytics Approach for Evaluating Visual Analytics Applications J
Tanja Blascheck, Markus John, Kuno Kurzhals, Steffen Koch, and Thomas Ertl

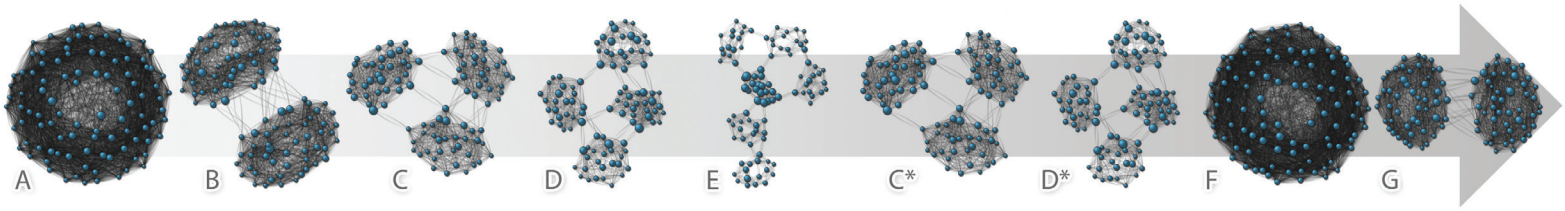
Coffee Break (3:40pm-4:15 pm)

InfoVis — Grand

Networks
(4:15pm-5:55pm)
SESSION CHAIR: David Auber

SchemeLens: A Content-Aware Vector-Based Fisheye Technique for Navigating Large Systems Diagrams J
Aurélie Cohé, Bastien Liutkus, Gilles Bailly, James Eagan, and Eric Lecolinet

★ Recommended for Practitioners



High-Quality Ultra-Compact Grid Layout of Grouped Networks J
Vahan Yoghourdjian, Tim Dwyer, Graeme Gange, Steve Kieffer, Karsten Klein, and Kim Marriott

HOLA: Human-like Orthogonal Network Layout J
Steve Kieffer, Tim Dwyer, Kim Marriott, and Michael Wybrow

AmbiguityVis: Visualization of Ambiguity in Graph Layouts J
Yong Wang, Qiaomu Shen, Daniel Archambault, Zhiguang Zhou, Min Zhu, Sixiao Yang, and Huamin Qu

Representing Uncertainty in Graph Edges: An Evaluation of Paired Visual Variables T
Hua Guo, Jeff Huang, David H. Laidlaw

SciVis — State

Reconstruction, Rendering and Evaluation
(4:15pm-5:55pm)
SESSION CHAIR: Xiaoru Yuan

Towards an Understanding of Mobile Touch Navigation in a Stereoscopic Viewing Environment for 3D Data Exploration T
David López, Lora Oehlberg, Candemir Doger, Tobias Isenberg

Reconstruction and Visualization of Coordinated 3D Cell Migration Based on Optical Flow J
Christopher P. Kappe, Lucas Schütz, Stefan Gunther, Lars Hufnagel, Steffen Lemke, and Heike Leitte

Gaze Stripes: Image-Based Visualization of Eye Tracking Data J
Kuno Kurzhals, Marcel Hlawatsch, Florian Heimerl, Michael Burch, Thomas Ertl, and Daniel Weiskopf

Anisotropic Ambient Volume Shading J
Marco Ament and Carsten Dachsbacher

JiTTree: A Just-in-Time Compiled Sparse GPU Volume Data Structure J
Matthias Labschütz, Stefan Bruckner, M. Eduard Gröller, Markus Hadwiger, and Peter Rautek

VAST — Red

Platforms of Visual Analytics
(4:15pm-5:55pm)
SESSION CHAIR: Chris Weaver

Personal Visualization and Personal Visual Analytics T
Dandan Huang, Melanie Tory, Bon Adriel Aseniero, Lyn Bartram, Scott Bateman, Sheelagh Carpendale, Anthony Tang, Rob Woodbury

Collaborative Visual Analysis with RCloud C
Carlos Scheidegger, Gordon Woodhull, Stephen North, Simon Urbanek

VEEVVIE: Visual Explorer for Empirical Visualization, VR and Interaction Experiments J
C. Papadopoulos, I. Gutenko, and A. E. Kaufman

Four Considerations for Supporting Visual Analysis in Display Ecologies C
Haeyong Chung, Sarang Joshi, Chris North, Jian Chen

Industry Panel — Grand

Visualization in the Real World: Assembling Teams and Systems to Create Visualization-Centric Solutions ✶
(4:15pm-5:55pm)
Alan Keahey (organizer), Phil Charron, Jen Christiansen, Craig Lawrence, Dean Malmgren, Sridhar Potenini

As visualization applications become more sophisticated and widespread, there has been increasing need to have it integrate well with other areas of team and system development. User Experience, Graphic Design, ETL Pipelines, Analytics, Computational Linguistics, Optimizers, Big Data Stacks and Hardware are common areas where tighter integration is desired. In addition, there are often requirements or opportunities for the visualizations to reflect deeper knowledge of the application domain.
These needs for tighter integration present a challenge for building a team that is able to address all aspects when delivering a solution that includes a significant visualization capability. It is not sufficient to simply add a visualization person or system to the project, rather there needs to be support and coordination between the areas. Conceptually we can think of these other areas or spheres as foundation requirements for delivering visualization, which can be visually represented as a pyramid with visualization at the apex.

VIS Fast Forward (Wed) — Red
(6:15pm-7:00pm)

VISAP — Leroy Neiman Center

Art Program Opening
(7:00pm-9:00pm)
CHAIRS: Angus Forbes, Fanny Chevalier, Daria Tsoupikova

✶ ✶ ✶ ✶

TUESDAY

T TVCG paper J Journal paper, proceedings special issue C Conference track paper

Wednesday, 28 October

WEDNESDAY

InfoVis — Grand

Applications (8:30am-10:10am)

SESSION CHAIR: Robert Kosara

Visual Mementos: Reflecting Memories with Personal Data J
Alice Thudt, Dominikus Baur, Samuel Huron, and Sheelagh Carpendale

Visualization, Selection, and Analysis of Traffic Flows J
Roeland Scheepens, Christophe Hurter, Huub van de Wetering, and Jarke J. van Wijk

Visually Comparing Weather Features in Forecasts J
P. Samuel Quinan and Miriah Meyer

Vials: Visualizing Alternative Splicing of Genes
Hendrik Strobelt, Bilal Alsallakh, Joseph Botros, Brant Peterson, Mark Borowsky, Hanspeter Pfister, and Alexander Lex

TimeSpan: Using Visualization to Explore Temporal Multi-dimensional Data of Stroke Patients J
Mona Hosseinkhani Loorak, Charles Perin, Noreen Kamal, Michael Hill, and Sheelagh Carpendale

SciVis — State

Tasks and Applications
(8:30am-10:10am)

SESSION CHAIR: Venkat Vishwanath

A Classification of User Tasks in Visual Analysis of Volume Data C
Bireswar Laha, Doug Bowman, David Laidlaw, John Socha

Using Maximum Topology Matching to Explore Differences in Species Distribution Models C
Jorge Poco, Harish Doraiswamy, Marian Talbert, Jeffrey Morisette, Cláudio T. Silva

Visual Verification of Space Weather Ensemble Simulations C
Alexander Bock, Asher Pembroke, M. Leila Mays, Lutz Rastaetter, Anders Ynnerman, Timo Ropinski

A Visual Voting Framework for Weather Forecast Calibration C
Hongsen Liao, Yingcai Wu, Li Chen, Thomas M. Hamill, Yunhai Wang, Kan Dai, Hui Zhang, Wei Chen

Real-Time Uncertainty Visualization for B-Mode Ultrasound C
Christian Schulte zu Berge, Denis Declara, Christoph Hennersperger, Maximilian Baust, Nassir Navab

VAST — Red

Visual Analytics in Medicine and Healthcare
(8:30am-10:10am)

SESSION CHAIR: Rita Borgo

VisOHC: Designing Visual Analytics for Online Health Communities J
Bum Chul Kwon, Sung-Hee Kim, Sukwon Lee, Jaegul Choo, Jina Huh, and Ji Soo Yi

3D Regression Heat Map Analysis of Population Study Data J
Paul Klemm, Kai Lawonn, Sylvia Glaßer, Uli Niemann, Katrin Hegenscheid, Henry Volzke, and Bernhard Preim

Supporting Iterative Cohort Construction with Visual Temporal Queries J
Josua Krause, Adam Perer, and Harry Stavropoulos

PhenoBlocks: Phenotype Comparison Visualizations J
Michael Glueck, Peter Hamilton, Fanny Chevalier, Simon Breslav, Azam Khan, Daniel Wigdor, and Michael Brudno

Integrating Predictive Analytics into a Spatio-Temporal Epidemic Simulation C
Chris Bryan, Xue Wu, Susan Mniszewski, Kwan-Liu Ma

Coffee Break (10:10am–10:30am)

InfoVis — Grand

Design Studies and Methodology
(10:30am-12:10pm)

SESSION CHAIR: Michael Sedlmair

Sketching Designs using the Five Design-Sheet Methodology J
Jonathan C. Roberts, Chris Headleand, and Panagiotis D. Ritsos

Bridging Theory with Practice: An Exploratory Study of Visualization Use and Design for Climate Model Comparison T
Aritra Dasgupta, Jorge Poco, Yaxing Wei, Robert Cook, Enrico Bertini, Claudio T. Silva

Speculative Practises: Utilizing InfoVis to Explore Untapped Literary Collections J
Uta Hinrichs, Stefania Forlini, and Bridget Moynihan

Poemage: Visualizing the Sonic Topology of a Poem J
Nina McCurdy, Julie Lein, Katharine Coles, and Miriah Meyer

Matches, Mismatches, and Methods: Multiple-View Workflows for Energy Portfolio Analysis J
Matthew Brehmer, Jocelyn Ng, Kevin Tate, and Tamara Munzner

SciVis — State

Feature Extraction and Flows (10:30am-12:10pm)

SESSION CHAIR: Daniel Weiskopf

Rotation Invariant Vortices for Flow Visualization J
Tobias Günther, Maik Schulze, and Holger Theisel

★ Recommended for Practitioners

Extracting, Tracking, and Visualizing Magnetic Flux Vortices in 3D Complex-Valued Superconductor Simulation Data J
Hanqi Guo, Carolyn L. Phillips, Tom Peterka, Dmitry Karpeyev, and Andreas Glatz

Distribution Driven Extraction and Tracking of Features for Time-Varying Data Analysis J
Soumya Dutta and Han-Wei Shen

Visualization and Analysis of Rotating Stall for Transonic Jet Engine Simulation J
Chun-Ming Chen, Soumya Dutta, Xiaotong Liu, Gregory Heinlein, Han-Wei Shen, and Jen-Ping Chen

In Situ Eddy Analysis in a High-Resolution Ocean Climate Model J
Jonathan Woodring, Mark Petersen, Andre Schmeißer, John Patchett, James Ahrens, and Hans Hagen

VAST — Red

Complementing Visual and Algorithmic Analysis (10:30am-12:10pm)

SESSION CHAIR: Remco Chang

The Data Context Map: Fusing Data and Attributes into a Unified Display J
Shenghui Cheng and Klaus Mueller

InterAxis: Steering Scatterplot Axes via Observation-Level Interaction J
Hannah Kim, Jaegul Choo, Haesun Park, and Alex Endert

Temporal MDS Plots for Analysis of Multivariate Data J
Dominik Jäckle, Fabian Fischer, Tobias Schreck, and Daniel A. Keim

Visual Analytics for Development and Evaluation of Order Selection Criteria for Autoregressive Processes J
Thomas Löwe, Emmy-Charlotte Förster, Georgia Albuquerque, Jens-Peter Kreiss, and Marcus Magnor

Supporting Activity Recognition by Visual Analytics C
Martin Röhlig, Martin Luboschik, Markus Bögl, Frank Krüger, Bilal Alsallakh, Silvia Miksch, Thomas Kirste, Heidrun Schumann

VISAP — Empire

Papers Track, Session I (10:30am-12:10pm)

SESSION CHAIRS: Angus Forbes, Fanny Chevalier, Daria Tsoupikova

Wrongfully Right: An Exploration of Figurative Metaphors in Visualization
Pedro Cruz

Endogenous Biologically-Inspired Visualization Immersed within an Art of Complex Systems
Haru Ji and Graham Wakefield

Climate Prisms: The Arctic - Connecting Climate Research and Climate Modeling via the Language of Art
Francesca Samsel, Linda Deck, and Bruce Campbell

Lunch Break (12:10pm–2:00pm)

Digital Compass Blind Lunch

VISAP Panel — Leroy Neiman Center

(1:00pm-2:00pm) Creative Challenges at the Intersections of Visualization Research and New Media Arts

Angus Forbes (organizer), Eduardo Kac, Donna Cox, Dan Sandin, and Jo Wood

This panel presents perspectives on the interconnections between art and research from established and emerging artists, and features Illinois-based pioneers Donna Cox (NCSA's Advanced Visualization Lab), Eduardo Kac (SAIC's Art and Technology Dept), and Dan Sandin (UIC's Electronic Visualization Lab), along with additional selected artists from the VISAP'15 Data Improvisations exhibition.

Each panelist will introduce their own work and discuss the primary research interests that motivate their creative outputs. The panel will investigate a range of questions about the possibilities of contemporary practice, such as: How can artistic explorations offer insight into thinking about the effective representation of complex data in visualization research contexts? Can advances in visualization and visual analytics research present new opportunities for artists to think about the creative coupling of data to meaning?

The "Creative Challenges" panel is part of the VISAP'15 activities, and is open to the public as well as IEEE VIS conference attendees.

InfoVis — Grand

Perception (2:00pm-3:40pm)

SESSION CHAIR: Heidi Lam

Spatial Reasoning and Data Displays J
Susan VanderPlas and Heike Hofmann

Beyond Weber's Law: A Second Look at Ranking Visualizations of Correlation J
Matthew Kay and Jeffrey Heer

A Psychophysical Investigation of Size as a Physical Variable J
Yvonne Jansen and Kasper Hornbæk

Guidelines for Effective Usage of Text Highlighting Techniques J
Hendrik Strobelt, Daniela Oelke, Bum Chul Kwon, Tobias Schreck, and Hanspeter Pfister

Comparing Color and Leader Line Highlighting Strategies in Coordinated View Geovisualizations T
Amy L. Griffin, Anthony C. Robinson

T TVCG paper J Journal paper, proceedings special issue C Conference track paper

Panel — State

(2:00pm-3:40pm)

Solved Problems in Visualization

Robert S Laramee (organizer), Thomas Ertl, Chris Johnson, Robert Moorhead, Penny Rheingans, William Ribarsky

Evaluation, solved and unsolved problems, and future directions are popular themes pervading the visualization research community over the last decade. The top unsolved problems in both scientific and information visualization was the subject of an IEEE Visualization Conference panel in 2004 (Rhyne et al 2004). The future of graphics hardware was another important topic of discussion the same year (Johnson et al 2004). The subject of how to evaluate visualization returned a few years later (House et al., 2005, Van Wijk 2005). Chris Johnson published a list of top problems in scientific visualization research (Johnson 2004) in 2004. This was followed up by report of both past achievements and future challenges in visualization research as well as financial support recommendations to the National Science Foundation (NSF) and National Institute of Health (NIH) (Johnson et al 2006). C. Chen published the first list of top unsolved information visualization problems (Chen 2005) in 2005. Future research directions in topology-based visualization were also a major theme of a workshop on topology-based visualization methods (Hauser et al., 2005, Scheuermann et al., 2005). Laramee and Kosara published a list of top future challenges in human-centered visualization (Laramee and Kosara 2007) in 2007. Laramee et al presented a list of top unsolved problems and future challenges in multi- field visualization (Laramee et al., 2014). These pervasive themes coincide roughly with the 20th anniversary of what is often recognized as the start of visualization in computing as a distinct field of research (McCormick et al., 1987).

VAST — Red

Visual Analytics of Movement and Transport Data (2:00pm-3:40pm) ★

SESSION CHAIR: Jörn Kohlhammer

A Methodology for Simplification and Thematic Enhancement of Trajectories T

Katerina Vrotsou, Halldor Janetzko, Carlo Navarra, Georg Fuchs, David Spretke, Florian Mansmann, Natalia Andrienko, Gennady Andrienko

TrajGraph: A Graph-Based Visual Analytics Approach to Studying Urban Network Centralities Using Taxi Trajectory Data J

Xiaoke Huang, Ye Zhao, Jing Yang, Chong Zhang, Chao Ma, and Xinyue Ye

iVizTRANS: Interactive Visual Learning for Home and Work Place Detection from Massive Public Transportation Data C

Liang Yu, Wei Wu, Xiaohui Li, Guangxia Li, Wee Siong Ng, See Kiong Ng, Zhongwen Huang, Anushiya Arunan, Hui Min Watt

AllAboard: Visual Exploration of Cellphone Mobility Data to Optimise Public Transport T

Giusy di Lorenzo, Marco Luca Sbodio, Francesco Calabrese, Michele Berlingerio, Fabio Pinelli, Rahul Nair

Visually Exploring Transportation Schedules J

Cesar Palomo, Zhan Guo, Cláudio T. Silva, and Juliana Freire

CG&A — Empire

Personal Visualization (2:00pm-3:40pm)

SESSION CHAIR: Melanie Tory

Understanding Digital Note-Taking Practice for Visualization

Wesley Willett, Pascal Goffin, Petra Isenberg

Eye Tracking for Personal Visual Analytics

Kuno Kurzhals, Daniel Weiskopf

Characterizing Visualization Insights from Quantified-Selfers' Personal Data Presentations

Eun Kyoung Choe, Bongshin Lee, M. C. Schraefel

Engaging with Energy in the Informative Home: Challenges and opportunities for eco-feedback

Lyn Bartram

Design and Effects of Personal Visualizations

Shimin Wang, Yuzuru Tanahashi, Nick Leaf, Kwan-Liu Ma

Coffee Break (3:40pm-4:15 pm)

SUPPORTERS — Grand

Supporter Presentation Session ★

(4:15pm-5:55pm)

Tableau Research: 2015 in Review

Justin Talbot

Biology as a Design Space: Visualization at the Nanoscale

Merry Wang

Software-Defined and High-Fidelity Visualization — Towards Efficient Visualization Rendering on Intel Architecture

Ingo Wald

SciVis — State

Maps, Geometry and Terrain (4:15pm-5:55pm)

SESSION CHAIR: Ross Maciejewski

Planar Visualization of Treelike Structures J

Joseph Marino and Arie Kaufman

Interstitial and Interlayer Ion Diffusion Geometry Extraction in Graphitic Nanosphere Battery Materials J

Attila Gyulassy, Aaron Knoll, Kah Chun Lau, Bei Wang, Peer-Timo Bremer, Michael E. Papka, Larry A. Curtiss, and Valerio Pascucci

★ Recommended for Practitioners

Effectiveness of Structured Textures on Dynamically Changing Terrain-like Surfaces J
Thomas Butkiewicz and Andrew H. Stevens

TelCoVis: Visual Exploration of Co-occurrence in Urban Human Mobility Based on Telco Data J
Wenchao Wu, Jiayi Xu, Haipeng Zeng, Yixian Zheng, Huamin Qu, Bing Ni, Mingxuan Yuan, and Lionel M. Ni

VAST — Red

Uncertainty, Correlation, and Causality
(4:15pm-5:55pm)
SESSION CHAIR: Laura McNamara

Visual Correlation Analysis of Numerical and Categorical Data on the Correlation Map T
Zhiyuan Zhang, Kevin T. McDonnell, Erez Zadok, Klaus Mueller

The Visual Causality Analyst: An Interactive Interface for Causal Reasoning J
Jun Wang and Klaus Mueller

The Role of Uncertainty, Awareness, and Trust in Visual Analytics J
Dominik Sacha, Hansi Senaratne, Bum Chul Kwon, Geoffrey Ellis, and Daniel A. Keim

An Uncertainty-Aware Approach for Exploratory Microblog Retrieval J
Mengchen Liu, Shixia Liu, Xizhou Zhu, Qinying Liao, Furu Wei, and Shimei Pan

Panel — Empire

(4:15pm-5:55pm)
Could Visualization Provide a Pathway to STEM?
Vetria Byrd (organizer), Donna Cox, Michael Smith, Joseph Cottam

Visualization is fundamental in understanding and analyzing complex data from all aspects and most disciplines of research and scholarship. Using visualization, researchers convert raw, simulated or observed information into a graphical format. The need to diversify a field with such far-reaching influences is imperative. This panel brings together a diverse group of visualization scientists. The main goal of the panel is to facilitate a timely discussion in VisWeek 2015 about potential mechanisms to broaden participation of women and members of underrepresented groups in visualization for the purpose of encouraging more diversity in the field of visualization. As a secondary benefit, this panel will raise awareness about efforts that are being made to broaden participation in visualization.

VIS Fast Forward (Thur+Fri)
(6:15pm-7:00pm) — Red

Exhibits & Poster Viewing
(7:00pm-8:00pm) — Exhibit

VIS Banquet and Awards
(7:30pm-10:00pm) — Grand State

WEDNESDAY

Thursday, 29 October

InfoVis — Grand

Human Reasoning (8:30am-10:10am)
SESSION CHAIR: Wesley Willett

How do People Make Sense of Unfamiliar Visualization?: A Grounded Model of Novice's Information Visualization Sensemaking J
Sukwon Lee, Sung-Hee Kim, Ya-Hsin Hung, Heidi Lam, Youn-ah Kang, and Ji Soo Yi

Learning Visualizations by Analogy: Promoting Visual Literacy through Visualization Morphing T
Puripant Ruchikachorn, Klaus Mueller

Acquired Codes of Meaning in Data Visualization and Infographics: Beyond Perceptual Primitives J
Lydia Byrne, Daniel Angus, and Janet Wiles

Beyond Memorability: Visualization Recognition and Recall J
Michelle A. Borkin, Zoya Bylinskii, Nam Wook Kim, Constance May Bainbridge, Chelsea S. Yeh, Daniel Borkin, Hanspeter Pfister, and Aude Oliva

Improving Bayesian Reasoning: The Effects of Phrasing, Visualization, and Spatial Ability J
Alvitta Ottley, Evan M. Peck, Lane T. Harrison, Daniel Afergan, Caroline Ziemkiewicz, Holly A. Taylor, Paul K. J. Han, and Remco Chang

SciVis — State

Interfaces, Languages and Systems
(8:30am-10:10am)
SESSION CHAIR: Yingcai Wu

Diderot: a Domain-Specific Language for Portable Parallel Scientific Visualization and Image Analysis J
Gordon Kindlmann, Charisee Chiw, Nicholas Seltzer, Lamont Samuels, and John Reppy

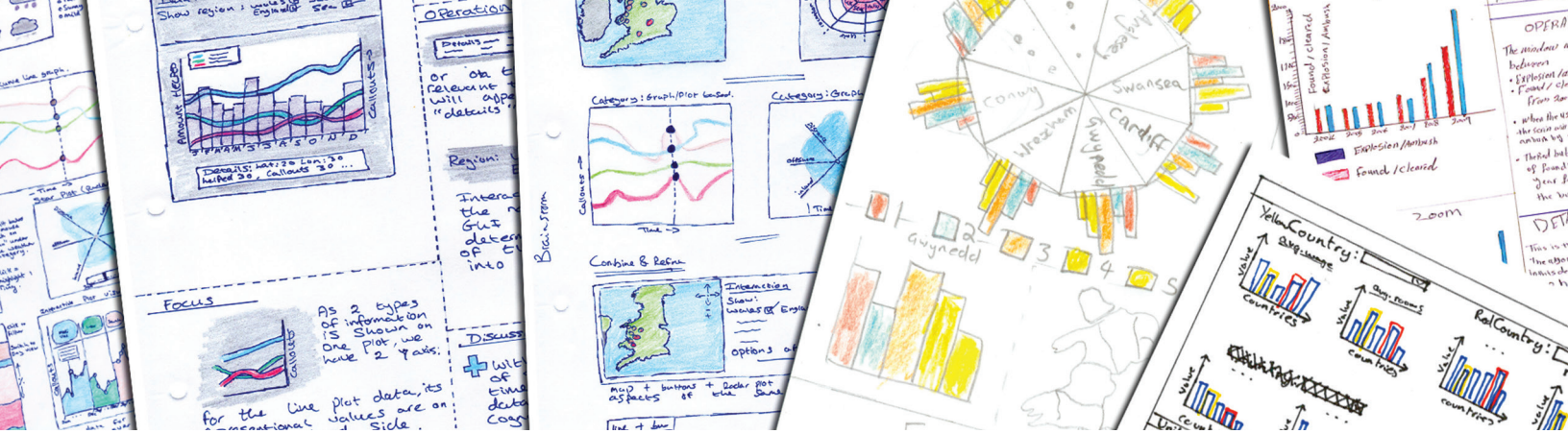
Visualization-by-Sketching: An Artist's Interface for Creating Multivariate Time-Varying Data Visualizations J
David Schroeder and Daniel F. Keefe

CAST: Effective and Efficient User Interaction for Context-Aware Selection in 3D Particle Clouds J
Lingyun Yu, Konstantinos Efstathiou, Petra Isenberg, and Tobias Isenberg

Intuitive Exploration of Volumetric Data Using Dynamic Galleries J
Daniel Jönsson, Martin Falk, and Anders Ynnerman

Scalable Parallel Distance Field Construction for Large-Scale Applications T
Hongfeng Yu, Jinrong Xie, Kwan-Liu Ma, Hemanth Kolla, Jacqueline H. Chen

THURSDAY



THURSDAY

VAST — Red

Visual Analytics of Textual Data (I)
(8:30am-10:10am)
SESSION CHAIR: Patricia Crossno

Visual Analysis and Dissemination of Scientific Literature Collections with SurVis J
Fabian Beck, Sebastian Koch, and Daniel Weiskopf

CiteRivers: Visual Analytics of Citation Patterns J
Florian Heimerl, Qi Han, Steffen Koch, and Thomas Ertl

Interactive Visual Profiling of Musicians J
Stefan Jänicke, Josef Focht, and Gerik Scheuermann

VAiRoma: A Visual Analytics System for Making Sense of Places, Times, and Events in Roman History J
Isaac Cho, Wenwen Dou, Derek Xiaoyu Wang, Eric Sauda, and William Ribarsky

Exploring Evolving Media Discourse Through Event Cueing J
Yafeng Lu, Michael Steptoe, Sarah Burke, Hong Wang, Ji-un-Yi Tsai, Hasan Davulcu, Douglas Montgomery, Steven R. Corman, and Ross Maciejewski

Coffee Break (10:10am–10:30am)

InfoVis — Grand

Interactive Systems (10:30am-12:10pm)
SESSION CHAIR: Miriah Meyer

Suggested Interactivity: Seeking Perceived Affordances for Information Visualization J
Jeremy Boy, Louis Eveillard, Françoise Detienne, and Jean-Daniel Fekete

VectorLens: Angular Selection of Curves within 2D Dense Visualizations T
Maxime Dumas, Michael McGuffin, Patrick Chasse

Voyager: Exploratory Analysis via Faceted Browsing of Visualization Recommendations J
Kanit Wongsuphasawat, Dominik Moritz, Anushka Anand, Jock Mackinlay, Bill Howe, and Jeffrey Heer

VisDock: A Toolkit for Cross-Cutting Interactions in Visualization T
Jungu Choi, Deok Gun Park, Yuet Ling Wong, Eli Raymond Fisher, Niklas Elmqvist

Reactive Vega: A Streaming Dataflow Architecture for Declarative Interactive Visualization J
Arvind Satyanarayan, Ryan Russell, Jane Hoffswell, and Jeffrey Heer

SciVis — State

Vectors, Acceleration, and Hardware
(10:30am-12:10pm)
SESSION CHAIR: Gunther Weber

Explicit Frequency Control for High-Quality Texture-Based Flow Visualization C
Victor Matvienko, Jens Krueger

Feature-Based Tensor Field Visualization for Fiber Reinforced Polymers C
Valentin Zobel, Markus Stommel, Gerik Scheuermann

CPU Ray Tracing Large Particle Data with Balanced P-k-d Trees C
Ingo Wald, Aaron Knoll, Gregory P Johnson, Will Usher, Valerio Pascucci, Michael Papka

Auto-Calibration of Multi-Projector Displays with a Single Handheld Camera C
Sanghun Park, Hyunggoog Seo, Seunghoon Cha, Junyong Noh

VAST — Red

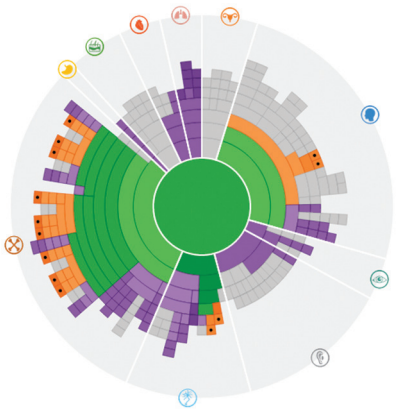
Visual Analytics of Social Media Data
(10:30am-12:10pm) ★
SESSION CHAIR: Jessie Kennedy

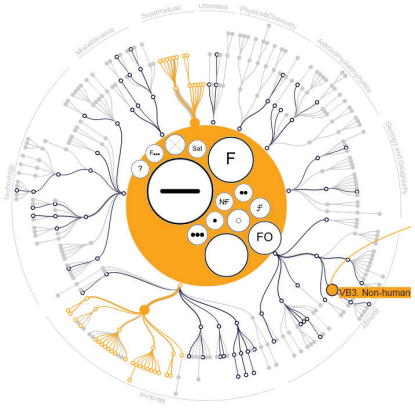
DemographicVis: Analyzing Demographic Information based on User Generated Content C
Wenwen Dou, Isaac Cho, Omar ElTayeby, Jaegul Choo, Bill Ribarsky

egoSlider: Visual Analysis of Egocentric Network Evolution J
Yanhong Wu, Naveen Pitipornvivat, Jian Zhao, Sixiao Yang, Guowei Huang, and Huamin Qu

Interactive Visual Discovering of Movement Patterns from Sparsely Sampled Geo-tagged Social Media Data J
Siming Chen, Xiaoru Yuan, Zhenhuang Wang, Cong Guo, Jie Liang, Zuchao Wang, Xiaolong (Luke) Zhang, and Jiawan Zhang

★ Recommended for Practitioners





TargetVue: Visual Analysis of Anomalous User Behaviors in Online Communication Systems J
Nan Cao, Conglei Shi, Sabrina Lin, Jie Lu, Yu-Ru Lin, and Ching-Yung Lin

EgoNetCloud: Event-based Egocentric Dynamic Network Visualization C
Qingsong Liu, Yifan Hu, Lei Shi, Xinzhu Mu, Yutao Zhang, Jie Tang

VISAP — Empire

Papers Track, Session II
(10:30am-12:10pm)
SESSION CHAIRS: Angus Forbes, Fanny Chevalier, Daria Tsoupikova

A Concise Taxonomy for Describing Data as an Art Material
Julie Freeman, Geraint Wiggins, Gavin Starks, and Mark Sandler

Ambiguous Topology: From Interactive to Pro-active Spatial Environments
Jia-Rey Chang, Nimish Biloria, and Dieter Vandoren

Lunch Break (12:10pm–2:00pm)

Digital Compass Blind Lunch
VIS 2016 Kick-off (open to all) — Empire

InfoVis — Grand

Techniques (2:00pm-3:40pm)
SESSION CHAIR: Nathalie Riche

Automatic Selection of Partitioning Variables for Small Multiple Displays J
Anushka Anand and Justin Talbot

A Simple Approach for Boundary Improvement of Euler Diagrams J
Paolo Simonetto, Daniel Archambault, and Carlos Scheidegger

AggreSet: Rich and Scalable Set Exploration using Visualizations of Element Aggregations J
M. Adil Yalcın, Niklas Elmqvist, and Benjamin B. Bederson

UnTangle Map: Visual Analysis of Probabilistic Multi-Label Data T
Nan Cao, Yu-Ru Lin, David Gotz

A Linguistic Approach to Categorical Color Assignment for Data Visualization J
Vidya Setlur and Maureen C. Stone

SciVis — State

Multivariate and Tensor Visualization
(2:00pm-3:40pm)
SESSION CHAIR: Hongfeng Yu

Interactive Visualization for Singular Fibers of Functions f: R3->R2 J
Daisuke Sakurai, Osamu Saeki, Hamish Carr, Hsiang-Yun Wu, Takahiro Yamamoto, David Duke, and Shigeo Takahashi

Association Analysis for Visual Exploration of Multivariate Scientific Data Sets J
Xiaotong Liu and Han-Wei Shen

Mining Graphs for Understanding Time-Varying Volumetric Data J
Yi Gu, Chaoli Wang, Tom Peterka, Robert Jacob, and Seung Hyun Kim

Visualizing Tensor Normal Distributions at Multiple Levels of Detail J
Amin Abbasloo, Vitalis Wiens, Max Hermann, and Thomas Schultz

Adaptive Multilinear Tensor Product Wavelets J
Kenneth Weiss and Peter Lindstrom

Panel — Red

(2:00pm-3:40pm)
The Professional Ecology of Visualization
Laura McNamara (organizer), David Ebert, Brian Fisher, John Alexis Guerra-Gomez, Jean Scholtz

IEEE VIS comprises three co-located complementary but distinct conferences. SciVis focuses on visualizing science data, while InfoVis visualizes abstract information and VAST takes a scientific approach to understanding analysis processes. This panel considers an alternative taxonomy based on the institutional situation of the researcher/developer; i.e., their "ecological niche" in the field. Our panelists represent visualization practice in three key "ecological niches" that span the SciVis, InfoVis and VAST communities: government, industry, and academia. Together, we would like to explore the identity and practices of the "visualization researcher" in each of these niches, comparing and contrasting experience to understand the permutations of VIS knowledge in our various professional environments.

Panelists include two government researchers who work with government clients, two interactive information visualization

T TVCG paper J Journal paper, proceedings special issue C Conference track paper

researchers representing the commercial sector, and two university researchers with experience collaborating with counterparts in the previously mentioned two niches. We draw on our collective professional experience to open a conversation about the role of professional and institutional affiliation as shaping forces in the practice and products of our research.

CG&A — Empire

Application-Tailored Visualizations
(2:00pm-3:40pm) ★
SESSION CHAIR: Miguel Encarnação

Visual Analytics for Early-Phase Complex Engineered System Design Support
Rahul C. Basole, Ahsan Qamar, Hyunwoo Park, Christiaan J.J. Paredis, Leon F. McGinnis

A Graph-based Method to Detect Rare Events: An Application to Identify Pathologic Cells
Enikö Székely, Arnaud Sallaberry, Faraz Zaidi, Pascal Poncelet

Knowledge-Assisted Ranking: A Visual Analytic Application for Sport Event Data
David H. S. Chung, Matthew L. Parry, Iwan W. Griffiths, Robert S. Laramee, Rhodri Bown, Philip A. Legg, Min Chen

Visualizing Personal Progress in Participatory Sports Cycling Events
Jo Wood

Interactive Visual Analysis of Heterogeneous Cohort Study Data
Paolo Angelelli, Steffen Oeltze, Judit Haász, Cagatay Turkay, Erlend Hodneland, Arvid Lundervold, Astri J. Lundervold, Bernhard Preim, Helwig Hauser

Coffee Break (3:40pm-4:15 pm)

InfoVis — Grand

Multidimensional Visualization (4:15pm-5:55pm)
SESSION CHAIR: Marian Dörk

Off the Radar: Comparative Evaluation of Radial Visualization Solutions for Composite Indicators J
Yael Albo, Joel Lanir, Peter Bak, and Sheizaf Rafaeli

Evaluation of Parallel Coordinates: Overview, Categorization and Guidelines for Future Research J
Jimmy Johansson and Camilla Forsell

Orientation-Enhanced Parallel Coordinate Plots J
Renata Georgia Raidou, Martin Eisemann, Marcel Breeuwer, Elmar Eisemann, and Anna Vilanova

Visualizing Multiple Variables Across Scale and Geography J
Sarah Goodwin, Jason Dykes, Aidan Slingsby, and Cagatay Turkay

Panel — State

(4:15pm-5:55pm)
Vis, The Next Generation: Teaching Across the Researcher-Practitioner Gap
Marti A. Hearst (organizer), Eytan Adar (organizer), Robert Kosara, Tamara Munzner, Jon Schwabisch, Ben Shneiderman

Information visualization has escaped the research lab and is now widely used by practitioners across a wide spectrum of fields. New software tools and programming frameworks appear on a monthly basis. New design paradigms are rapidly gaining acceptance and evolving. At the same time, methods for teaching in the classroom and beyond are being challenged and influenced by online offerings such as Khan Academy and Massive Open Online Courses (MOOCs), the adoption of flipped classrooms, and the adaptation of instructional environments used in other communities. Pedagogy geared towards mastery learning that makes use of active learning and peer learning are being introduced in more and more contexts, reflecting the results of decades of research showing the benefits of these techniques, as well as their suitability for today's connected students who expect a more interactive learning experience. As the role of information visualization grows and changes in the world of practice, new methods are needed to teach this dynamic topic. This panel brings together experts with different perspectives to talk about how they are rising to the challenge to teach information visualization in this new world.

VAST — Red

Visual Analytics in Design and Development
(4:15pm-5:55pm)
SESSION CHAIR: Kelly Gaither

FPSSeer: Visual Analysis of Game Frame Rate Data C
Quan Li, Peng Xu, Huamin Qu

LiteVis: Integrated Visualization for Simulation-Based Decision Support in Lighting Design J
Johannes Sorger, Thomas Ortner, Christian Luksch, Michael Schwarzler, Eduard Groller, and Harald Piringer

Comparative Visual Analysis of Vector Field Ensembles C
Mihaela Jarema, Ismail Demir, Johannes Kehrer, Rüdiger Westermann

Interactive Visual Steering of Hierarchical Simulation Ensembles C
Rainer Splechtna, Kresimir Matkovic, Denis Gracanin, Mario Jelovic, Helwig Hauser

Urbane: A 3D Framework to Support Data Driven Decision Making in Urban Development C
Nivan Ferreira, Marcos Lage, Harish Doraiswamy, Huy Vo, Luc Wilson, Heidi Werner, Muchan Park, Cláudio T. Silva

VIS

SciVis Contest — Empire
(4:15pm-5:55pm)

★ Recommended for Practitioners

Friday, 30 October

InfoVis — Grand

Time (8:30am-10:10am)

SESSION CHAIR: Adam Perer

Visual Encodings of Temporal Uncertainty: A Comparative User Study J
Theresia Gschwandtner, Markus Bögl, Paolo Federico, and Silvia Miksch

TimeNotes: A Study on Effective Chart Visualization and Interaction Techniques for Time-Series Data J
James Walker, Rita Borgo, and Mark W. Jones

Time Curves: Folding Time to Visualize Patterns of Temporal Evolution in Data J
Benjamin Bach, Conglei Shi, Nicolas Heulot, Tara Madhyastha, Tom Grabowski, and Pierre Dragicevic

An Efficient Framework for Generating Storyline Visualizations from Streaming Data T
Yuzuru Tanahashi, Chien-Hsin Hsueh, Kwan-Liu Ma

ThemeDelta: Dynamic Segmentations over Temporal Topic Models T
Samah Gad, Waqas Javed, Sohaib Ghani, Niklas Elmqvist, Tom Ewing, Keith N. Hampton, Naren Ramakrishnan

SciVis — State

Biomedical and Molecular Visualization (II) (8:30am-10:10am)

SESSION CHAIR: Gordon Kindlmann

AnimoAminoMiner: Exploration of Protein Tunnels and their Properties in Molecular Dynamics J
Jan Byka, Mathieu Le Muzic, M. Eduard Gröller, Ivan Viola, and Barbora Kozlíková

Exploration of the Brain's White Matter Structure through Visual Abstraction and Multi-Scale Local Fiber Tract Contraction T
Maarten H. Everts, Henk Bekker, Jos B.T.M. Roerdink, Tobias Isenberg

Cluster Analysis of Vortical Flow in Simulations of Cerebral Aneurysm Hemodynamics J
Steffen Oeltze-Jafra, Juan R. Cebral, Gábor Janiga, and Bernhard Preim

VAST — Red

Visual Analytics of Textual Data (II) (8:30am-10:10am)

SESSION CHAIR: Margit Pohl

TimeLineCurator: Interactive Authoring of Visual Timelines from Unstructured Text J
Johanna Fulda, Matthew Brehmer, and Tamara Munzner

BiSet: Semantic Edge Bundling with Biclusters for Sensemaking J
Maoyuan Sun, Peng Mi, Chris North, and Naren Ramakrishnan

FeatureInsight: Visual Support for Error-Driven Feature Ideation in Text Classification C
Michael Brooks, Saleema Amershi, Bongshin Lee, Steven Drucker, Ashish Kapoor, Patrice Simard

Task-Driven Comparison of Topic Models J
Eric Alexander and Michael Gleicher

CG&A — Empire

Business Intelligence Visualization and Displays (8:30am-10:10am)

SESSION CHAIR: Theresa-Marie Rhyne

The Reality Deck - Immersive Gigapixel Display
Charilaos Papadopoulos, Kaloian Petkov, Arie E. Kaufman, Klaus Mueller

Visual Business Ecosystem Intelligence: Lessons from the Field
Rahul C. Basole

Visualization Beyond the Desktop - the next big thing
Jonathan C. Roberts, Panagiotis D. Ritsos, Sriram Karthik Badam, Dominique Brodbeck, Jessie Kennedy, Niklas Elmqvist

From Data to Insight: Work Practices of Analysts in the Enterprise
Eser Kandogan, Aruna Balakrishnan, Eben M. Haber, Jeffrey S. Pierce

Business Intelligence from Social Media: A Study from the VAST Box Office Challenge
Yafeng Lu, Feng Wang, Ross Maciejewski

Coffee Break (10:10am–10:30am)

VIS Capstone (10:30am-11:30pm)

Grand & State

SPEAKER: Molly Wright Steenson

Architectures Physical and Digital

How do computer architectures and physical architectures inform each other? This talk will explore the interconnection of data and visualization through an architectural and computational lens over the last 50 years, including the work of Steven Coons, Christopher Alexander, Richard Saul Wurman and others.

VIS Closing (11:30am-12:00pm)

CHAIRS: Michael E. Papka and Maxine D. Brown and
VIS 2016 CHAIR: Terry Yoo

T TVCG paper J Journal paper, proceedings special issue C Conference track paper

VIS POSTERS

Correlation Analysis in Multidimensional Multivariate Time-varying Datasets, Najmeh Abedzadeh

Teaching Information Visualization: A Playground for Classroom Response Systems and Declarative Programming Projects, Volker Ahlers

Visual Scalability of Spatial Ensemble Uncertainty, Sujan Anreddy, Song Zhang, Andrew Mercer, Janie Dyer, J. Edward Swan II

Exploring Data For Fun And Profit: Case Study of Jeopardy!, Joshua Appleman, Anubhav Gupta, Anand Rajagopal, Juan Shishido, Marti A. Hearst

Pixel-oriented Visualization for Analyzing Classical Latin Texts, Bharathi Asokarajan, June Abbas, Sam Huskey, Chris Weaver

"Show Me Data." Observational Study of a Conversational Interface in Visual Data Exploration. Jillian Aurisano, Abhinav Kumar, Alberto Gonzales, Khairi Reda, Jason Leigh, Barbara Di Eugenio, Andrew Johnson

AlignmentVis: Visual Analytics for Ontology Matching, Jillian Aurisano, Amruta Nanavaty, Isabel F. Cruz

NetworkCube: Bringing Dynamic Network Visualizations to Domain Scientists, Benjamin Bach, Nathalie Henry Riche, Roland Fernandez, Emmanoulis Giannisakis, Bongshin Lee, Jean-Daniel Fekete

Visualization of Hierarchical Communities in Large Scale Networks, Adrien Baland, Raghvendra Mall, Rocco Langone, Johan Suykens

Supporting Crime Analysis through Visual Design, Roger Beecham, Jason Dykes, Aidan Slingsby, Cagatay Turkay

OpenSpace: Public Dissemination of Space Mission Profiles, Alexander Bock, Michal Marcinkowski, Joakim Kilby, Carter Emmart, Anders Ynnerman

Visually and Statistically Guided Imputation of Missing Values in Univariate Seasonal Time Series, M. Bögl, W. Aigner, P. Filzmoser, T. Gschwandtner, T. Lammarsch, S. Miksch, A. Rind

Path Maps: Visualization of Trajectories in Large-Scale Temporal Data, David Borland, Eugenia McPeek Hinz, Leigh Ann Herhold, Vivian L. West, W. Ed Hammond

StreamVisND: Visualizing Relationships in Streaming Multivariate Data, Shenghui Cheng, Yue Wang, Dan Zhang, Zhifang Jiang, Klaus Mueller

3D Superquadric Glyphs for Visualizing Myocardial Motion, Teodora Chitiboi, Mathias Neugebauer, Susanne Schnell, Michael Markl, Lars Linsen

A Software Developer's Guide to Informal Evaluation of Visual Analytics Environments Using VAST Challenge Information, Kristin Cook, Jean Scholtz, Mark A. Whiting

Visualizing the Scale of World Economies, Owen Cornec, Romain Vuillemot

Discrepancies in the Intention and Interpretation of Sketchy Visualizations, Emily S. Cramer, Lyn Bartram, Jill N. Warren

Hands On, Large Display Visual Data Exploration, Andrew Dai, Ramik Sadana, Charles D. Stolper, John Stasko

HTMVS: Visualizing Hierarchical Topics and Their Evolution, Haoling Dong, Siliang Tang, Si Li, Fei Wu, Yueting Zhuang

DVIZ: A Model-driven Visualization Generation System, Yi Du, Qianyu Liu, Yuanchun Zhou, Jianhui Li

IVACS - Interactive Visual Analytics for Cyber Security, James Elder, Eng-Jon Ong, Richard Bowden

Real-Time Interactive Time Correction on the GPU, Mai Elshehaly, Denis Graanin, Mohammed Gad, Junpeng Wang, Hicham G. Elmongui

Reorder.js: A JavaScript Library to Reorder Tables and Networks, Jean-Daniel Fekete

Interactive Semi-Automatic Categorization for Spinel Group Minerals, María Luján Ganuza, María Florencia Gargiulo, Gabriela Ferracutti, Silvia Castro, Ernesto Bjerg, M. Eduard Gröller, Kresimir Matkovi

Toward Using Matrix Visualizations for Graph Editing, Stefan Gladisch, Heidrun Schumann, Martin Luboschik, Christian Tominski

Mapping Tasks to Interactions for Graph Exploration and Editing, Stefan Gladisch, Ulrike Kister, Christian Tominski, Raimund Dachselt, Heidrun Schumann

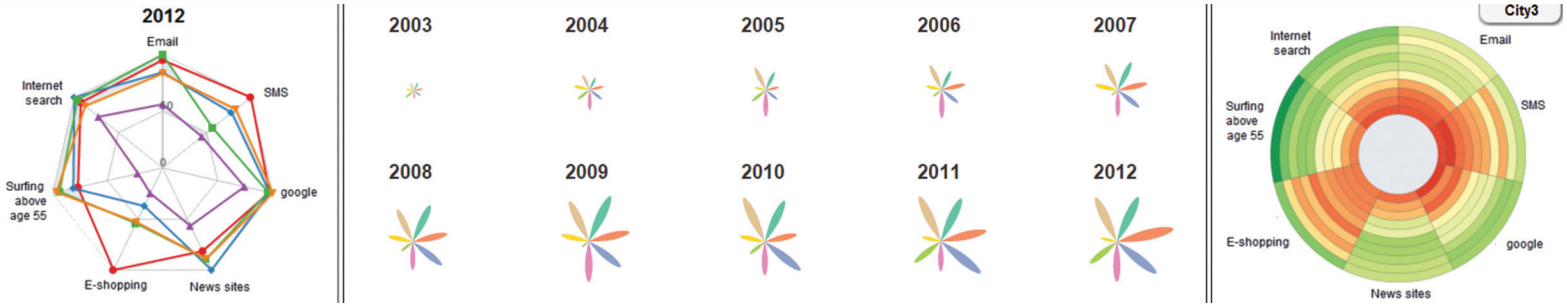
Drawing Data on Maps: Sketch-Based Spatiotemporal Visualization, Alex Godwin, John Stasko

Design Considerations for Enhancing Word-Scale Visualizations with Interaction, Pascal Goffin, Wesley Willett, Jean-Daniel Fekete, Petra Isenberg

Visualizing Crossing Probabilistic Tracts, Mathias Goldau, André Reichenbach, Mario Hlawitschka

Caleydo Web: An Integrated Visual Analysis Platform for Biomedical Data, Samuel Gratzl, Nils Gehlenborg, Alexander Lex, Hendrik Strobelt, Christian Partl, Marc Streit

Where Can I Go From Here? Drawing Contextual Navigation Maps of the London Underground, Cameron C. Gray, Jonathan C. Roberts, Panagiotis D. Ritsos



Examining the Many Faces of Selection, Emily K. Grimes, Chris Weaver

Exploring Temporal Granularities with Visualization, Rafael Henkin, Aidan Slingsby, Jason Dykes

An Evaluation of Three Methods for Visualizing Uncertainty in Architecture and Archaeology, Scott Houde, Shelia Bonde, David H. Laidlaw

A Web-based Large-scale Timelapse Editor for Creating and Sharing Guided Video Tours and Interactive Slideshows, Yen-Chia Hsu, Paul Dille, Randy Sargent, Christopher Bartley, Illah Nourbakhsh

Visualizing Fine-Grained Memory Accesses using Linked Software and Hardware Views, Benafsh Husain, Alfredo Giménez, Todd Gamblin, Peer-Timo Bremer, Joshua A. Levine

A System for Visual Exploration of Caution Spots from Vehicle Recorder Data, Masahiko Itoh, Daisaku Yokoyama, Masashi Toyoda, Masaru Kitsuregawa

Multiresolution Visualization of Digital Earth Data via Hexagonal Box-Spline Wavelets, Mohammad Imrul Jubair, Usman Alim, Niklas Roeber, John Clyne, Ali Mahdavi-Amiri, Faramarz Samavati

Easy Screens and Play: A Library for Information Visualization on Tiled display Environments, Younghun Jung, Geongi Gim, Myeongjae Kim, Yejin Kim, Kwangyun Wohn

Comparative Visualization of Personal Beer Taste, Tanyoung Kim

Informing Non-Response Bias Model Creation in Social Surveys with Visualisation, Kaisa Lahtinen, Aidan Slingsby, Jason Dykes, Sarah Butt, Rory Fitzgerald

Research Trend Case Study: For Understanding Interdisciplinary Keywords in South Korea, Jihye Lee, Geon Hur, Yongkyun Lee, Yerin Ga, LeeKyung Hong, Kyungwon Lee

Stories in the Data: A Multimodal Analysis on the Threshold of Data Journalism and Narrative Visualisation, Eugenia Lee

Automated Visualization Workflow for Simulation Experiments, Jonathan P. Leidig, Santhosh Dharmapuri

Visual Analytics for Fraud Detection and Monitoring, Roger A. Leite, Theresia Gschwandtner, Silvia Miksch, Erich Gstrein, Johannes Kuntner

A Bottom-Up Scheme for User-Defined Feature Exploration in Vector Field Ensembles, Richen Liu, Hanqi Guo, Xiaoru Yuan

An Initial Study on Assessing Comprehension of Information Visualization with the Sentence Verification Technique, Mark A. Livingston, Derek Brock, Dennis Perzanowski, Tucker Maney, Wende Frost

A Proposed Multivariate Visualization Taxonomy from User Data, Mark A. Livingston, Jonathan W. Decker, Zhuming Ai

Visualizing Large Networks Using BioTapestry and BioFabric, William J.R. Longabaugh

Visual Analysis of Route Choice Behaviour based on GPS Trajectories, Min Lu, Chufan Lai, Tangzhi Ye, Jie Liang, Xiaoru Yuan

Interactive Visualization of Provenance Graphs for Reproducible Biomedical Research, Stefan Luger, Holger Stitz, Samuel Gratzl, Nils Gehlenborg, Marc Streit

Visualizing User's Experience to Support Real Time Decision-Making in Urban Transportation Systems, David Manzano, Juan Salamanca, Carlos Arce-Lopera

SMART Series: Sketch-based Matching through Approximated Ratios in Time Series, Prithiviraj K. Muthumanickam, Katerina Vrotsou, Matthew Cooper, Jimmy Johansson

PathlinesExplorer Image-based Exploration of Large-Scale Pathline Fields, Omniah H. Nagoor, Markus Hadwiger, Madhusudhanan Srinivasan

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Redundant Coding Can Improve Segmentation in Multiclass Displays, Christine Nothelfer, Michael Gleicher, Steven Franconeri

Ecological Validity in Quantitative User Studies - A Case Study in Graph Evaluation, Mershack Okoe, Radu Jianu

Micro Visualizations: Data-driven Typography and Graphical Text Enhancement, Jonas Parnow, Marian Dörk

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Using Visualization and Analysis with Efficient Dimension Reduction to Determine Underlying Factors in Hospital Inpatient Procedure Costs, Miriam Perkins, Yanlai Chen

Topicks: Visualizing Complex Topic Models for User Comprehension, Jessica Peter, Steve Szigeti, Sara Diamond

AdaptiveNav: Adaptive Discovery of Interesting and Surprising Nodes in Large Graphs, Robert Pienta, Zhiyuan Lin, Minsuk Kahng, Jilles Vreeken, Partha P. Talukdar, James Abello, Ganesh Parameswaran, Duen Horng (Polo) Chau

TimeStitch: Interactive Multi-focus Cohort Discovery and Comparison, Peter J. Polack, Shang-Tse Chen, Minsuk Kahng, Moushumi Sharmin, Duen Horng Chang

ORCAESTRA: Organizing News Comments using Aspect, Entity and Sentiment Extraction, Radityo Eko Prasojo, Fariz Darari, Mouna Kacimi

WESt: Visualizing non-Emergency Surgery Wait Times, Fateme Rajabiyazdi, Charles Perin, Sheelagh Carpendale

Tell Me What Do You See: Detecting Perceptually-Separable Visual Patterns via Clustering of Image-Space Features in Visualizations, Khairi Reda, Alberto González, Jason Leigh, Michael E. Papka

Sequencing of Categorical Time Series, Christian Richter, Martin Luboschik, Martin Röhlig, Heidrun Schumann

Multi-Perspective Synopsis with Faceted Views of Varying Emphasis, Chris Rooney, Roger Beecham, Jason Dykes, Cagatay Turkay, Aidan Slingsby, Jo Wood, William Wong

What Are They Doing? : Real-time Analysis of Eye-Tracking Data., Sayeed Safayet Alam, Radu Jianu

Visual Pruner: Visually Guided Cohort Selection for Observational Studies, Lauren R. Samuels, Robert A. Greevy, Jr.

uRank: Visual Analytics Approach for Search Result Exploration, Cecilia di Sciascio, Vedran Sabol, Eduardo Veas

Storyline Visualization with Force Directed Layout, Shejuti Silvia, June Abbas, Sam Huskey, Chris Weaver

Evolution Inspector: Interactive Visual Analysis for Evolutionary Molecular Design, Veronika Solteszova, Marco Foscato, Sondre H. Eliasson, Vidar R. Jensen

Coordinated Interactive Scatterplots for Comparative Gaze Analysis with Volumetric Medical Images, Hyunjoo Song, Jeongjin Lee, Tae Jung Kim, Kyoung Ho Lee, Bohyoung Kim, Jinwook Seo

Visualizing 3D Flow through Cutting Planes, Andrew H. Stevens, Colin Ware

ThermalPlot: Visualizing Multi-Attribute Time-Series Data Using a Thermal Metaphor, Holger Stitz, Samuel Gratzl, Wolfgang Aigner, Marc Streit

Inviwo - An Extensible, Multi-Purpose Visualization Framework, Erik Sundén, Peter Steneteg, Sathish Kottravel, Daniel Jönsson, Rickard Englund, Martin Falk, Timo Ropinski

Trending Pool: Visual Analytics for Trending Event Compositions for Time-Series Categorical Log Data, Yi-Chih Tsai, Liang-Chi Hsieh, Wen-Feng Cheng, Yin-Hsi Kuo, Winston Hsu, Wen-Chin Chen

Visual Representations for Uncertain Temporal Information of Archaeological Sites, Andrea Unger, Katrin Kermas, Doris Dransch

Visualization for Equity Analysts: Using the DSM in Stock Picking, Sergi Vives, Jason Dykes, Andrew Merryweather

Hyperbolic Dependency Tree Visualization for Parser Evaluation, Le Wang, Yue Zhang, Lei Shi

Visual Data Quality Analysis for Taxi GPS Data, Zuchao Wang, Xiaoru Yuan, Tangzhi Ye, Youfeng Hao, Siming Chen, Jie Liang, Qiusheng Li, Haiyang Wang, Yadong Wu

Plotting Programming Trajectories with the NetLogo Data Explorer, David Weintrop, Bryan Head, Uri Wilensky

Drawing Things Together: Supporting Information Visualizations' Coherence across Multiple Views, Florian Windhager, Günther Schreder, Michael Smuc, Eva Mayr

SEQIT: Visualizing Sequences of Interest in Eye Tracking Data, Michael M.A. Wu, Tamara Munzner

Texture-Based Edge Bundling for Graph Visualization, Jieting Wu, Hongfeng Yu

Visualization of Job Execution Data at Long Timescales, Adam D. Young, Michael E. Papka

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High Performance Flow Field Visualization with High-Order Access Dependencies, Jiang Zhang, Hanqi Guo, Xiaoru Yuan

VISUALIZATION IN PRACTICE POSTERS

✶ **Scientific Visualization for Space Science Data Analysis in Collaborative Virtual Reality Environments,** Wito Engelke, Arturo S. Garcia, Robin Wolff, Christian Bar, Terrence Fernando, David J. Roberts, and Andreas Gerndt

✶ **TellFinder: Discovering Related Content in Big Data,** Eric Hall, Chris Dickson, David Schroh and William Wright

✶ **Exploring Anomalous Behavior in Wireless Networks with Visual Analytics,** Veena Mendiratta, Vijay K. Gurbani, Chitra Phadke, and Angelo Migliosi

✶ **Global to Local Pattern of Life Analysis with Tile-Based Visual Analytics,** Scott Langevin, David Jonker, Kevin Birk, Chris Bethune, and Nathan Kronenfeld

✶ **Challenges in Creating Task-Tailored Dashboards for the Automotive Industry,** Stephan Pajer and Harald Piringer

✶ **DoD HPC User Level Distributed Visualization and Analysis,** Rhonda J. Vickery and Matthew J. Grismer

✶ **Visualizing Natural History in The Field Museum EMu Database,** Kate Webbink, Marc Lambruschi, and Sharon Grant

VIZSEC SYMPOSIUM POSTERS

CyberViz: A Tool for Trustworthiness Visualization of Projected Cyber Threats, Ewart de Visser, Alix Dorfman, Marvin Cohen, Niraj Srivastava, Christopher Eck and Suzanne Hassell

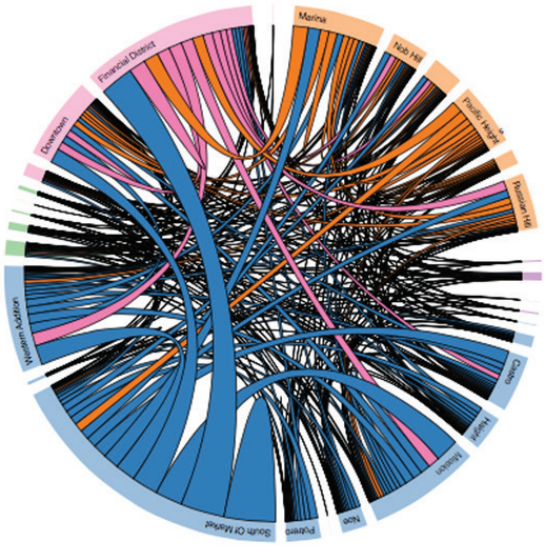
Visualization of Network Security Policy Evaluation, Bastian Hellmann, Marcel Reichenbach, Leonard Renners and Volker Ahlers

Hall Monitor: An interactive visualization to monitor "who goes where" on the network, Cody Fulcher and Diane Staheli

V3SPA: An IDE and Visualization Environment for SELinux Security Policy Abstractions, Robert Gove, Christopher Wacek, Matthew Oertle and Jeffrey Karrels

VEGAS: Visualizing, Exploring and Grouping AlertS, Damien Cremilleux, Frédéric Majorczyk, and Nicolas Prigent

Visible Hardware Security Techniques, Mehrdad Zaker Shahrak and Sheng Wei



LDAV SYMPOSIUM POSTERS

Vispark: GPU-Accelerated Distributed Visual Computing Using Spark, Woohyuk Choi, Won-Ki Jeong

Fuzzy Clustering of Network Traffic Features for Security, Terrence P. Fries

Skdive: An Interactive Data Visualization Engine, Jarek Gryz, Parke Godfrey, Piotr Lasek, Nasim Razavi

ViQAP: Visualizing Quality Aspects of Public Transportation between Cities in a Region, Aamir Islam, Ragaad AlTarawneh, Shah Rukh Humayoun, Sascha Baron, Achim Ebert

Streaming Ultra High Resolution Images to Large Tiled Display at Nearly Interactive Frame Rates with vl3, Jie Jiang, Mark Hereld, Joseph Insley, Michael E. Papka, Silvio Rizzi, Thomas Uram, Venkatram Vishwanath

Distributed Aggregate Computation between Server and Client for Interactive Visualization, Xinxiao Li, Kuroda Akira, Hidenori Matsuzaki, Nobuyasu Nakajima

Advanced Aggregate Computation for Large Data Visualization, Xinxiao Li, Kuroda Akira, Hidenori Matsuzaki, Nobuyasu Nakajima

CEDARS: Combined Exploratory Data Analysis Recommender System, Mark A. Livingston, Stephen Russell, Jonathan W. Decker, Eric Leadbetter, Antonio Gilliam

Large-Scale Co-Visualization for LAMMPS using vl3, Silvio Rizzi, Mark Hereld, Joseph Insley, Michael E. Papka, Thomas Uram, Venkatram Vishwanath

Tracking Space-Filling Structures in Turbulent Flows, Andrea Schnorr, Jens Henrik Göbbert, Torsten W. Kuhlen, Bernd Hentschel

✶ Recommended for Practitioners

VDS SYMPOSIUM POSTERS

Pathfinder: Visual Analysis of Paths in Heterogeneous Graphs, Christian Partl, Samuel Gratzl, Marc Streit, Hanspeter Pfister, Dieter Schmalstieg, Alexander Lex

NetSet: Interactive Visualization for Analyzing Set in Large Network, Heungseok Park, Hongjun Lim, Kyungwon Lee

Seeing The Web of Microbes, Annette Greiner, Trent Northen, Suzanne Kosina, Richard Baran, Benjamin Bowen, Stefan Jenkins, Tami Swenson

Internet Review Opinion Mining utilizing Opinion Mining and Data Visualization, Seongmin Mun, Ginam Kim, Raja Mubashar Karim, Kyungwon Lee

Interactive Exploration and Verification of Latent Factor in Large Scale Biophysical Networks, Yosuke Onoue, Naohisa Sakamoto, Koji Koyamada

Visual Analytics System for Finding a Causal Relationship between Physical Quantities from Multivariate Volume Datasets, Naohisa Sakamoto, Zhao Kun, Koji Koyamada

Minerva Taxi: Interacting with the Social Media and Transportation Landscape of Cities at Scale on the Web, David Manthey, Roni Choudhury, Jeffrey Baumes, Jonathan Beezley, Aashish Chaudhary

Show me the Spot : Mapping & Parallel Visualization of Traffic Accident Pattern Analysis in Highway, Sang bin Han, Ba rom Kang, Seong yeop Han, Jin ki Kim, Kyung won Lee

Interactive Visualization for Interdisciplinary Research, Mohamed aly etman, Naomi Keena, Anna Dyson

VAST CHALLENGE

VAST CHALLENGE 2015: Mayhem at Dinofun World, Mark Whiting, Kristin Cook, Georges Grinstein, John Fallon, Kristen Liggett, Diane Staheli, Jordan Crouser

Award for Outstanding Comprehensive Submission
VAST Challenge 2015: Grand Challenge - Team VADER/VIS Award for Outstanding Comprehensive Submission, Michael Steptoe, Robert Krueger, Yifan Zhang, Xing Liang, Rolando Garcia, Sagarika Kadambi, Wei Luo, Thomas Ertl, Ross Maciejewski

Honorable Mention for Good Analysis of Subtle Signals
Using Visual Analytics to Provide Situation Awareness for Movement and Communication Data, Juri Buchmüller, Fabian Fischer, Dirk Streeb, Daniel A. Keim

Honorable Mention for Good Cross-Visualization Interactions
ParkVis: A Visual Analytic System for Anomaly Detection in DinoFun World, Siwei Fu, Yeuk-Yin Chan, Shaoyu Chen, Dongyu Liu, Abishek Puri, Tianyu Wang, Huamin Qu

Honorable Mention for Intuitive Design of Animation and Interaction
Interactive Analysis of Movement and Communication Data by Animation, Felix Brodkorb, Johannes Heucher, Eugen Dundukov

Award for Content-Rich Visualization
Applying Visual Analytics to Explore and Analyze Movement Data, Eren Cakmak, Thomas Hepp, Alexander Gärtner, Juri Buchmüller, Fabian Fischer, Daniel A. Keim

Award for Good Combination fo Analysis and Visualization to Solve the Challenge
KU Leuven Sakai, Ryo Sakai, Daniel Alcaide, Jan Aerts

Award for Integrated Analysis Environment
Middguard at DinoFun World, Christopher Andrews, Julian Billings

Honorable Mention for Good Support for Flexible and Collaborative Analysis
Behavior Analysis through Collaborative Visual Exploration on Trajectory Data, Tangzhi Ye, Youfeng Hao, Zhenhuang Wang, Chufan Lai, Siming Chen, Zongru Li, Jie Liang, Xiaoru Yuan

Honorable Mention for Outstanding Video
Bar-muda Triangle, James Skinner, Gabriel Rosser

Award for Compelling Analysis Supported by Strong Interaction
VAST Challenge 2015 Solver, Bowen Yu, Bo Zhou

Award for Strong Application of Advanced Analytic Techniques
Applying Advanced Analytic Techniques to Visually Explore Communication Patterns in Mobile Data, Juncai Li, Quan Wang, Pin Luo, Yuan Zeng, Ying Zhao, Fangfang Zhao

Honorable Mention for Compelling Narrative Debrief
VAST 2015 Challenge Mini-Challenge 2: DinofunVis, William Hatton, Jieqiong Zhao, Mahesh Babu Gorantla, Junghoon Chae, Benjamin Ahlbrand, Hanye Xu, Siqiao Chen, Guizhen Wang, Jiawei Zhang, Abish Malik, Sungahn Ko, David S. Ebert

Honorable Mention for Good Analysis with Custom Tools
A Collaborative Visual Analysis System for Communication Pattern Discovery, Jin Xu, Shuilin Ren, Yubo Tao, Hai Lin

Additional Submissions
Rapid Exploration and Analysis of VAST 2015 "Mini-Challenge 2" Dataset, Pranab Banerjee
Group Identification from Visitor Movement Data, Perakath Benjamin, Karthic Madanagopal, Kumar Akella, Kalyan Vadakkeveedu

Case Study of Dino Fun World Movement and Communication Data, Jordan Benson, Paul Vezzetti, Nascif Abousalh-Neto, Rajiv Ramarajan

Visualizing Movement in Theme Park, Yuanchao Cai, Karen Tay, Budi Winarta,Tin Seong Kam

Visual Analytics of Heterogeneous Data for Criminal Event Analysis, Junghoon Chae, Guizhen Wang, Benjamin Ahlbrand, Mahesh Gorantla, Jiawei Zhang, Siqiao Chen, Hanye Xu, Jieqiong Zhao, William Hatton, Abish Malik, Sungahn Ko, David Ebert

A Methodology for Classifying Visitors to an Amusement Park, Gustavo Dejean

ParkVis: A Visual Analytic System for Anomaly Detection in DinoFun World, Siwei Fu, Yeuk-Yin Chan, Shaoyu Chen, Dongyu Liu, Abishek Puri, Tianyu Wang, Huamin Qu

ParkVis: A Visual Analytic System for Anomaly Detection in DinoFun World, Siwei Fu, Yeuk-Yin Chan, Shaoyu Chen, Dongyu Liu, Abishek Puri, Tianyu Wang, Huamin Qu

Exploring Dinofun Park Happenings, Pascal Held, Chrstian Braune, Rudolf Kruse

On the Move at DinoFun World, Heike Hofmann, Dianne Cook, Eric Hare, Andee Kaplan, Vianey Leos-Barajas, Carson Sievert, Samantha Tyner

Visualizing Communication Patterns at DinoFun World, Heike Hofmann, Dianne Cook, Eric Hare, Andee Kaplan, Vianey Leos-Barajas, Carson Sievert, Samantha Tyner

Dynamic DinoFun World Communication Graph, Ting Li, Qi Liao

Eagleyes: Performing Data Analysis Using an Interactive Dataflow, Bin Liu, Gang Chen, Kun Dong, Lehong Fang

Exploring Trajectory Data Using ComVis CMV Tool, Kreimir Matkovi, Denis Graanin, Rainer Splechtna, Alexandra Diehl, Mai Elshehaly, Claudio Delrieux

Visual Analytics for Inspecting the Evolution of a Graph over Time: Pattern Discovery in a Communication Network, Bruno Schneider, Carmela Acevedo, Juri Buchmüller, Fabian Fischer, Daniel A. Keim

Using Visual Analytics to Analyze Movement and Action Patterns, Dirk Streeb, Udo Schlegel, Juri Buchmüller, Fabian Fischer, Daniel A. Keim

[COMM]gregater: A Toolset for Temporal Communication Patterns and Dynamic Network Structure, Hui Tang, Chao Pan, Bing Yu, Weidan Du, Yingjie Chen, Zhenyu Qian, Yu Zhu, Shuang Wei, Mingran Li, Chen Guo

Spectrum: A Visual Analytics Tool to Explore Movement Logs, Junpeng Wang, Ji Wang, Chris North

CrowdAnalyzer: A Collaborative Visual Analytic System, Shuang Wei, Kai Hu, Longjie Cheng, Hui Tang, Weidan Du, Chen Guo, Chao Pan, Yingjie(Victor) Chen, ZhenYu(Cherly) Qian, Yu Michael Zhu

ParkAnalyzer: Characterizing the Movement Patterns of Visitors, Jieqiong Zhao, Guizhen Wang, Junghoon Chae, Hanye Xu, Siqiao Chen, William Hatton, Sherry Towers, Mahesh Babu Gorantla, Benjamin Ahlbrand, Jiawei Zhang, Abish Malik, Sungahn Ko, David S. Ebert

Safety-Oriented Visual Analytics of People Movement, Jianlong Zhou, Jinjun Sun, Fang Chen, Xiuying Wang, Xianglin Miao

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VISKids Child Care Grants

This year, for the first time, the VIS conference is providing family grants to offset the travel and childcare costs of the youngest members of our community -- our VISKids!

Preference was given to students and early career attendees who are presenting at the conference. The application deadline for VIS 2015 was September 9, 2015.

VISKids Chairs: Petra Isenberg and Miriah Meyer

We wish to thank the following organizations for making VISKids possible:

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NOTE: There will be no conference-sponsored childcare services onsite at the meeting. The conference does not sanction or recommend specific childcare providers, and does not assume responsibility or liability for childcare services of any sort. It is the responsibility of the parent(s) to thoroughly investigate all childcare providers.

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DOCTORAL COLLOQUIUM 2016

CALL FOR PARTICIPATION

VIS 2016 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 scientific 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. The colloquium will be run as a single day invitation-only event at the beginning of IEEE VIS.

Questions? Email doctoral_coll@ieeevis.org

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